



# MALAYSIA INLAND WATERWAY TRANSPORT SYSTEM

IN SARAWAK



MALAYSIA INLAND WATERWAY  
**TRANSPORT SYSTEM**

I N S A R A W A K



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# Foreword

There has been a resurgence in commercial inland waterway transport, particularly for cargo, in Asia and Europe. The major rivers of India, China and Southeast Asia are being used as an alternative to road transport in order to achieve greater fuel conservation, reduce emissions of greenhouse gases, and lower road and vehicle maintenance costs.

Experiences of Asian countries, where more sparsely settled areas of rural population have historically relied on boats for passenger and cargo transport, such as Cambodia, Vietnam, and Thailand, are especially relevant to Sarawak. A natural resource, large rivers like the Mekong, Chao Phraya and Rajang, offer a viable option to difficult and expensive construction, maintenance and operation of roads, of bridges and vehicles, especially through steep and difficult terrain.

In Sarawak, the road network is still underdeveloped and, unlike Sabah and Peninsular Malaysia, there is no rail network passing through rural areas and connecting the main towns. Under the Ninth Malaysia Plan 2006–2010, RM702 million has been allocated to Sarawak to upgrade rural and village roads in order to improve accessibility and connectivity between rural and urban areas. But building roads is a slow and costly process and, meantime, the state's rivers can serve efficiently as superhighways from coastal ports into the interior. In a recent comment reported in *The Borneo Post* (November 7, 2007), the Chief Minister of Sarawak, Pehin Sri Abdul Taib Mahmud, reiterated this view when he said, 'Sarawak has many rivers, and water transportation is always cheaper than land transportation. I think bulk transportation has to be undertaken by water.'

Efficient transport is essential for connecting the rural communities to Sarawak's larger towns and cities, for reducing isolation, and for providing employment opportunities. And since human needs are not just physical, effective modes of transport can help increase community interconnectedness and social capital. Furthermore, the promotion of community-based ecotourism along rivers not only provides additional revenue for the State, but also generates income for poor communities and helps raise awareness of the need for sustainable river management.

As elsewhere in Malaysia, the water quality of Sarawak's rivers is deteriorating. With development, river pollution has increased and water quality has declined. Polluted rivers affect the health of plants, animals, and human beings. According to data from the Ministry of Natural Resources and Environment, there has been a steady deterioration in the water quality of rivers throughout the country, and the Ninth Malaysia Plan 2006–2010, has set aside a huge allocation to help clean them up.

River pollution is caused by discharges of sewage, wastewater, wood waste, toxic chemical waste, heavy marine and spilt oil waste, discarded plastic containers, thermal pollution, accelerated riverbank erosion, and natural river debris from trees and sedimentation. With appropriate discipline, care and attention, most of these undesirable impacts can be eliminated, so that we can enjoy and preserve the utility and beauty of our rivers.

The Sarawak Inland Waterway Transport System Study, which supports the preparation of an Inland Waterway Transportation Master Plan, aims to promote the development and use of community water transport, primarily for the benefit of the rural communities located in scattered settlements along the state's navigable rivers. At the aggregate level, Sarawak has an enviable record of development, and an overall poverty level of just 8 percent in 2004. However, development in the rural areas is more limited, and the rural poverty rate was 14 percent in 2004. The poor tend to be scattered along the rivers, and it is these communities who potentially stand to benefit most from improvements in river transport.

Besides its advantages in making use of a major accessible resource that is available to all participating communities - the rivers - community water transport is an environmentally friendly, energy efficient and

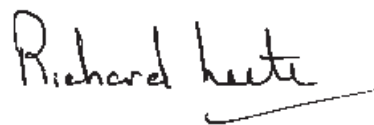
low-emission mode of transport. Such development has the potential to enhance economic benefits through the increased market activity of more consumer goods moving upstream, and raw materials (coal, logs, agricultural output) and cottage-industry products moving downstream. Similarly, access to hospitals, clinics and schools can be improved, facilitating use of essential services and enhancing the daily lives of communities up and down the rivers.

But the management of community water transport is also a challenge given the unpredictable and sudden changes in the condition of the rivers, the threatening combination of king tides and heavy rainfall in the river watersheds, and low-water levels across rapids and shallow riverbeds during periods of little rainfall. Consequently, the carrying capacity of the boats, the prospective demand for services, and the boats' operating costs and earning capacity, must all be taken into account.

The study reports on a UNDP supported project designed to encourage improvement in the safety of boat operations, and cargo and passenger movement on the rivers. As operators tend to favour large, high-powered boats and travel at high speeds of 15-25 knots (28-56 km per hour) or more, the risk of boat accidents and collisions is high. Furthermore, the supporting rural transport infrastructure is often in need of attention, as terminals, jetties and landing points are often in disrepair, and have precarious, eroded landward approaches and footholds. Services and the safety provisions need to cater for all users including both the very young and the elderly who are most likely to be accessing schools, clinics and hospitals.

This volume is the seventh in a series of periodic publications reporting on UNDP Malaysia's work in its energy, environment and human development practice area. The large range of projects being undertaken in this portfolio is designed particularly to support Malaysia's efforts to achieve high human development for all its people, to eradicate poverty and ensure environmental sustainability.

I would like to thank the Sarawak State Government, especially to the Sarawak Planning Unit, the Ministry of Infrastructure Development and Communications, and the Sarawak Rivers Board for their support in implementing this project. I would especially like to thank members of the State Technical Working Committee and the stakeholders for their commitment to the project. I would also like to express my sincere appreciation to all project participants and members of the Project Team as listed on page ix, led by Dr. Chung Tsung Ping, for their commitment to the success of the project and for putting this publication together. I sincerely hope that it will be widely read and will increase awareness of the critical importance of rivers in Sarawak and its role in reducing extreme poverty



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# Abbreviations and Acronyms

Btg	Batang (river)
CWT	Community Water Transport
GDP	Gross Domestic Product
EPU	Economic Planning Unit
ICT	Information and Communications Technology
INTIMS	Integrated Transport Infrastructure Master Plan for Sarawak
IWT	Inland Water Transport
MDGs	Millennium Development Goals
NREB	Natural Resources and Environment Board
RECODA	Regional Corridor Development Authority
RM	Malaysian ringgit
SCORE	Sarawak Corridor of Renewable Energy
Sg	Sungai (river)
SIWT	Sarawak Inland Waterway Transport
SPU	(Sarawak) State Planning Unit
SRB	Sarawak Rivers Board
TC	Technical Committee
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific

# Participants

## Institutional Participants

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Ministry of Infrastructure Development and Communication  
Ministry of Planning and Resource Management  
Public Works Department (JKR)  
Ministry of Urban Development and Tourism Sarawak  
Natural Resources and Environment Board (NREB)  
Lands and Surveys Department Sarawak  
Marine Department Sarawak  
Riverine Communities of Sarawak

# Development of Infrastructure and Transportation Networks



Historically, patterns of settlement in Malaysia have been strongly influenced by the physical relief of the country; by its natural resources (though actual oil and gas deposits are largely offshore); tin, forests, and land suitable for agriculture; and more recently, by the country's pattern of urban industrialization.

On the peninsula, from the mid-nineteenth century, early Malay settlement and subsistence farming on the coastal plains, especially those to the west of the main divide, gave way to plantation crops and opencast tin mines. And waterborne transportation along the coast and inland for the length of the navigable rivers was soon superseded by road and rail links that followed the north-south grain of the peninsula's relief. Together with a substantial influx of migrant labour from southern China and south India, the investment of large, international

commercial houses, and accelerating urbanization, the basic patterns of economic growth and infrastructure development were well established by mid-twentieth century.

Since gaining independence from Britain in 1957, the west coast states of Peninsular Malaysia have continued to lead Malaysia's development. The railways, road networks and airports, as well as other communication and physical infrastructure systems, have been at the forefront of the nation's development, supporting international trade by land, sea (through the Strait of Malacca), and air. These states contain most of the free trade zones and have attracted and benefited most from the flow of foreign direct investment and new technology supporting economic growth (largely through industrialization) and rapid urbanization from the 1980s onwards. By contrast, the communications systems on

the east coast, especially before the discovery of offshore oil and gas in Terengganu, were much less developed.

The greatest contrast, however, has been with the states of East Malaysia: Sabah and Sarawak. Always sparsely populated, heavily forested over much of their land surface, and with a different administrative history that left them relatively neglected in terms of economic and social development, these two states are among the least urbanised and industrialised in Malaysia.

Although their history prior to independence as part of Malaysia and relatively sparse population have contributed to their present level of development, the physical character of Sabah and Sarawak has played a dominating role in moderating change. Alluvial coastal plains are succeeded inland by undulating hill country and a sharply rising mountainous interior. The river valley flood and coastal plains (mainly peat swamps in Sarawak), form only a small proportion of the total area, but it is here that most of the state's limited settlement, agriculture, road and river transport networks are concentrated.

The construction of transport networks in Sabah and Sarawak did not occur at the same scale or time as the establishment and growth of the road and rail systems in Peninsular Malaysia. The Ninth Malaysia Plan 2006–2010 acknowledges this deficiency and targets 'expansion of networks to underserved areas as well as capacity expansion'. Strategies cited in the Plan for infrastructure development include: enhancing accessibility to quality infrastructure facilities in rural areas, to



reduce the urban-rural development gap; providing efficient and reliable services to ensure optimal utilisation of infrastructure facilities; and recognition that 'river transport will continue to support the socio-economic and cultural development of Sarawak. In this regard a study will be conducted to identify the potentials of developing inland water transport as an efficient alternative mode of transportation as well as promoting tourism.' That study is the subject of this volume.

# A Profile of Sarawak

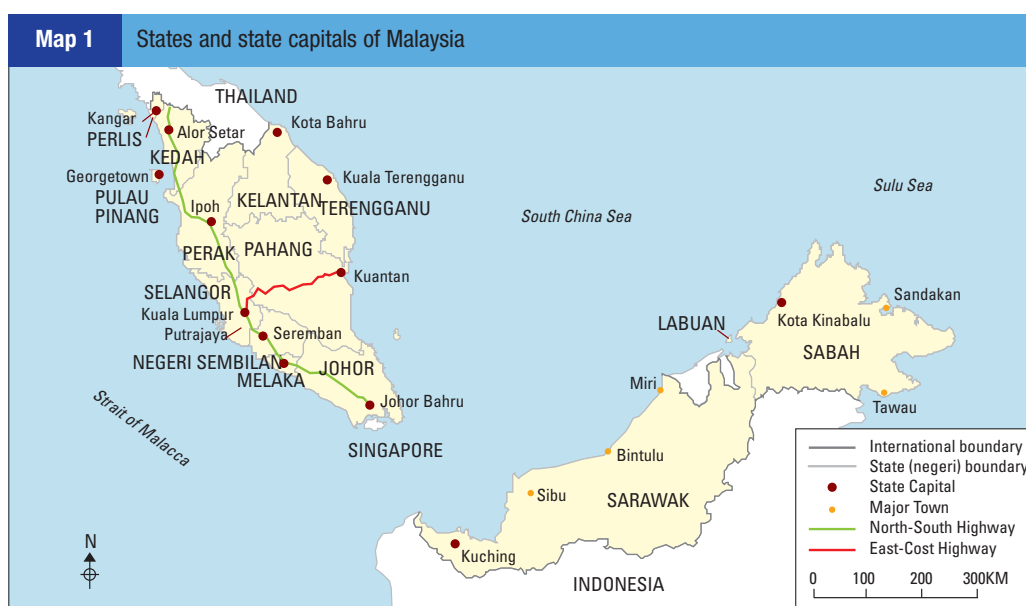
The very large tropical island of Borneo is divided into four political territories: Sarawak and Sabah (both states of Malaysia), Kalimantan (a province of Indonesia), and the independent sultanate of Brunei Darussalam. Soon after the Second World War, Sarawak and Sabah became British colonies and Brunei remained a British-protected sultanate. Set as they were within an area of emergent nationalism and newly independent states, the two Malaysian states were regarded as political anachronisms as they had been before the war when Sarawak was ruled by a 'White Rajah', and Sabah by a Chartered Company.

Borneo quickly moved into the international limelight in the early postwar period because of its huge oil and gas potential and the changing political status of the surrounding countries. Amidst some controversy, Sabah and Sarawak, together with Singapore, joined the Federation of Malaya to form Malaysia. Singapore subsequently became independent in its

own right, so that Malaysia now comprises Peninsular Malaysia and the East Malaysian states of Sarawak and Sabah.

Sabah and Sarawak are separated from Peninsular Malaysia by the South China Sea, the location of much of the oil and natural gas wealth of Malaysia and Brunei. With an area of 124,450 km<sup>2</sup>, Sarawak is the largest state in Malaysia, and with some 37.5% of the country's total area is almost as large as the whole of Peninsular Malaysia. However, it has less than one-tenth of the country's population, giving it the lowest population density of any state in the country.

The state is divided into eleven administrative divisions. Each division (or administrative region) is headed by a Resident, and subdivided into between 2 and 4 districts. This is a form of administrative decentralization to empower the Residents and District Officers, heads of the civil service administration at the divisional and district levels respectively, to make day-to-day decisions.





Sarawak is characterized by an extensive network of navigable rivers that potentially form an inland waterway transport system. Sarawak has 35 gazetted rivers (under the Sarawak Rivers Ordinance 93) rivers with a combined length of about 5,000 km, of which approximately 3,300 km are navigable. The Sungai Rajang, with a length of 567 km, is not only the most important river in Sarawak, but also the longest river in Malaysia. The other major navigable rivers comprise the Sungai Baram, Sungai Kemena, Sungai Tatau, Sungai Limbang, Sungai Lupar, Sungai Sadong, and Sungai Sarawak (Map 2).

The inland waterway transport system of Sarawak plays a significant role as the primary means of transportation for a large section of the population living in the interior and along the coast, performing functions that, in the states of Peninsular Malaysia,

are undertaken mainly by road and rail. Although coastal shipping is not part of Sarawak's inland waterway transport system, it provides an important link between rivers and settlements in the overall system.

Recognition of the need to develop riverine transport in Sarawak supports UNDP's view that such infrastructure has a direct and indirect impact on human poverty reduction, thus playing a significant role in the achievement of the Millennium Goals (MDGs). The impact of developing riverine transportation has the potential to directly improve access to basic amenities such as health and educational services and indirectly enhances economic growth. Furthermore, this study supports national and state government plans to further develop the rivers of Sarawak as a mode of transportation, as noted in the Ninth Malaysia Plan, 2006–2010 for example.

### The economy

Sarawak's economy is largely export-oriented and dominated by primary products. Primary production, comprising mainly mining, agriculture and forestry, contributes about 40% of the state's GDP, with the secondary sector, made up largely of construction and manufacturing, contributing almost 30%.

Sarawak has an abundance of natural resources, with natural gas and oil constituting the mainstay of the state's economy over several decades. Tropical hardwood timber has also been a major revenue earner, but the imposition of log-production quotas in recent years in order to manage remaining forests sustainably following wide-scale deforestation has introduced constraints. Nevertheless, Sarawak still produces about 9 to 10 million cubic metres of logs annually.

Agricultural production other than forestry and log production is based predominantly on rapidly expanding areas of oil palm plantation and, to a lesser extent, on rubber, wet and upland rice, pepper, cocoa and sago. Significant but greatly diminished proportions of the state remain under tropical rainforest, parts of which are designated as national parks, and together with Sabah, the state's outstanding biodiversity attracts ecotourism and international scientific attention.

Despite the rapid depletion of timber resources in Sarawak, and mainly because of its high production level of oil and natural gas (from which it receives 5% of the gross value) and its relatively diversified economy, the impact on income levels of reduced job opportunities in logging has been less severe than in Sabah, and stringently



controlled immigration flows have avoided major unemployment problems.

Since the 1980s, Sarawak has been attempting to diversify its economy through industrialization. Most of the industrial development has been based on the processing of local natural resources that include the manufacture of hardwood furniture, laminated board and specialised mouldings and joinery; and production of petroleum and petrochemicals. The town of Bintulu in particular has developed a thriving petrochemical industry, and has the facilities to cater for an expanded petrochemical sector.

### The people

Malaysia's population has grown substantially in recent decades with natural increase contributing the greater part of the increase in all states. In 2005, Sarawak

**Table 1** Population of Malaysia by region, 1957–2005

Year	Peninsular Malaysia	Sabah Number (000)	Sarawak	Malaysia
1957	6,278.8	410.5	693.2	7,382.5
1970	8,809.5	653.6	976.3	10,439.4
1980	11,426.6	1,011.0	1,307.6	13,745.2
1991	14,797.6	1,863.7	1,718.4	18,379.7
2000	18,523.2	2,679.4	2,071.5	23,274.7
2005	20,799.8	3,015.2	2,312.6	26,127.7
<b>Distribution (per cent)</b>				
1957	85.0	5.6	9.4	100
1970	84.4	6.3	9.4	100
1980	83.1	7.4	9.5	100
1991	80.5	10.1	9.3	100
2000	79.6	11.5	8.9	100
2005	79.6	11.5	8.9	100
<b>Average annual growth rate (per cent)</b>				
1957-1970	2.6	4.7	2.6	2.7
1970-1980	2.2	3.8	2.4	2.3
1980-1991	2.4	5.6	2.5	2.6
1991-2000	2.5	4.0	2.1	2.6
2000-2005	2.3	2.4	2.2	2.3

Source: Leete, 2007, Table 2.1.

was the fourth most populous state, having grown at slightly less than the national average rate, and considerably more slowly than in Sabah, where immigration has played a much larger role in population growth. Consequently, despite being almost as large as Peninsula Malaysia, Sarawak has less than 9% of the country's total population (Table 1).

Sarawak has a large number of indigenous ethnic groups, most of them with a distinctive language, culture and lifestyle, plus a substantial Chinese

community that had its early roots in the large-scale nineteenth century migration to Southeast Asia.

By the 2000 Malaysian census of population, no one group predominated. The Ibans, who are mainly Christians and predominantly rural, comprised 32% of Sarawak's population in 1960, but this share had fallen to 29% by 2000. The Chinese are the next largest group, accounting for 26% in 2000, also a smaller share than the 31% in 1960, but a proportion similar to that of Chinese in the





**Table 2** Ethnic communities in Sarawak, 1960–2000

Community	1960	1970	1980	1991	2000
Malays	17.4	18.6	19.7	21.0	22.3
Ibans	31.9	31.1	30.3	29.5	29.1
Bidayuhs	7.7	8.6	8.2	8.2	8.0
Melanaus	6.0	5.5	5.7	5.7	5.5
Other Indigenous	5.1	5.2	5.3	6.1	5.7
Chinese	30.8	30.1	29.5	27.7	25.9
Others <sup>1</sup>	1.1	1.0	1.3	0.9	0.4
Non-Malaysian citizens	no data	no data	no data	1.1	3.0
Total percent	100.0	100.0	100.0	100.0	100.0
<b>Total numbers</b>	<b>744.5</b>	<b>976.3</b>	<b>1,307.6</b>	<b>1,718.4</b>	<b>2,071.5</b>

<sup>1</sup> Before 1991, 'Others' included mainly Indians and others, such as Europeans, but from 1991 it also included Filipinos.  
Source: Leete, 2007, Table 2.4.

peninsula. Whilst the proportions of Ibans and Chinese have declined over time, the share of Malays in Sarawak's population has grown, rising from 17% in 1960 to 22% in 2000 (Table 2).

Chinese and Malays tend to predominate in the state capital of Kuching, and in the other main towns such as Sibul, Miri and Bintulu, whereas the indigenous communities are mainly located in the much less developed rural areas. The isolated location and poverty of many of the indigenous communities is evident in poor housing, unsafe environmental conditions, inadequate access to health care and much higher incidence of malaria than in the peninsula. Communication systems are less well developed and some rural communities lack access to electricity and clean water.

The sparse and unevenly distributed population of Sarawak in the context of its very large size gives rise to significant

## Reducing isolation and poverty can be a tortuous process

- **food security** can be threatened when an area is opened up:
  - ~ through loss of land and resources ;
- **cash earning opportunities** can become available:
  - ~ but are dependent on skills, knowledge, wages;
- **commercial agricultural cultivation**, especially of intensive crops, necessitates:
  - ~ significant socio-cultural changes;
  - ~ high value, small volume, low weight, transport-tolerant, time-tolerant;
  - ~ intermodal bulking agents and facilities;
  - ~ cost considerations: multiple handling, transport tolerant;
- **improved transport:**
  - ~ implies increased cash dependence;
- **greater role of cash economy:**
  - ~ impacts to reduce social solidarity and community-based social-security safety nets;
- **out-migration, encouraged by isolation and poverty:**
  - ~ can make uplift of rural conditions more difficult;
  - ~ create new problems economically and socially;
  - ~ may raise problems of social regulation.



challenges in the provision of physical and social infrastructure, the delivery of social and economic services, the restricted possibilities of market-based policies for economic expansion and poverty eradication, and the justification on a per capita economic basis for the provision of a modern infrastructure and services.

State	Poverty rate (%)
Sabah	23
Terengganu	15
Kelantan	11
<b>Sarawak</b>	<b>8</b>
Kedah	7
<b>Malaysia</b>	<b>5.7</b>

Source: Leete, 2007, p.147.

### The incidence of poverty

Sarawak has an enviable record in poverty reduction. A poverty incidence of nearly 60% of households in 1976 had been reduced to 8% by 2004. From a condition much worse than the country average, Sarawak is now only a couple of percentage points above it (Table 3). However, despite this achievement, Sarawak remains in the bottom half of a ranking of states by incidence of poverty, having slipped behind two more states (Kedah and Perlis) since 2002.

In Sarawak, poverty is largely a rural phenomenon. In 2004, the rural poor accounted for 90% of the state's poor households and for 98% of hardcore poor households. Most of this rural poverty is associated with families working in agriculture. In that same year, these households accounted for two-thirds of all poor households in the state, and for 70% of the hardcore poor households.

The occurrence of poverty also varies

Ethnic group	Incidence of poverty (%)	Share of state's households (%)	Share of poor households (%)
Other Bumiputera	17.2	4.5	9.7
Bidayuhs	16.6	10.6	21.9
Malays	9.0	21.1	23.7
Ibans	8.9	28.0	31.1
Melanaus	8.3	6.7	6.9
Chinese	1.9	28.4	6.7

Source: Khoo, 2007, Table 12.

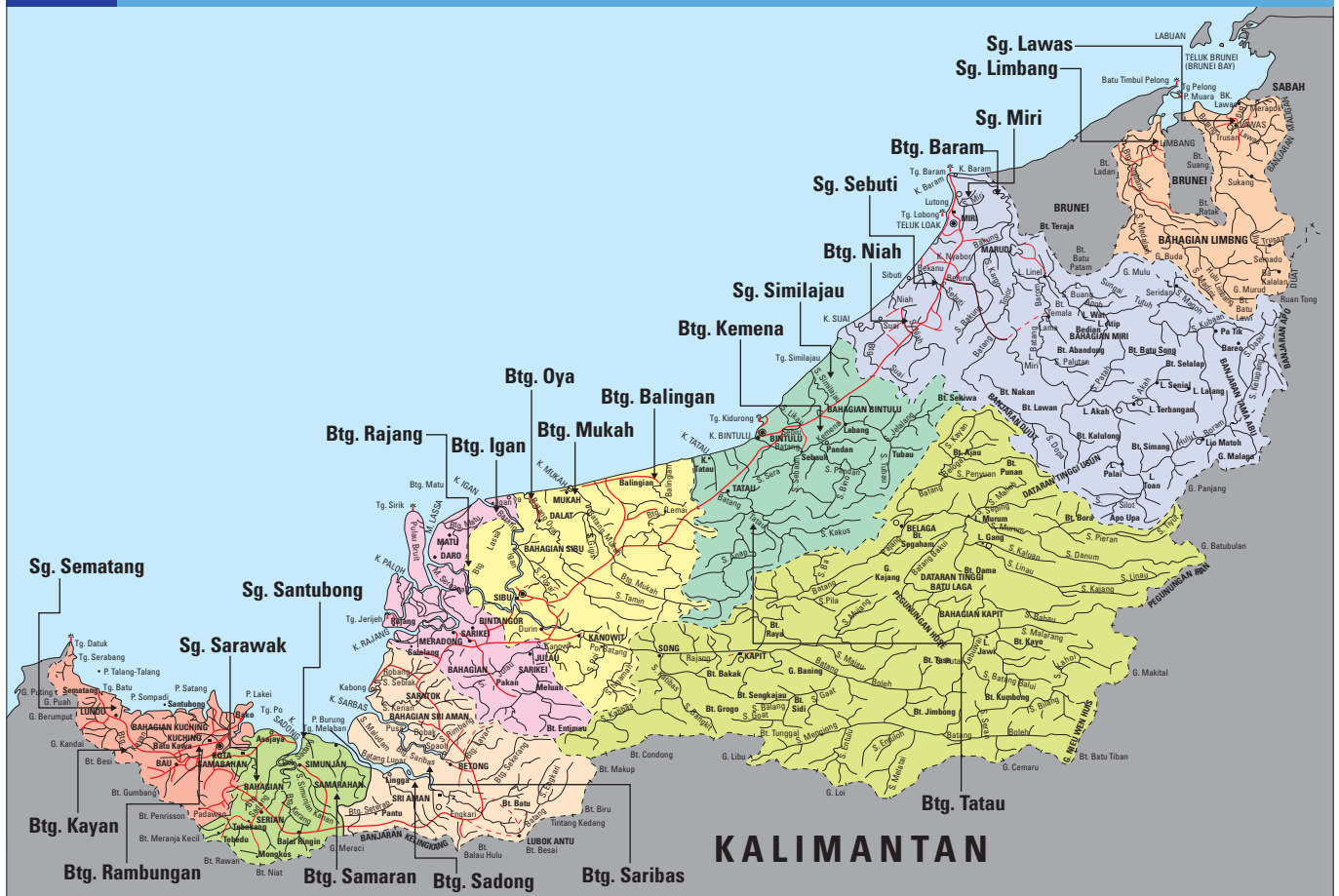
significantly by ethnic group (Table 4). With an incidence of around 17%, Bidayuhs and Other Bumiputera account for nearly 32% of poor households although they comprise only 15% of the total. Ibans, Malays and Melanaus, each with an estimated incidence of around 9%, account for nearly 62% of the poor households but comprise just 56% of all households. Chinese comprise the largest number of households but have the lowest incidence of household poverty. Ibans and Bidayuhs accounted for the large majority of hardcore poor.

Whilst the poor are overwhelmingly rural, they also tend to be predominantly small-scale agriculture-dependent communities that are generally the least educated, and commonly average a family size above the national norm. In addition to financial hardship, the poor face many challenges including securing land rights and other basic rights to development. Many of these indigenous communities have low levels of human capital, lack ready access to basic amenities and facilities, and because the physical infrastructure is underdeveloped in the areas where they live, they remain poorly connected to markets. They seem to be locked into an unrelenting intergenerational cycle of poverty, and require outside assistance to break free (Leete, 2007).



# Inland Waterways Are A Major Natural Asset

Map 2 Major navigable rivers in Sarawak



In Sarawak, broadly speaking, two main groups of rivers drain the state: the larger rivers that flow from the mountain ranges marking the Sarawak-Kalimantan border that constitutes the watershed for all the rivers flowing into the South China Sea; and the short, meandering coastal rivers across the mid-Sarawak lowlands. It is the former group, extending far up into the remote areas of the state, with which this Sarawak Inland Waterway Transport (SIWT) Study is primarily concerned.

Before the advent of Europeans in the sixteenth century, the island of Borneo had

belonged to various other island-kingdoms of Southeast Asia that had a very different perspective on the region. Within this island world, ocean and riverine waterways were perceived as unifying rather than dividing, and the mountain ranges towards the centre of the islands, not the coasts, were always regarded as the real frontiers that separated and divided.

The rivers of Sarawak have been the main, and often the only, means of transporting passengers and goods in both urban and rural areas. River transport possesses significant advantages when

## INLAND WATERWAYS ARE A MAJOR NATURAL ASSET



compared to competing modes of transport, although it also has some disadvantages (Box 1).

Until recently, the extensive network of navigable rivers provided the main means of transport between the major urban centres of Kuching, Sibul, Bintulu and Miri, and the widely patronised means of access for people living in many interior districts and villages. In addition, freight has traditionally been transported between the interior and the main river and sea ports by small ships and barges. Between 300 and 500 vessels currently ply the rivers daily and about half of these are engaged in the transport of passengers, with the remainder involved in transporting bulk and break-of-bulk freight.

In terms of passenger transport, Sarawak has an extensive express boat service which connects various coastal towns and the rural areas of the interior that are, in the main, inaccessible by road. These scheduled services are operated by private companies under an authorised river transport permit from the Sarawak Rivers Board with which the timetable and fares are agreed. At present there is no evidence of a formal pricing methodology such as average or marginal cost-based pricing. In practice, fares are determined on

the basis of historical rates moderated by inflationary cost increases and equity considerations. Similarly, there are no 'through' multimodal fares.

Passengers use various modes of transport for onward travel from express-boat terminals. In urban centres, these comprise walking, motorised private transport, buses and minivans. Other activities involving the river system, especially in urban areas, include short river-crossing and cruising trips, and bay crossing. In rural riverine locations, a variety of methods is used involving private speedboats, longboats and small paddleboats. With regard to express boat services, residents frequently state their concerns about cost, reliability, comfort and safety, particularly with regard to embarking and disembarking at passenger landings and jetties. At the village level, local people often lack direct access to any basic transport service.

A limited number of new passenger terminals have been built to serve express boats. However, congestion often occurs, especially during festive seasons when express boats, speedboats, longboats and other craft compete for the limited quay space available. There are 83 gazetted

### Rivers ruled the way of life

The rivers are of great significance for they as yet provide the only practical line of movement. In an undeveloped, forested and hilly country where there are no integrated road and rail networks, it is not surprising that most, if not all, the settlements are wholly dependent on river transport... Rivers and tracks in most areas form the link between hinterland and coast, a circumstance which at once results from, and contributes to, the low level of internal development... The present-day consequence of this complete dependence on waterways is the dominance of coastal and river civilizations, with the bulk of the population living within easy reach of rivers.

Lee, 1970, p.7.

wharves and jetties (under the River Traffic Regulation 1993), and available statistics also indicate there are over 900 other facilities operating in Sarawak. Numerous small jetties and piers exist along the riverbanks serving the dispersed village settlements. Some are scarcely identifiable as regular jetties, and many are dangerous and in need of repair.

Freight transport comprises a wide range of services that include the bulk shipment of logs, coal and gravel by a variety of means such as: the towing of floating logs; small bulk carriers; and tug-barge systems. These cargoes are transported to riverine and coastal ports for transshipment to domestic or export destinations. General cargoes and provisions are moved in a range of craft, and loaded and discharged at private and Government wharves and jetties using shipboard and shore-based cranes. Services are provided either by the shippers themselves, or by privately owned common carriers at negotiated freight rates. Very little use is made of modern cargo-handling or unitized shipment methods outside the main ports.

The main ports in Sarawak are in Kuching, Sibul, Bintulu, and Miri. The latest addition, Senari Port, a new deepwater port at Kampung Senari, complements the existing facilities of the Kuching Port Authority. All Sarawak's ports are well equipped to handle general and bulk cargo dry, liquid and gaseous. With the exception of Bintulu Port (a deep sea, federal port), all ports are managed by State Port Authorities. As the state relies heavily on external trade for its economic growth, the development of port facilities is important. Port development will be an essential

#### Box 1 Advantages and disadvantages of river transport

##### Advantages

River transport has:

- ~ the least impact on the environment in terms of congestion, noise and pollution;
- ~ the lowest costs for domestic and international transport;
- ~ enormous capacity reserves;
- ~ the least energy consumption;
- ~ relatively low demands on land use.
- ~ opens-up opportunities for scattered rural communities.

##### Disadvantages

Inland waterway transportation has:

- ~ relatively high travel time costs;
- ~ constraints imposed by physical limitations on geographical expansion;
- ~ a vulnerability to the influence of fluctuating hydro and meteorological conditions;
- ~ limits to the comfort and quality of the transport service provided to passengers
- ~ while vessels are in motion;
- ~ an erosive impact on riverbanks as a consequence of passenger express boats travelling at speeds between 15 and 25 knots (about 28 – 56 km per hour).

The extent and relative importance of such advantages and disadvantages depends on the specific circumstances of the waterways system and the alternative modes of transport available.

element in the creation of an effective intermodal system that utilizes inland waterways transport to its full potential.

A study developing the first Integrated Transport Infrastructure Master Plan for Sarawak (INTIMS) has been completed and the Final Report was submitted to the State Planning Unit in 2006. The findings of this study provide a broader framework within which the SIWT system will be developed and will be reviewed during the mid-term review of the Ninth Malaysia Plan.

# CONSERVING AND UTILIZING SARAWAK'S RIVERS

## Transport developments in Sarawak

The recent development of airports and trunk roads, such as the Pan-Borneo Highway between the major urban centres, has created a significant shift in passenger and freight transport from the inland waterways to road and air services. In consequence, there has been a reduction in interurban movement of people and cargo by river transport in the last few years. In much of the interior, however, the rivers still provide the only transport links to the main urban centres.

Further road development is planned, but this will primarily comprise urban road schemes and feeder links into the new trunk road network. River transport will therefore face growing competition from road and air transport for urban and inter-urban freight and passenger traffic. Within the current planning horizon to 2020, however, the rivers will remain the primary mode of transport to, from and within the interior.

The development of roads, ports and airports is creating intermodal transport hubs or gateways for the movement of passengers and cargoes to the regions they serve. Kuching, Sibul, Bintulu, and Miri are the major current gateways. A system is emerging that comprises intraregional and long-haul inter-urban services that link to the riverine transport corridors served by these hubs. The rivers that form the transport corridors have transport nodes at the larger centre of economic activity such as Song, Kapit, and Belaga on the Sungai Rajang. The residents of the dispersed longhouse villages, however, still use a variety of methods of transport. Access



and mobility to the transport system are often problematic for these remote riverine communities.

The expansion of the transport infrastructure, and particularly the development of skeletal road network, is fundamentally changing the position of inland waterways in Sarawak's transport system as a whole. Since inland waterways form a natural infrastructure that is significantly underutilized, and their use creates least environmental damage, continuing improvements designed to facilitate growing usage of the inland waterway system are an important objective. The Ninth Malaysia Plan 2006–2010 recognizes this, and is supportive of the further definition and promotion of the role of river transport in the economic and social development of the state.

## Medium-term prospects

The economy of the state can be expected to continue to grow at a fairly rapid pace,

accompanied by population growth. Urban populations can be expected to grow faster than rural populations, with internal migration to urban areas, particularly among younger rural adults, in search of new opportunities. Economic and population growth combined will increase demand for domestic transport of passengers and cargo.

The transport modal mix on roads and waterways is likely to continue to change but with some modification. The extended and improved road network is attracting passengers to cheaper, faster, and more convenient low-cost bus services. By contrast, increasing cargo traffic on the waterways continues its steady expansion, reflecting the cost of transporting heavy and bulky goods.

However, the difficulties of further rapid expansion of the road system heading inland from the coast are likely to make this trend unsustainable in the short term because of the nature of the steep upland terrain, the high cost of road building for such a sparse population, and the high vehicle operating costs in such steep territory. Furthermore, implementation of improvements proposed in the SIWT Master Plan can be expected to increase the efficiency of the waterways, rebalancing the modal mix somewhat in favour of inland waterway transport. This would ensure the continued use of this valuable natural asset for the foreseeable future, and contribute to the alleviation of escalating fossil fuel consumption on the roads. Other major developments are underway or planned that could have significant impacts on the river system (Box 2).

### **The Sarawak Rivers Board**

The planning and management of the inland waterway transport system is the responsibility of the Sarawak Rivers Board (SRB). The SRB was established in October 1993 under the Sarawak Rivers Ordinance. The functions of the SRB stipulated in the Ordinance include development and improvement of the riverine transport system within the state, control and regulation of river traffic, provision and improvement of wharfs and passenger terminals and navigational facilities, protection and restoration of riverbanks, implementation of safety measures, and river environment management.

In the first few years of its operation, the SRB's role was restricted to regulating riverine traffic and providing navigational and terminal facilities. As the Board was a new agency, plans tended to be conceived and implemented on an ad hoc basis in response to immediate needs of riverine traffic safety and cleanliness. However, by 2000, it had become apparent that strategic planning was essential given the need to achieve safe, clean and natural rivers. This can be achieved through sustainable development in the provision of quality services to ensure optimal domestic, commercial and recreational use of Sarawak's rivers. The development of the rivers is seen as important to Sarawak's heritage for present and future generations.

A Strategic Plan was initiated in 1999, and has provided a guiding document for the SRB in the implementation of its short and medium-to-long-term programmes. These cover the years 2001–2005 and 2006–2016 respectively.

Whilst it is true that river transport will never supplant the ubiquitous lorries and trucks in terms of speed, efficiency and flexibility, there can be no doubt that optimizing the use of the river system for movement of bulk and finished products will benefit both the transport user and the public at large, financially and economically.

Christopher Chan,  
2003, p.104.



## Box 2 How will major developments in Sarawak affect the river systems

### Development

Bakun hydro-electric dam scheme is under construction and other schemes are planned at Bengoh (water supply), Murun and Balleh (hydro-electricity)

Sarawak Corridor of Renewable Energy (SCORE) from Similajau, Bintulu to Tanjung Manis

A gas pipeline will be constructed from Kimanis Sabah to Bintulu, crossing more than 200 rivers and streams

Marudi as an economic centre

Promotion of Sibu for tourism growth of coal industry in Merit rural growth centre and increased agriculture in Kapit and increased sago plantations in Mukah completion of coastal road from Bintulu to Miri

### Impacts

- reservoirs behind the dams will offer tourism and recreational possibilities;
- schemes could have impacts on water levels and quality of the rivers, monitored by the SRB.
- industrial development corridor based on energy;
- will increase population in the central region by 200,000 persons;
- potential for using inland water transport for bulk transportation; e.g., for coal;
- potential source of jobs for many hinterland communities.

this will impact on the SRB's management of the river systems:

- navigational access must be maintained;
- risk of adverse environmental effects;
- potential for additional revenue for the SRB.
- construction of a road to Long Lama will reduce usage of river transport for cargo and passengers;
- increase in oil palm plantations raises potential for river cargo.
- potential for inland waterway transport tourism.
- potential for inland waterway transport cargo.
- potential for inland waterway transport cargo and passengers.
- reduction in the use of inland waterway transport in areas like Tatau.



The first Strategic Plan set out seven key objectives and identified plans and time scales for their implementation, as follows:

- improving safety and the development of an intermodal transport system;
- upgrading of riverine cargo and passenger facilities;
- restructuring management systems;
- preventing river pollution whilst promoting

conservation and rehabilitation;

- enhancing human resources;
- implementing organizational restructuring;
- expanding sources of revenue.

This study, by developing a new Master Plan up to 2020 for an integrated inland waterway transport system in Sarawak, will assist the SRB in updating its Strategic Plan.

# POLICY FRAMEWORK FOR MALAYSIA AND SARAWAK

Within the context of the long-term Vision 2020 that details the emergence of Malaysia as an industrialized nation, the shorter term national policy framework for the Sarawak Inland Waterway Transport (SIWT) Master Plan is outlined in the Ninth Malaysia Plan 2006–2010. While addressing the broader issue of

infrastructure that applies to all of the states of Malaysia, the Ninth Plan explicitly identifies continuity of river transport in Sarawak for the purpose of supporting social, economic and cultural development and promoting tourism (Box 3), and makes specific reference to the Master Plan Study (Ninth Malaysia Plan, 2006–2010. p. 384).

## Box 3 Water transport and the Ninth Malaysia Plan, 2006–2010

*River transport will continue to support the socio-economic and cultural development of Sarawak.*

Ninth Malaysia Plan 2006-2010, p.384.

The thrust for further infrastructure development cited in the Ninth Plan is directly supportive of improved conservation and utilization of Sarawak's inland waterways, namely by:

- greater utilization of existing facilities;
- increased emphasis on better service delivery and quality services;
- extension of networks to underserved areas;
- expansion of capacity.

Some of the strategies for infrastructure development set out in the Ninth Plan are directly relevant to specific Master Plan priorities for Sarawak, including:

- enhancing accessibility to quality infrastructure facilities in rural areas to reduce the urban-rural development gap: community water transport;
- providing efficient and reliable services to ensure optimal utilization of infrastructure facilities: commercial inland water transport;
- improving the safety and comfort of users: safety and security;
- increasing the competency and capability of service providers: institutional development and
- capacity building of SRB.

Waterborne transport is dealt with in the Infrastructure section of the Ninth Plan under the heading of 'Ports'. This states that the use of Information and Communications Technology (ICT) will be intensified and expanded to improve port efficiency, and electronic documentation systems will be extended to smaller ports. The focus will continue to be on the expansion of navigation safety systems, reducing pollution (including the disposal of wrecks), and increasing dredging works to allow larger vessels to operate.





At the state level, a number of strategies and plans are contributing to the promotion of economic growth and sustainable development. The following are three notable examples.

**1. The Integrated Transport Infrastructure Masterplan for Sarawak (INTIMS)** aims, among a range of objectives (recommended but not currently adopted), to:

- introduce bigger and more efficient commercial vessels;
- develop integrated public transport terminals;
- enhance the role of the SRB to be a 'one-stop-shop' for internal waterways transport;
- privatize facilities and make the SRB a purely regulatory body;
- qualify the SRB to receive government grants and generate additional funding from revenues;
- ensure the SRB has the power and staff resources to act effectively.

The final report of the INTIMS was

submitted in 2006, and its proposals are scheduled to be considered as part of the mid-term review of the Ninth Malaysia Plan. Meantime, these issues and recommendations are still being discussed and debated.

**2. Sarawak Rivers Ordinance** created the SRB as the competent authority to manage the river systems of Sarawak. The Vision of the SRB is 'Towards Safe, Clean and Natural Rivers':

- ensuring the safety of riverine traffic in order to promote the development of an efficient inland water transport system contributing to the balanced development of Sarawak;
- ensuring the rivers remain clean and free from pollution by any means for domestic, commercial and recreational purposes;
- ensuring the rivers remain in their natural state as our common heritage, for the benefit of present and future generations.

In its mission statement, the SRB is committed to achieving its Vision through

**Sustainable Development** and **Quality Services** for the **Optimum** domestic, commercial and recreational uses, and to realise the development of the rivers as a state heritage for present and future generations. As noted above, an SRB Strategic Plan was initiated in 1999 continuing into the period 2006 to 2010.

However, several other government agencies also have defined responsibilities relating to inland water transport, and some of these overlap SRB duties. They include: Marine Department of the federal Ministry of Transport; federal and state port authorities; Sarawak Public Works Department; Sarawak Drainage and Irrigation Department; and Sarawak Natural Resources and Environment Board.

**3. 2nd Sarawak Tourism Master Plan 1993–2010** reflects the federal Tourism Strategic Plan and the Ninth Malaysia Plan with emphasis on:

- ensuring sustainable tourism development;
- developing innovative tourism products and services;
- encouraging domestic tourism;
- ensuring comfort and safety of tourists.

The Tourism Master Plan provides the guiding framework for Sarawak's tourism development, defining sustainable management strategies. The main themes of the Plan are product development, marketing management, marketing operations, access and contribution to socio-economic development. The product development strategies focus on nature, adventure, and cultural tourism products.



# THE SARAWAK INLAND WATERWAY TRANSPORT SYSTEM STUDY



## Box 4 Sarawak Inland Waterway Transport System Study

The broad aim of this study is to prepare a Master Plan for the development of the Inland Waterway Transport System. The Master Plan will cover the period up to 2020, and will incorporate a 5-year Action Plan. This project will define the future role of the IWT system. The objective of the Master Plan is to provide a financially viable and environmentally sustainable programme of improvements that will be designed to achieve an efficient, cost effective, secure and safe Inland Waterway Transport System for Sarawak. The scope of the Plan will incorporate all aspects of developing and managing Sarawak's inland waterways with particular emphasis being given to the following priorities:

- improving mobility by community water transport to provide access to economic and social services, particularly in rural areas;
- sustaining inland waterways as the main mode of transport by developing integrated water transport services designed to create an effective intermodal transport network;
- developing sustainable riverine tourism;
- enhancing safety, security and environmental protection;
- providing recommendations to strengthen the institutional framework and, in particular, the Sarawak River Board's capacity to implement the Master Plan.

The Master Plan will be developed through stakeholder participation, which will increase the likelihood that the improvements to facilities and services to be provided will reflect the needs of local people and ensure that development benefits are equitably shared.

The study develops a two-pronged approach to examine the potential role and growth of inland water transport: firstly, in relation to transshipment and passengers; and secondly, with respect to increasing economic growth in rural areas. The

development of a competitive strategy for SIWT includes moves to:

- establish economic and environmental benefits of inland water transport as opposed to other modes of transport;
- strengthen the market position of existing cargo and passenger services;
- increase market share by establishing a niche market for Sarawak's inland water transport;
- ensure interventions incorporate measures that address security and safety concerns;
- define targets in terms of modal share, job creation, and potential revenue generation from inland water transport;
- participate in education programmes and knowledge exchange with other inland waterway transport authorities in Asia as a base for long-term harmonisation of inland waterway transport in the region.

The SIWT project is being completed over a period of two years, September 2006 to August 2008. The first year was devoted to completing the necessary preliminary work, writing the project document, making organizational arrangements, gaining approvals, and recruiting staff.

The study itself is being carried out in the second year and adopts the broad concept of CONNECTivity, encapsulating the key features of the Master Plan-study approach.

This concept highlights the study's intention of examining all aspects of transport in Sarawak's river-system infrastructure: commercial cargo and passenger services, transport at the community level, and transport for tourism. The study is addressing issues relating to safety and the capacity of the Sarawak

## Goals for the preparation and implementation of the Master Plan

- ensure international performance standards in the development of efficient inland waterway transport are applied to Sarawak's river systems to exploit the comparative economic advantages of commercial river transportation as one component of an integrated state transport network;
- promote development of viable community water transport, taking account of the characteristics of rural Sarawak, to increase the mobility and access of communities (cheaper, faster, more reliable and safer transport) and promote poverty reduction;
- promote high standard, sustainable riverine tourism, competitive in the international market and benefiting rural communities;
- adopt international best practices and standards for navigation, wharf and terminal safety and security adapted to Sarawak's river systems, and protective of the river environment and heritage
- identify core functions of the Sarawak Rivers Board as the competent authority for river transportation clearly defined, properly resourced and efficiently implemented.

Rivers Board to manage inland water transport. The study emphasizes that the Master Plan must be economically, financially, environmentally and socially sustainable.

Most importantly, the concept defines the approach of preparing the Master Plan in partnership with organisations and communities with interests in this sector. This is crucial to achieving sustainability. If the Master Plan is to be implemented successfully, it must be realistic, practical, and address the needs and priorities of the stakeholders by whom, ultimately, it must be owned. A participatory approach to the preparation of the Master Plan involving all stakeholders—public and private, civil society, boat owners/operators and

### Defining **CONNECTivity**

- ~ **C**ommunity and -
- ~ **O**rganization partnership
- ~ **N**etworked river infrastructure for safe navigation
- ~ **N**ature and sustainability
- ~ **E**quity for all stakeholders
- ~ **C**apacity building for SRB
- ~ **T**ransportation and tourism

users—is intended to maximise the likelihood that the proposed improvements reflect real needs and ensure that development benefits are equitably shared.

## The study methodology

The study was divided into 3 stages to be implemented over the course of 52 weeks. The schedule has been subject to some unavoidable delays but the study is proceeding satisfactorily.

### Stage One: Goal setting (6 weeks).

In Stage One, the task of a specially organised SRB team working with a small group of international consultants was to develop goals and competitive strategy; define issues and key geographical areas for study; develop the concept plan and, by means of a workshop, outline the detailed terms of reference for Stage 2. The deliverable for Stage One was the *Concept Master Plan (Inception Report)*. This will form an integral part of the completed Master Plan.

### Stage Two: Detailed study of the issues (20 weeks).

Stage Two involves the planning team, with the subsequent support of international consultants, overseeing a cluster of mini consultancies, mainly by local consultants who are optimizing stakeholder involvement in each component. The consultants are undertaking and submitting the analysis, demand, operational and layer plans and guidelines developed through ground surveys, focus groups, and workshops. This stage includes the utilization of a local team overseeing the mini consultancies



with international consultants; the mini consultancies allow for better stakeholder control over each component. The deliverable for Stage Two is the *Detailed Components (Interim Report)*. This will also form an integral part of the completed Master Plan.

### Stage Three: Synthesis and production (22 weeks).

In Stage Three, the findings from the mini consultancies will be utilized to formulate the final SRB Master Plan and 5-year Action Plan. These will be developed by the planning team consisting of the local SRB team and the international consultants. The development and phasing strategy, implementation and capacity strategies will also be determined during this stage. The deliverables for Stage Three are the *Draft Final Master Plan Report* and the *Final Master Plan Report*.

# SCOPE OF THE SARAWAK INLAND WATERWAY TRANSPORT MASTER PLAN



## Objective

As previously noted (Box 4), the objective of the Sarawak Inland Waterway Transport (SIWT) Master Plan is to provide a financially viable and environmentally sustainable programme of improvements designed to achieve an efficient, cost-effective secure and safe inland waterway transport system serving the needs of Sarawak.

An efficient and cost-effective inland waterway transport system, integrated with other modes into an intermodal national transport network, will serve the needs

of Sarawak in two ways:

- it will contribute economic growth by increasing the overall efficiency of the transport sector, supporting the Ninth Malaysia Plan thrust of developing infrastructure services to facilitate growth in other sectors;
- it will impact directly and indirectly on poverty reduction by reducing rural isolation and improving access, especially by disadvantaged groups, to health and education services, and to income-earning opportunities.



# SCOPE OF THE SARAWAK INLAND WATERWAY TRANSPORT MASTER PLAN

## Time horizon

The Master Plan has three time horizons:

- a long-term Master Plan running from 2008 to 2020;
- a five-year Action Plan beginning in 2008;
- Pilot Projects to initiate implementation of the Master Plan beginning in 2008 (subject to approval of funding).

## Stage One

The Master Plan addresses current constraints for realizing the potential for utilizing the valuable natural resource of navigable river systems efficiently, and identifies sustainable improvements. The Plan aims to exploit the potential to increase modal share of cargo carried by inland water transport; consolidate inland waterway passenger services; and provide efficient community water transport, complementing improved rural roads to increase the mobility and access of rural communities. The Stage One Concept Master Plan (Inception Report) sets out the proposed goals, future directions and competitive strategies for the development of inland waterway transport.

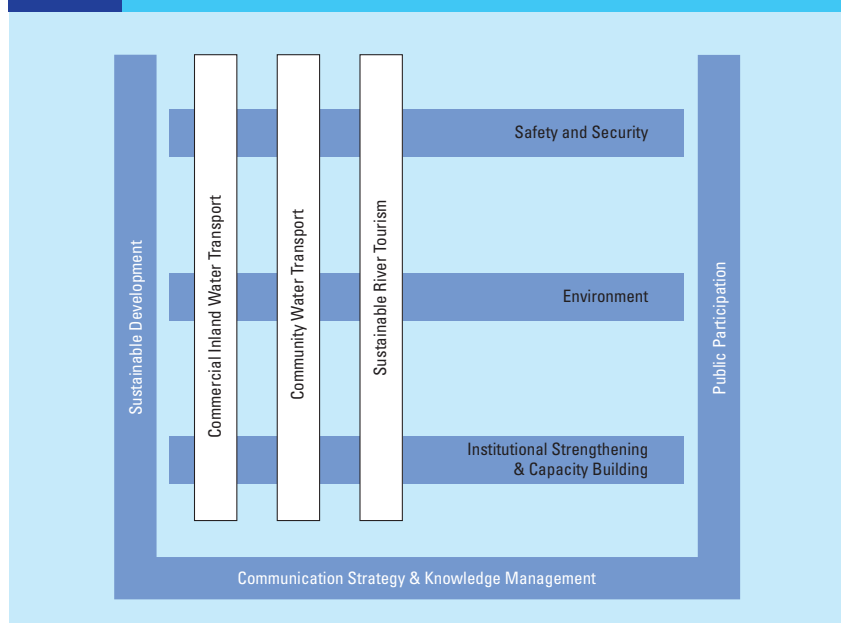
**Stage Two**, the detailed study of the issues, is currently proceeding, and **Stage Three** will see the culmination of the study in the synthesis and production of the Master Plan itself.

## Key components of the SIWT Master Plan

Items 1.-3. comprise the three main elements of riverine transport; the other items deal with their operation and management.

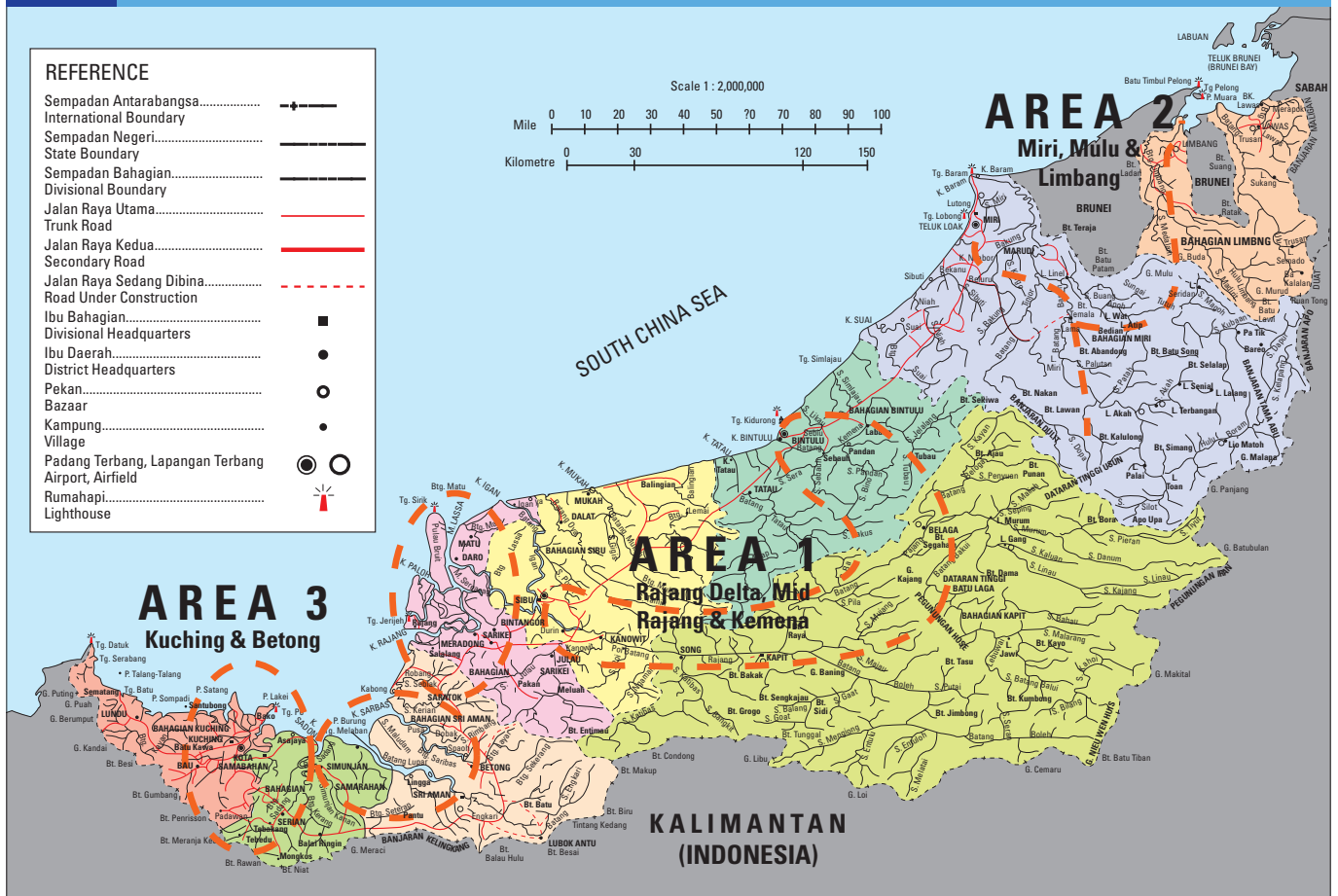
1. commercial cargo and passenger inland water transport, and intermodal transport;
2. community water transport;
3. sustainable riverine tourism;
4. the priorities of safety and security;
5. the cross-cutting environmental sustainability and enhancement;
6. the cross-cutting institutional strengthening and capacity building;
7. all-embracing priorities of sustainable development, public participation, communication strategy, and knowledge management.

**Figure 1** Connectedness of the key components of the SIWT Master Plan



# DELINEATING THE STUDY AREAS

**Map 3** Study areas comprising the inland waterway transport corridor



## Selection of study areas

The limited time scale and resources available for the Master Plan Study mean that detailed field investigation covering all navigable river systems of Sarawak is not feasible. Consequently, available secondary data for the whole of Sarawak's river system was assembled and analyzed, but detailed fieldwork focused on three regions selected as important and representative. These locations were selected to represent the differing conditions of:

- sustainable commercial inland water transport of cargo and passengers;

- community water transport;
- sustainable riverine tourism.

The study areas, selected through workshop discussion, cover the upland, middle and lower altitude terrain conditions of the river systems in Sarawak as well as the low-lying Rajang delta area (Map 3). They also encompass areas with different potential for economic development, including existing and future growth areas for industry, agriculture and tourism.

Conceptually, the regions selected identify the potential for an interconnected inland waterway corridor or network across

three geographical areas:

- Kuching-Betong;
- Rajang-Kemena-Bintulu;
- Miri-Mulu-Limbang.

In respect of commercial inland waterway transport, the study areas:

- include the major navigable river systems and major routes where passenger express and speedboat services operate;
- cover all the rivers linked to major ports and the major access points by road and air to the inland waterway transport system;
- provide specific opportunities to study the potential for –
  - ~ movement by inland waterway of construction materials and commodities sourced from rural areas;
  - ~ extension of inland waterway transport to coastal operations.

The study areas cover the high poverty rural locations where communities rely on river transport using longboats, and a range of varying rural demographic and socio-economic conditions.

With regard to riverine tourism, the study areas selected include locations:

- to study the potential for developing a variety of types of sustainable recreation and leisure products;
- to enhance tourism that is already established, revitalize tourism that has declined and, where there is potential, promote the concept of riverine tourism.

## Key study regions

The selected study areas are characterised by several important components:

- **the river corridor** comprising main navigable rivers that link gateway cities to development and growth areas where



integrated planning can be carried out in detail;

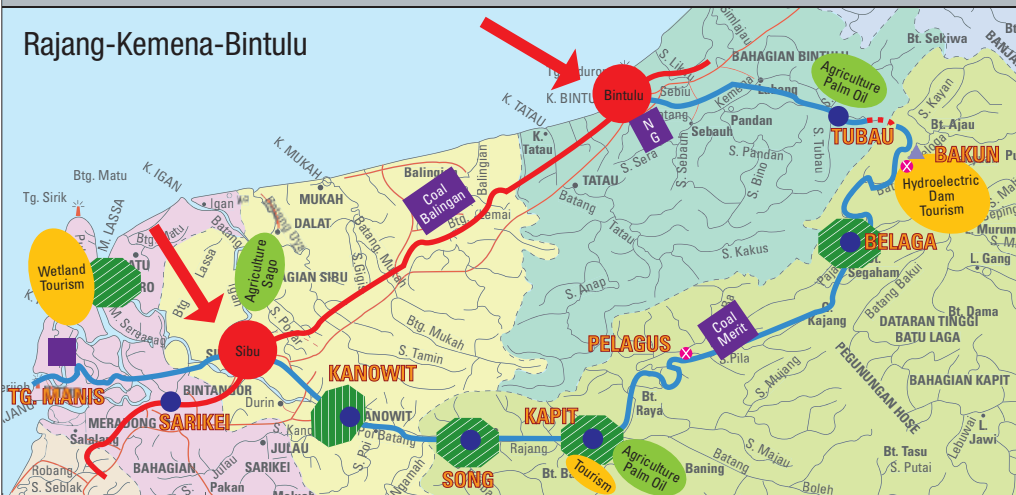
- **gateway cities** constituting primary access points to the inland waterway transport network for cargo and passenger traffic via major ports, terminals, airports and roads; the potential of major facilities for transshipment, passenger connectivity and intermodal transport is a potential consideration;
- **existing or growth areas** for agriculture, industry, or tourism that could contribute to the development of inland waterway transport;
- **community centres** comprising population centres that rely on the river corridor for transportation, where improvement of inland waterway transport facilities will be addressed;
- **areas of poverty** comprising rural communities reliant on inland water transport that will be studied in an attempt to increase economic activity and improve inland waterway transport facilities.

Map 4 The concept plans for the key study areas

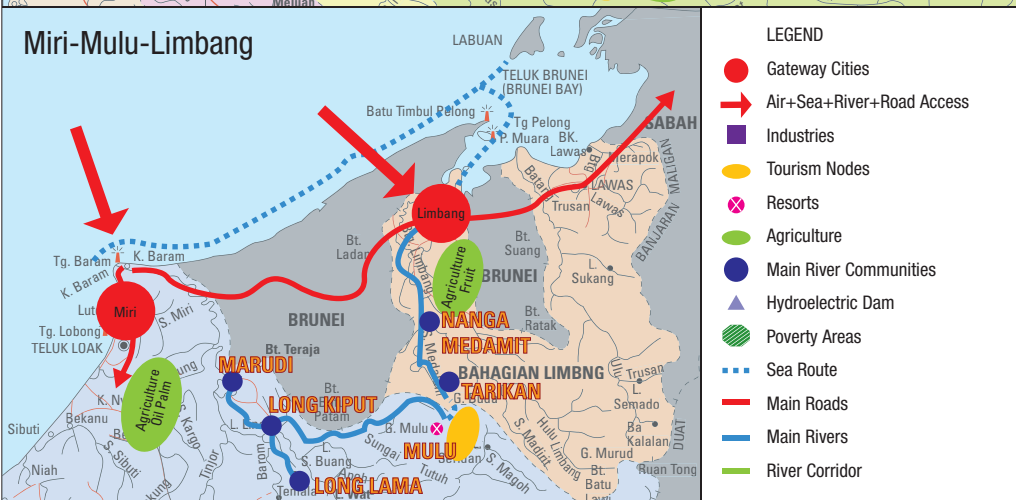
Kuching and Betong



Rajang-Kemena-Bintulu



Miri-Mulu-Limbang



- LEGEND
- Gateway Cities
  - ➔ Air+Sea+River+Road Access
  - Industries
  - Tourism Nodes
  - ✳ Resorts
  - Agriculture
  - Main River Communities
  - ▲ Hydroelectric Dam
  - Poverty Areas
  - Sea Route
  - Main Roads
  - Main Rivers
  - River Corridor

## DELINEATING THE STUDY AREAS

### Box 5 Focus on important components in each study area

#### Study area

Kuching - Betong

#### Focus

Enhancing urban inland waterway transport such as penambang, river taxis and cruises; reviving river tourism and developing new opportunities; expanding cargo transport; improving community water transport.

Rajang - Kemena - Bintulu

Integrating commercial cargo, passenger, tourism and community water transport along Sungai Kemena, Sungai Belaga and Sungai Rajang, and community water transport in the delta.

Miri - Mulu - Limbang

Enhancing and promoting the existing route to Mulu for riverine tourism; as an alternative to air travel; for community water transport and as a long-term development growth area for commercial cargo, tapping potential of Brunei market via Sungai Limbang, Sungai Mendalam, and Sungai Baram.

River taxi



Tug boat



Long boat



Express boat



# ADDRESSING STRATEGIES AND ISSUES

## Enhancing Commercial Inland Waterway and Intermodal Transport

The future direction is to transform commercial inland waterway transport in Sarawak into a modern, efficient and safe system, exploiting its comparative economic and environmental advantages as a key component of an integrated state-wide transport system. The strategy will be to define a programme to improve the waterway and landside infrastructure for commercial inland waterway transport and its management to international standards; and to facilitate the operation of modern, efficient vessels and the provision of competitive and demand-responsive services by the private sector.

The critical issues for the commercial inland waterway transport sub-sector all relate to its transformation into a modern, efficient and safe transport system which will realize its potential economic and environmental advantages over road transport. Exploiting these potential advantages by developing efficient commercial inland waterway transport, as part of an integrated state transport system with the necessary intermodal linkages, will be an effective use of investment resources and reduce the total costs of the transport sector.

To be successful, the transformation of commercial inland waterway transport into a modern and safe system necessitates:

- accepting that efficient inland waterway transport has lower operating costs than road transport for movement of long distance cargo;
- defining future regional and domestic scope and components of inland



water transport;

- establishing the potential future demand for inland waterway transport traffic cargo and passenger services;
- identifying the measures required to reach inland waterway transport's full potential.

An assessment has been made of the measures required to realise the potential future demand for inland waterway transport cargo and passenger services. These include the following:

**Waterway infrastructure.** Dredging to deepen channels, and the installation of navigation lights would permit better access for cruise vessels, and the operation of larger cargo vessels with lower unit costs; these steps would

provide greater confidence for shippers, and improve safety.

**Landside infrastructure.** Upgrading of port and wharf infrastructure, including container and petroleum handling and passenger terminals, and development of transshipment and intermodal facilities; these would enable more efficient and lower cost operation, more efficient handling of cargo and processing of passengers, increased efficiency and lower supply chain costs, and greater confidence for users.

**Cargo operations.** Introduction of larger modern vessels would reduce operating costs and fuel consumption, and improve safety.

**Passenger operations.** Introduction of demand responsive services and combined goods and passenger services would increase competitiveness and stimulate demand.

Some of the measures would involve investments by the private sector. The role of the SRB would be to provide the enabling framework that encourages the private sector to innovate. Effective communication between the SRB and private sector interests would contribute to this process.

**Method of investigating commercial inland waterway and intermodal transport.** There are three components to this investigation and analysis being carried out as part of Stage Two:

1. secondary data analysis of all available information on current commercial operations in Sarawak including:

hydrographic data; navigational aids; operational characteristics of ports, wharves and terminals; time series on cargo and passenger flows; details of the registered vessel fleet; information on inland vessel operators; and field observations of current operations in the major river systems.

2. forecasting future demand for inland waterway services including: projections of economic and population growth to 2020; volumes of production, consumption, imports and exports and their distribution; developments in manufacturing; estimates of future demand for water transport; and cost comparisons with alternative modes; public officials and private stakeholders are being consulted.
3. technical analysis of infrastructure measures, including: defining the operational requirements, specifications and standards needed to match the demand forecasts.

### Supporting Community Water Transport

Key features of rural poverty in Sarawak include a lack of income-generating opportunities other than agriculture, and inadequate access to economic and social services. Often the character and extent of these problems are largely a function of an inadequate rural transport infrastructure and services, especially at village and community levels. This deficiency can result in:

- uneconomic movement of village products;
- declining income levels;



- increased cost of imported basic goods and provisions;
- restricted access to public services, resulting in declining health, nutrition and education status;
- marginalization of households and population subgroups;
- isolation from knowledge/networks and diminished social capital.

Ease of access to transport services, river or otherwise, has a significant and positive impact on social and economic indicators of 'wellbeing' and on the overall quality of life in rural communities. The availability, affordability and reliability of community water transportation directly affect access to markets as well as to primary health services and education. Furthermore, the lack of community water transport (CWT) services negatively affects the ability of local government to supply public services and civil organisations to operate in rural areas.

Community water transport has two major considerations that require addressing: operational costs, and quality of infrastructure. The most critical issue facing the community water transport sub-sector is the high and increasing cost of operation of motorized longboats, due primarily to rising fuel prices. Two approaches are possible in addressing this issue; regulation/subsidy of fuel process, and technical innovation.

**Regulation/subsidy of fuel prices.** Fuel prices are regulated in the urban centres of Sarawak, but there is a fairly steep rise in the price gradient for fuel distributed to more remote areas. The consequence is that the poor, disadvantaged groups, who are dependent on their longboats, pay a

### Community Water Transport

- at the time of the 2000 census, about 600,000 people, or about one-quarter of the total population of Sarawak, depended on river transportation;
- a higher than average fertility rate among rural communities will have increased this number significantly (although this will have been partly offset by some outward migration among young people); this trend can be expected to continue;
- river-dependent people are predominantly rural and lower income;
- the Orang Ulu and Iban people are the most dependent on river transportation;
- other groups especially reliant on the river include Melanau, Malays and Chinese.

significantly higher price for fuel than higher-income urban dwellers.

The study is reviewing the possible responses, which include a single, pan-territory price regulation of fuel; price regulation at different levels to take account of actual distribution costs; and targeted fuel subsidies for rural boat users (for which fisheries have already set a precedent). This is a complex and controversial issue, and further economic analysis is required in order to provide a basis for informed policy recommendations.

#### **Technical innovations to reduce operating costs.**

International experience indicates that it is worthwhile exploring the potential for reducing operating costs through technical innovation. Most longboats in Sarawak are powered by outboard petrol engines. This contrasts with the practice in most parts of Southeast Asia where diesel engines predominate, mounted either inboard or as 'long-tail



motors' pivoted on the stern of the boat. Outboard petrol engines are relatively costly, not very durable, and have higher fuel consumption costs.

Other possible innovations include: improved design of transmission systems incorporating a reduction gearbox between engine and propeller; a more efficient system of protecting the propeller with guards and a mechanism analogous to that of the long-tail motors that facilitate raising the propeller in very low-water conditions; and improvement in hull designs for motorised boats based on traditional styles.

There are several problems to be addressed in considering improvements to community water transport infrastructure, including the efficiency of actual movement of transport along the rivers themselves.

**Navigation in shallow water.** Stretches of shallow water during periods of low flow can be hazardous, particularly upstream. Spot dredging, marking and maintenance of navigation channels, and prevention of riverbank erosion, offer the most practical solutions.

**Hazards presented by rapids.** Negotiating rapids, especially at times of low-water levels, can be tricky and hazardous. Where rapids are of no particular environmental or tourist value, alternative by-pass channels may be feasible in some instances, and navigation routes can be established and marked.

**Inadequate jetties and landings.** Many landings are unsafe, inefficient and difficult to use. At the community level, availability of standard designs for construction and



operation to suit varying conditions, with safety equipment and awareness training for frequent users, would be a fundamental improvement. In addition, technical and financial assistance, together with supply kits of standard components, and lighting, could achieve substantial improvements.

### **An integrated planning approach.**

Construction of other facilities such as roads and bridges crossing navigable rivers, and other elements of the physical infrastructure, need to take account of boat movements and access. At appropriate localities, passenger and cargo landing facilities designed as part of bridges would be highly advantageous.

**Method of investigating community water transport.** There are four components to the community water transport investigation and analysis being carried out during Stage Two including:

1. secondary data analysis of the extent of community water transport operations on the various river systems, and their relationship to low-income levels, socio-economic disadvantage and poverty; the intention is to map these operations and how they relate to poverty, and to

develop a secondary database on community water transport.

2. primary case studies to be carried out in the key geographical study areas; participatory case-study analyzes are being carried out in selected communities to understand the role of water transport in the lives of communities and sub-groups such as women; establish present practice for the construction and maintenance of boats, and purchase of engines and fuel; collect examples of longboat operating costs in different riverine conditions; and identify issues, constraints and priorities among longboat users.
3. the broader institutional framework: meetings and discussions are being held with state and local government officials, private sector and civil society stakeholders to understand their perceptions of issues, and to identify potential future roles for them.
4. economic analysis of the high and rising fuel price issue.

### Encouraging Riverine Tourism

The upgrading, protection and enhancement of Sarawak's rivers are attracting increasing flows of domestic and international visitors. Activities such as the Sarawak Festival Regatta, travel upstream to the longhouses, and the introduction of new events such as the International Tattoo convention, are all serving to raise the state's profile as a tourist destination.

The impact of tourism on the rural disadvantaged can be expected to continue to evolve as communities

### The pros and cons of river-dependence

#### Costs

- use of rivers is almost free but, unlike roads, transport costs are unsubsidized;
- the more remote, the more dependent, the more costly:
  - ~ fuel costs rise steeply in the interior
  - ~ the greater the distances, the greater the time and cost;
  - ~ greater wear and tear on boats in interior (shallow riverbeds etc.);
  - ~ goods supplied by boat are expensive (but no cheaper by road);
- greater social solidarity offsets some costs.

#### Hazards of river dependence

- river conditions somewhat within control:
  - ~ familiarity: know location and risks of routes, rapids, rocks
- river conditions not under control, unpredictable, other users:
  - ~ express boats, speedboats, logs and tugs with log-barges;
- changing currents, bad weather, no night navigation aids;
  - ~ risk of accidents:
    - ~ collision;
    - ~ getting on and off on precarious landings;
    - ~ fast, large boats create a wake that can overturn light boats.

#### Isolation

- not usually an issue for access to primary schools and clinics:
  - ~ over 95% of primary-aged children are attending school;
  - ~ majority of births are in a clinic or hospital;
  - ~ Malaysian Medical Resources service reaches over 90% of target group;
  - ~ telecommunications; mainly a market failure of current technology;
- problematic for:
  - ~ commercial agriculture;
  - ~ access to transport and services 24/7.

participate in the establishment and operation of tourism businesses. The support systems for developing rural tourism alongside some of the rivers will require the development of market-led,

mainly small to medium-scale businesses that are likely to require a publicly funded infrastructure and support from across the range of government agencies, the private sector and key stakeholders.

The critical issues from a tourism and leisure perspective focus on water and riverine quality, tourism demand, current and future tourism products, the integration of stakeholder needs, and the creation of an appropriate enabling environment.

Over the last decade, Sarawak has developed a relatively strong and diverse tourist industry based largely on physical landscape and human cultural attractions (Map 5), and is somewhat akin to the neighbouring state of Sabah in its products, landforms and seasonality. Initially the industry was centred on Kuching, but the national parks and wildlife centres have broadened the state's attractions substantially. In addition to strong inbound domestic tourist traffic from Peninsular

Malaysia, Sarawak has about one-third of a million international tourist arrivals annually. The average visitor stay in Sarawak is more than 9 days, compared with 6 days for Malaysia as a whole.

### Guiding principles for sustainable riverine tourism in Sarawak

- maintaining the clean, healthy and environmentally attractive river systems that are the essential foundation of riverine tourism; they must be sustained, and enhanced wherever possible.
- recognizing that river tourism is not just the use of river transport to travel to and from cultural and natural attractions, but includes an array of recreational activities on, in and alongside the rivers.
- providing clean, safe and healthy rivers, and comfortable and efficient facilities such as passenger terminals, that benefit the local population and are essential for the success of international tourism; the target market of users of the river for recreation includes local people enjoying leisure and holidays in their own state, visitors from Peninsular Malaysia, and international tourists.

**Map 5** Key tourist attractions in Sarawak



#### Sarawak Attractions

- 1 Tanjung Datu National Park
- 2 Sarawak Cultured Village
- 3 Gunung Gading National Park
- 4 Matang Wildlife Centre
- 5 Jalan Satok Sunday Market
- 6 Bako National Park
- 7 Skrang River Safari
- 8 Longhouse Tours
- 9 Batang Ai National Park
- 10 Similajau National Park
- 11 Niah National Park
- 12 Lambir Hill National Park
- 13 Gunung Mulu National Park

With the support of local and international agencies, the nurturing of the tourist industry can be an effective development tool in the implementation of the Millennium Development Goals (MDGs) for the eradication of poverty and its accompaniments by directing economic benefits towards the poor.

This process requires focused policies, plans and actions if the disadvantaged sections of the community are to benefit. This pro-poor approach is focused on creating suitable tourism locations and attractions, providing locally produced goods for the tourist industry, and offering associated services from local sources. For visits to many of the attractions such as parks, caves and longhouses, river travel on express boats, longboats, and penambang are an integral part of the experience, ferrying people far and wide. These opportunities can provide significant income for the rural poor, although the possibility of negative social impacts cannot be ignored.

**Method of investigating sustainable riverine tourism.** The core tourism and leisure study team comprises a SRB project team member and a tourism and leisure sub-consultant. The task is to assess the current and potential role of Sarawak's inland waterway transport system in tourism and recreational activities and in travel between tourist destinations, and to identify sustainable riverine tourism developments including those benefiting disadvantaged rural communities, their infrastructure and service requirements. The environmental impact is also being addressed. Again, a participatory approach is being adopted, including discussions,



consultations and workshops with stakeholders. This work, being carried out during Stage Two, includes:

1. a review of the 2nd Sarawak Tourism Master Plan 1993–2010, the tourism section of the INTIMS Report, the Malaysian Tourism Strategy, the Malaysian Rural Tourism Plan and other related information;
2. an analysis of the state's comprehensive tourist arrival and national park visitor statistics;
3. an assessment of regional tourist trends, patterns, and length of stay;
4. an assessment of study areas for tourism and leisure development potential and associated environmental impacts;
5. the role of the SRB in managing the development of sustainable riverine tourism.

### **Improving Safety and Security**

Safety is considered by the SRB to be of paramount importance. The future direction of strategies for river transport safety and security must be to continue to enhance river transport safety and security in the context of changing patterns of use of the waterway, to cultivate a safety culture, and to promote the good safety record of the river systems.

The SRB has functions, powers and duties to control and regulate the safety of waterborne traffic on the river systems of Sarawak, and in its ports and harbours. The area of jurisdiction of the SRB extends beyond the inland rivers to the three-mile state territorial waters limit along the coast. As noted in its Strategic Plan 2006–2010, the SRB places great emphasis on making the river systems safer, and will continue to conduct safety campaigns.

There is a common perception among the general public, and some policymakers, that river transport is unsafe and unclean. People are clearly sceptical about the safety of travelling by boat, and accidents on the rivers nearly always feature as news items. In fact official data demonstrate that water transport is safer than most other forms of transport, but there certainly are recurrent issues relating to boats, crews, the rivers, jetties and the environment, that require ongoing attention. Such matters are being addressed in the Master Plan and include the following elements:

### **Vessels and boats plying the rivers.**

Vessels and equipment vary greatly in age, design, condition, life-saving gear, capacity and risk from overloading, and provision of minimal security measures.

**Vessels and boat crews.** Crew are often inexperienced, untrained, unfamiliar with regulations, disregard safety measures, and unaware of local procedures and customs.

**River systems.** The rivers themselves can be dangerous with hazardous stretches especially in the upper reaches; sand bars and shallows occur

### Strategy for enhancing safety and security

- apply a risk management strategy of objectively assessing different categories of risk and prioritising enhancement measures accordingly, and continue to monitor risk;
- define a coherent and rational structure of responsibilities among the different agencies involved, and achieve a common, cooperative approach among these agencies;
- apply relevant international standards and practices to improve safety management;
- develop a safety culture, promote safety awareness and training, and enforce safety procedures effectively, so that prevention of problems prevails;
- carry out investigations of serious incidents and casualties in order to learn lessons for improving safety.



in the river estuaries; unmarked wrecks and other submerged objects can be dangerous; many stretches of river lack navigational aids and signage; and inclement weather can change sailing conditions very rapidly. A Marine and Risk Traffic Analysis (MRTA) report has been proposed as a requirement, to be submitted by any parties wanting to construct any structures within the rivers.

**Terminals and jetties.** In upriver rural areas, safe terminals and jetties are rare or non-existent; many, including some of

the larger new ones, are poorly designed; illegal jetties do not comply with regulations and may be difficult and risky to use; operational procedures take little account of safety; and movement of passengers and cargo between land and boat is often precarious.

**Environment and safety.** Substantial amounts of floating debris, particularly logs and solid waste, present a hazard; and there is a lack of facilities at terminals for boats to discharge bilge water, sewage and solid waste.

**Enforcement.** Enforcement is problematic due to insufficient manpower for this purpose in the SRB; there is often a lack of training among ship surveyors, inspectors and enforcement officers; there is a need to regularly review and update rules and regulations; and there is a lack of communication and cooperation among enforcement agencies.

These and similar issues of safety and security are being addressed and recommendations for improvement made in the Master Plan.

**Method of investigating safety and security.** The procedure for investigating safety and security included the following, being carried out during Stage Two:

1. a full risk analysis of all recorded fatalities, casualties, and incidents relating to water transport over the last decade, is being undertaken, and this will prove a database for tracking future trends.
2. a comparison is being made of international norms and practices for the

management of water transport safety and security with the current situation in Sarawak; this will enable the identification of shortcomings and inadequacies in local regulations and procedures.

3. the two preceding sets of findings will provide the basis for enhancing safety and security, and introducing specific measures and training for improvements in local river transport and terminal operations.
4. a critical assessment is being made of whether the International Association of Lighthouse Authorities Risk Management Tool for Ports and Restricted Waterways (employing both its qualitative and quantitative risk assessment criteria) is appropriate to the scale of operations for which the SRB is responsible.

### Advocating Environmental Sustainability and Enhancement

The future direction for environmental management of Sarawak's river systems needs to be the reinforcement of the SRB's existing efforts to remove, minimise and monitor the unfavourable environmental effects of riverine transport, and achieve its vision of clean rivers and the preservation of cultural heritage.

Protecting and enhancing the river environment is a critical issue that cuts across many different aspects and vested interests. The three components of inland waterway transport (commercial inland waterway transport, community waterway transport and riverine tourism), safety and security operations, and institutional management of the sector, all have



implications for the environment. Although the SRB's emphasis on clean rivers and preserving the cultural heritage has had a significant impact, there are still environmental issues related to existing riverine transport operations, and the major examples of these are as follows:

**Vessel operations.** The main issues relate to air pollution from engine exhausts; disposal of bilge water and other waste in the river; disposal of garbage by operators and passengers into the river; floating logs and other debris; and riverbank erosion exacerbated by fast moving craft.

**Ports, terminals and wharves.** The disposal of waste oil, sewage, garbage and other materials into the river at these destinations is a serious problem, with cumulative and disfiguring results.

**Other landside facilities.** Uncontrolled disposal of various waste materials and household garbage into the river is a perpetual problem.

**Riverine tourism.** Promotion of riverine tourism risks damaging the cultural heritage, and therefore requires precautionary measures.

**Safety enforcement.** In addition to personal injury or loss of life, accidents on the waterway can cause environmental damage: through spillage of fuel and engine oil; abandonment of boat or other wreckage in the river; and loss of cargo on the river which, in the case of hazardous materials, could have serious consequences.



**Institutional capacity.** Lack of resources and regulatory authority to deal with all existing environmental concerns creates uncertainty and allows undesirable outcomes to occur.

The Master Plan's proposal is to increase the utilization of Sarawak's river systems, but the volume of traffic on the rivers will further increase the risk of environmental damage. Appropriate measures are therefore essential to mitigate such risks.

***Method of investigating environmental sustainability and enhancement.***

Issues of environmental sustainability and enhancement are subsumed in each of the other components because of their cross-cutting character and are being dealt with in those contexts. The relevant procedures being carried out during Stage Two include:

1. reviewing the extent of relevant current environmental problems and recommending how they should be addressed;
2. assessing the level of potential environmental risks associated with proposed improvements, and identifying ameliorating measures.

A separate environmental consultancy will be carried out during Stage Three of the study, once the content of the complete Master Plan has been defined in more detail. This will aim to:

1. reinforce SRB's capacity to protect and enhance the environment;
2. make an overall assessment of the environmental implications of the Master Plan proposals;
3. carry out an initial environmental examination of those measures identified as having significant risks;
4. define the institutional strengthening measures required by the SRB to fulfil its obligations in managing the implementation of the Master Plan.

### Promoting Institutional Strengthening and Capacity Building

The SRB, along with other government agencies with responsibilities for inland waterway transport, will be operating within a legal and regulatory framework, with historical functions, powers, duties, and practices that may have been satisfactory in the past, but may be inappropriate in the future. It is therefore timely to review the current functions, powers and duties of the SRB with a view to responding positively to future challenges, thereby enhancing the effectiveness and efficiency in managing inland water transport in Sarawak. Alongside this, it would be appropriate for the SRB to review and revise its organisational structure to ensure that it has the resources, competencies and capabilities to fulfil its duties. There are several issues that could usefully be

addressed to enable the SRB to optimise its efforts, as follows:

**Organizational structure** in the SRB currently results in an imbalance in staff composition so that about 95% of staff comprise administrative support and enforcement personnel, leaving just 5% to perform all other functions such as senior and middle management, and the professional roles such as those of lawyers, accountants, engineers, and computer specialists. This structure has major implications for the way that the SRB is able to function. Such a structure in an organization like the SRB makes planning difficult, and reactions to changing circumstances frustratingly slow. To effectively fulfil its function, the SRB requires a different structure.

**Funding** for the SRB, a government not-for-profit agency, comes from two sources: government grants and revenue from service charges for some activities. There is no clear linkage between the costs associated with its duties and the grants and revenues available for fulfilling those duties (such as barrage operation, installation of navigational aids, clearance of wrecks, maintenance of terminals and the like). Issues raised in the section on safety and security clearly imply a need for adequate financial resourcing.

**Legal framework** issues highlight the need for adequate powers to enable the SRB to carry out its functions and duties including controlling and regulating waterborne traffic (including pilotage); keeping water clean and minimising pollution generally; improving navigation





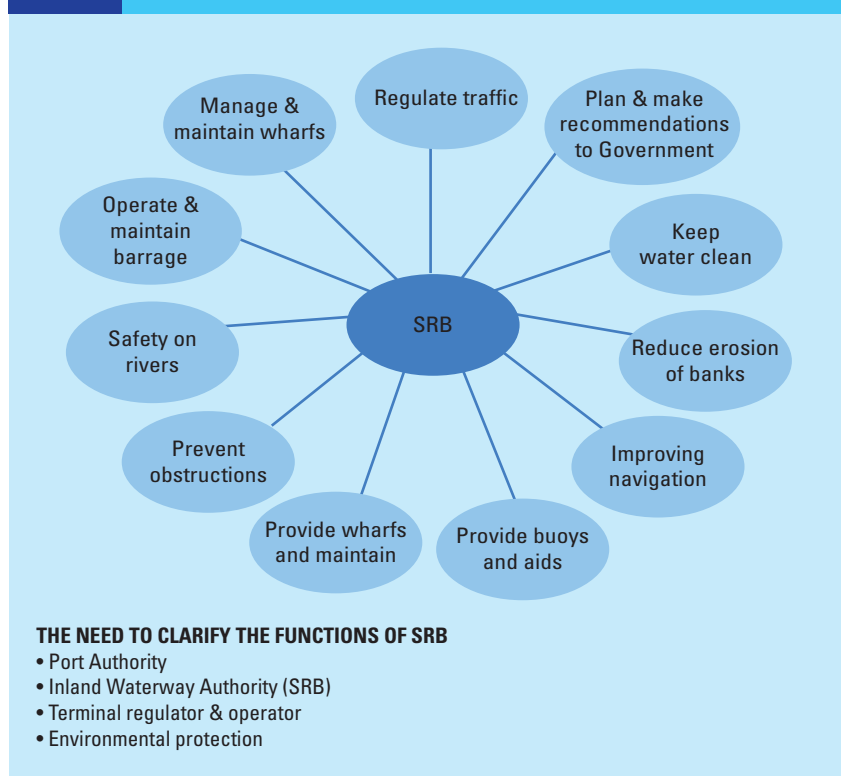
with respect to debris; providing buoys and aids for navigation; providing and maintaining wharves and jetties; preventing obstructions; making recommendations for river safety and prevention of collisions; operating and maintaining the barrage system; planning and making developmental recommendations to government; and reducing erosion of riverbanks. SRB also provides and manages extensive passenger boat services.

Overall, SRB has responsibility for the enforcement of safety and security measures on certain terminals and river vessels. However, it is not always clear where the functions of the Marine Department end and those of the SRB begin, nor is it satisfactory to have the SRB as both operator and enforcement agency.

**Environmental responsibilities** of the SRB include reducing the rate of riverbank erosion; removing and disposing of all pollutants, floating debris, and dilapidated fencing; and preventing rubbish from accumulating in or flowing down the river. Whilst ensuring vessels, terminals and wharves have facilities to discharge bilge water, sewage, and solid waste is itself a major task, being the sole environmental agency responsible for the pristine condition of all rivers in the state is a complex and difficult undertaking.

**Method of investigating institutional strengthening and capacity building.** The proposed strategy to review and analyse the institutional strengthening and capacity building capabilities of the SRB is being

**Figure 2** Institutional strengthening and capacity building



carried out in five stages during Stage Two, as follows:

1. audit current functions, powers and duties of the government agencies involved in the inland waterway transport sector, including those outside the current ordinance, their funding, revenue and costs, to assist in identifying inadequately covered or overlapping jurisdictions;
2. undertake an organizational structure analysis of the SRB in terms of human resources, staffing costs, duties and responsibilities, including an assessment of the adequacy of funding and revenue arrangements against the costs of fulfilling its functions, powers and duties, and a SWOT analysis of competencies,

capabilities, and resources;

3. review international norms and practices regarding the functions, powers and duties of inland water transport ports, riverine organizations and agencies, and use this information as the basis for a critical evaluation of Sarawak's riverine organizations and agencies with particular reference to conflicting, irregular, overlapping, and omitted provisions in jurisdiction, functions, powers, and responsibilities for commercial river craft, terminals and jetties.
4. consider the implications of the Master Plan in terms of new or potential functions, powers, and duties of the agencies involved, especially for the SRB, for which consideration of revised funding and revenue arrangements under different assumptions and scenarios will be required;
5. propose institutional strengthening and capacity building requirements for a 5-year Plan of Action and long-term planning to 2020, by: conducting a gap analysis between the SRB's current and preferred organizational structure; conducting a training-needs analysis for the SRB at the organization and individual levels for key staff; identifying priority-training needs for the improvement of job competencies for key departments and staff; identifying human resource development strategies and priorities in the areas of planning, project evaluation, modern inland waterway technologies and safety; conducting workshops, training sessions and seminars to enhance understanding and explore best practice in management and operation of an inland waterway system.



### **Advancing Sustainable Development, Public Participation, Communication Strategy, and Knowledge Management**

A number of strategies have been adopted in order to engage stakeholders throughout Sarawak in an education and awareness programme. This has involved organising newsworthy events relating to the rivers that involve all levels of society, including the civil, private and public sectors, that can be enjoyable as well as educational. The process and key lessons learnt during the study period are documented in brochures, manuals, slides, conference papers, DVDs or other media. These are used for distribution and presentation to the community, schools, universities, other government bodies, local and international forums.

Another strategy adopted is to collaborate with local media, with contributions from all stakeholders to release a series of articles about the rivers of Sarawak. The articles focus on community, river transportation and infrastructure, rural poverty, river tourism, river safety, policy, management and



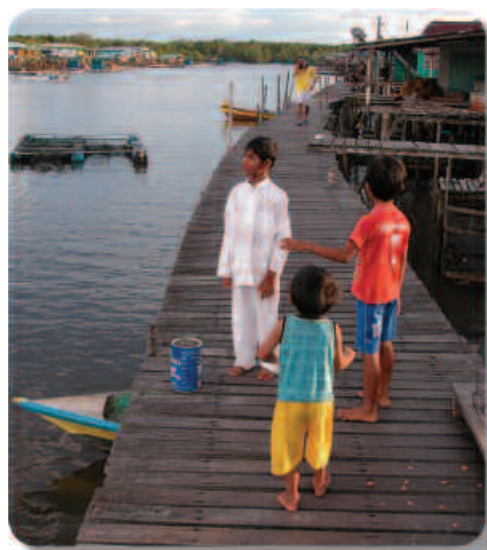
environment, for public consumption. Ultimately these articles will be assembled as a book entitled 'Reflections from Sarawak's Rivers', as documentation of issues faced by the rivers in Sarawak .

Other challenges for the education and awareness programme include: understanding stakeholders specific needs in different locations and designing appropriate events; creatively developing interesting educational events and activities to ensure participation and long-term learning; optimising the use of limited resources, time and budget in reaching people throughout the state; and applying resources and appropriate methods for measuring the quantitative and qualitative success of events and activities.

***Method of investigating sustainable development, public participation, communication strategy and knowledge management.*** Efficient communication at and between all aspects, (1)-(4), covering:

1. concept development: confirm objectives and research and develop event concept; estimate preliminary budget breakdown; develop detailed education and awareness; these are carried forward under (2);
2. stakeholder participation: survey, inter-

- view and evaluate preliminary proposals with inputs from local stakeholders; engage key stakeholders including local Resident and District Officer; discuss with community leaders; explore public/private partnerships; seek sponsorships;
3. implementation: mobilize site inspections by the SRB and UNDP team; hold the event;
4. knowledge management: quantify deliverables; compile feedback and prepare post hoc report; event documentation requires updating websites, collating event publications, writing articles for publication in The Borneo Post, and collating the photo gallery.





#### Box 6 Stakeholder feedback on promotion of river transportation

Everybody has a view!

- **Local government official** (with a laugh): Everybody wants roads; nobody is interested in river transportation now.
- **Key government decision maker:** The rivers are an untapped infrastructure we don't have to pay any money to construct, not like roads.
- **Rural longhouse resident:** My community wants to be modern, have electricity 24 hours, televisions, hand phones and cars. We don't want to live in the traditional way.
- **Tourism operator:** The tourists don't come all the way to see a modern longhouse made of concrete with cable TV, they want to see tradition and culture. We have to travel further and further into the rural areas now for this.
- **School headmaster:** Education in Malaysia is free, books, uniforms, boarding fees, everything. It is the standard of the students that we need to be concerned about.
- **Tourism consultant:** Water quality and the river environment are critical to riverine tourism. No operator will invest money in developing a tourism business and infrastructure if there is no guarantee that, next year, the rivers will not be polluted due to activities up-stream.
- **SRB staff:** The local community knows the rivers better than anyone else; we don't need to educate them.
- **Local tourist:** I only booked the boat to Mulu because the flights were full. The boat journey is longer, costs more, and then, if the water level is low, I even have to get out and help carry the boat!

# TWO PILOT PROJECTS

If funding is available, two pilot projects will be initiated during Stage 3 of the study as a precursor to the full-scale implementation of the Master Plan once approved. The pilot projects afford the opportunity to verify the feasibility and effectiveness of the proposals to improve facilities and safety measures for rural riverine communities.

## **Pilot Project One: Improving river facilities and capacity building in safety, for local communities in Mendamit and Limbang.**

### **Improving river facilities, and capacity building safety measures for local communities in Mendamit and Limbang**

#### **Context**

There are about 30 communities, 13 schools and 3 clinics along the Limbang, Mendamit and Tarikan Rivers up to the 'back' entrance of the Mulu National Park via the Headhunters' Trail. A large number of the local community, numbering over 20,000, are totally dependent on the rivers for transportation. In addition, up to 700 tourists a year take boats from Nanga Mendamit to Mulu and this number is expected to grow.

Due to the topography, soil conditions and scattered nature of the communities, there are no immediate development plans for roads from Nanga Mendamit onwards. However, many of the existing facilities, including landings and navigation channels for river transport used by students, clinic patients, villagers and tourists, are in poor condition and potentially unsafe.

#### **Objective**

- to develop a public, private and

#### **Box 7 Public private partnerships**

Corporate Social Responsibility (CSR) is about doing good and doing well. It is about corporations rising to the social and environmental challenges humankind is facing. Increasingly, UNDP engages businesses through CSR and public-private partnerships in support of national development aspirations. We seek to get some convergence of cultures, building the capacity of corporations to view development and environment issues from new perspectives.

New partnerships, sharper management tools and better national and local policy frameworks are all necessary to make a difference. Individuals, corporations, government and civil society alike have a role to play. While CSR on its own can only bring about little islands of improvement, collectively it has the potential to make a sea change in progress. Let the private sector therefore step forward as trusted ambassadors for Sarawak's rivers.

*Source: Tan, 2008, Borneo Post*

community partnership to ensure the comfort, safety and well-being of the rural communities and tourists by improving the basic amenities such as river landings, safety equipment, lighting, signage and clear navigable channels;

- to improve the quality of life of the rural communities dependent on river transportation by providing facilities that also encourage use by tourist operators and growth of tourist numbers, thus generating income for the rural communities that provide boat and homestay services;
- to develop capacity building and a culture of river safety through a training programme for river rescue, navigation, cardiopulmonary resuscitation (CPR) and first aid;
- to develop a sustainable approach to river management through community involvement, classification of rivers, and

improvement of river buffers, vegetation and river maintenance.

**Project components**

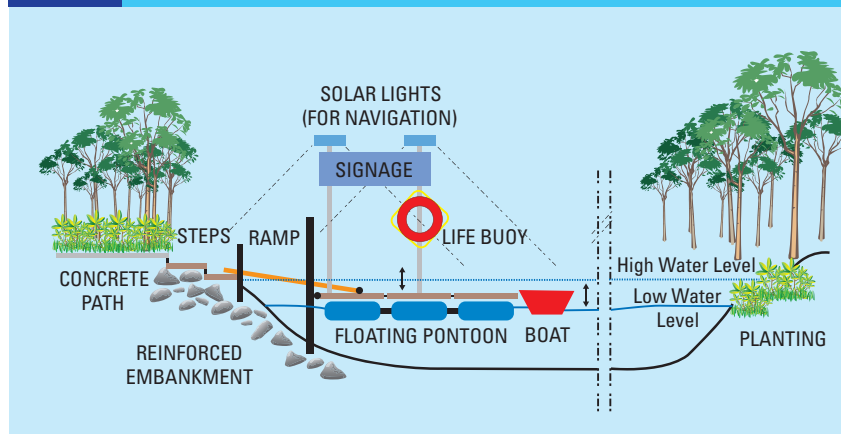
1. Undertake a survey of river conditions for river clearing and design of adjustable pontoons with landing steps, safety equipment, lighting, and signage; and further improve the condition of riverbanks.
2. Utilize lightweight and modular technology designs for the pontoons to reduce cost and allow community participation in assembly and maintenance.
3. Develop an ongoing safety training programme to be delivered by the SRB for long-term upgrading, practice and maintenance of safety skills.

The total length of the Limbang River from the mouth to Tarikan is 298 km, and the facilities required are extensive. Consequently, the initial phase will cover only the communities from Nanga Mandamit to Tarikan: this involves 5 schools, 1 clinic, 7 communities with (shared) tourist landings routinely used by up to 2,900 persons plus about 700 tourists a year.

This project can be implemented within a time frame of 10 to 12 months. The outputs will include the construction of 5 pontoons and integrated facilities, and the training of up to 1,000 community members and river tourism services in safety training.

If the lightweight and modular integrated pontoon systems, lighting, signage and safety equipment are deemed to be successful and cost effective, these systems could also be adopted by other communities in Limbang, Tatau, Ulu Baram, Kapit, and Belaga, where there is a need. With cleared waterways and proper landing facilities, additional services like floating libraries and trading banks become an

**Figure 3** Construction of pontoon and facilities for Limbang and Mendamit Rivers



option in improving the quality of life for these rural communities.

**Pilot Project Two:  
Developing the Rivers -  
Streets of Tomorrow (2)  
Improving service delivery to the rural river  
communities of Daro, Matu and Dalat, Mukah  
Division**

**Context**

There are over 45,000 people living in rural communities in Daro, Matu and Dalat. Many of these communities and 29 schools along

the Igan, Oya and Lassa Rivers are dependent on the rivers for transportation and support of their livelihood – as in the case of sago production and processing.

There are no immediate development plans for roads in the Daro and Matu districts. The communities use express-boat services and small channels as shortcuts to reach larger towns such as Sibul, Sarikei and Mukah, in order to access services such as banks and clinics. The river is also a source of water for drinking and bathing – especially during the dry season.

The Kut Canal, river and channels are used by the local community as a means of transportation, as a water source, and as a toilet for the disposal of sewage. This project will address the multiple uses of waterways that overlap in rural river communities to increase the standard and quality of life in these areas.

The establishment of the Sarawak Corridor of Renewable Energy (SCORE) will help to ensure the growth and improvement of this region. The Authority has, as a priority, the improvement of basic amenities, public services and public transportation in support of rural growth and development.

### **Objective**

- to clear and improve community navigation channels for safe and easy access;
- to improve services to rural communities by bringing mobile services such as a library, banks and healthcare to rural areas via river transportation;
- to ensure a sustainable river environment and improve quality of life for rural river communities by developing improved

sewage systems, and thus reducing pollution of the river and sources of water.

### **Project components**

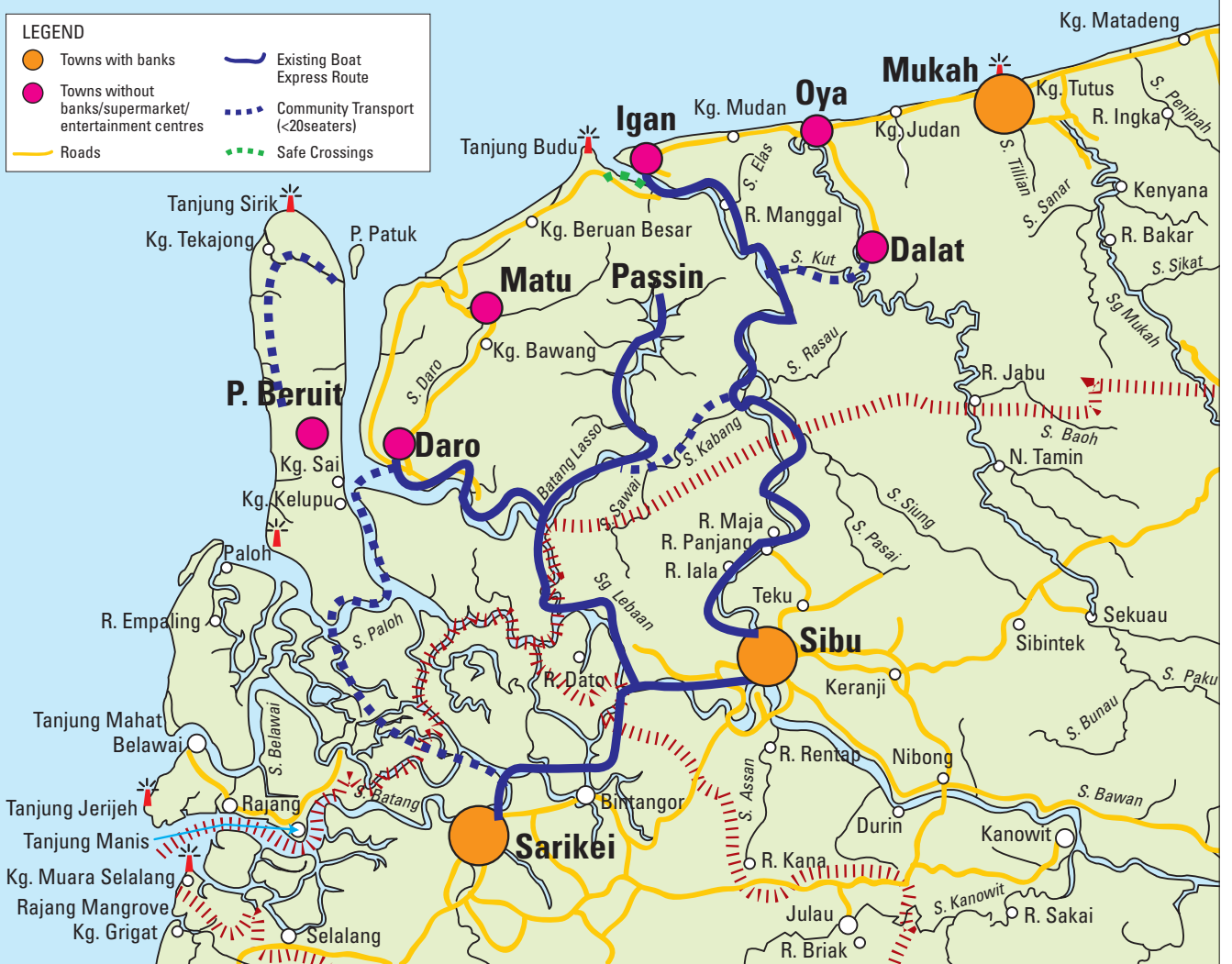
1. Survey and clear Kut Canal and other channels that link the Igan, Oya and Lassa Rivers, and work on improving the riverbanks.
2. Deploy a floating mobile library and bank, to increase services to the nearby rural communities, working in partnership with the Education Department and the private sector.
3. Construct an economical and sustainable sewage system for rural communities (of a type developed in Bangladesh) that can be constructed and maintained by individual community members.

This project can be implemented within a time frame of 12 to 18 months. The outputs will include the clearance by the SRB of approximately 30 km along the Kut Canal and channel links. The mobile library and bank will service Daro and involve a route of about 120 km that includes about 15,000 people and 23 schools, and will be run for a trial period of 12 months. There will be training to raise awareness of the need for improved sewage disposal and implementation of 20 rural sewage systems in 5 communities.

In the long-term it is planned to introduce an holistic plan to improve basic amenities and public health services to all of these rural communities. The rivers provide a largely untapped infrastructure that can be utilized to improve service delivery. If these mobile service boats and sewage systems prove successful, there is the potential to increase service delivery to the entire district of Mukah and beyond.

**Map 6** Community water transport network in Mukah Division

LEGEND	
	Towns with banks
	Towns without banks/supermarket/entertainment centres
	Roads
	Existing Boat Express Route
	Community Transport (<20seaters)
	Safe Crossings



**Daro, Matu, Dalat Districts:**

- ~ 4 towns
- ~ About 29 schools
- ~ Communities travel to Sibiu, Sarikei or Mukah for banking, supplies, entertainment
- ~ There is need for proper infrastructure such as jetties, signage, safety buoys/lights, dredging of channels.



# Lessons Learnt

## Development of Project Design

- The original terms of reference defined 23 navigable rivers for study over the project's duration of one year. However, the vastness of Sarawak, the difficulty of travel in many rural areas of the state, and a lack of available data on inland water transport, made it impossible to complete such a study within twelve months. Consequently the project team ran a workshop to redefine and limit the study to three major navigable systems linked to core passenger and freight routes, rural riverine poverty areas, and tourism activities.
- In general terms, strategic master planning (carried out by Sarawak's State Planning Unit), tourism, and community transport are not part of the core activity of the Implementing Partner, the Sarawak Rivers Board. An SRB Planning Team was therefore set up to ensure that the SRB is fully informed and involved, and that members of the Planning Team participate on a continuing basis in the planning process.
- The project aimed at increasing the participation of SRB team members to encourage technology and knowledge transfer and maintain continuity in developing the pilot projects and negotiating a public-private partnership. This strategy was adopted with the aim of building capacity in the areas of project conceptualization, business plans, river promotion and corporate social responsibility.
- A key requirement of the project was to hire local consultants for the detailed component of the study, working under an international consultant. This has not proved easy as inland waterway transport has not been the focus of research or investigation in Malaysia, and there are few calibered transport economists specializing in this field.

- The rivers are greatly affected by 'king' tides, the 'landas' (monsoon season) and 'kemarau' (dry seasons). During these periods, travel is severely impeded due to flooding and strong currents or, in contrast, by the difficulty of navigating in the upper reaches of the rivers when water levels are very low. Timing of fieldwork and surveys to avoid or accommodate these conditions is essential.
- Consultation with local communities from the very beginning of a project can provide important insights into the issues that need to be addressed, the people that should be interviewed and acknowledged, and the pitfalls to be avoided that are not necessarily obvious to members of the project team coming from different environments.

## Effective use of media and publicity

- There are notable benefits in maintaining a regular presence in the local newspapers, raising awareness of the issues relating to the state's rivers, and advising people of the objectives and benefits of the study.
- A comprehensive Education and Awareness Programme conducted in each of the 11 divisions of Sarawak, has brought together government officials and enabled them to see for themselves the issues and challenges people are confronted by when living in a rural, riverine environment.

# ISSUES AND CHALLENGES

- **Taking responsibility for river management.** Giving agencies clearly defined responsibilities and the authority to enforce the requisite regulations, would improve conditions on and around the waterway system. River management is not a clearly defined or designated responsibility, and jurisdictions are unclear and overlap. This inevitably results in confusion, uncertainty, and an unwillingness to take urgently needed initiatives.
- **Investing in rivers.** Changing the mindset of decision makers in positions of authority and influence so that they are enthusiastic about investing in the rivers as a long-term, economically feasible, environmentally sustainable form of transportation. Many countries around the world are demonstrating that inland water transport is a twenty-first century technology worth investing in.
- **Project implementation.** The project was designed to complete a Master Plan that would be handed to the local agency for implementation. Given the Sarawak Government's comments that many such projects are shelved and not implemented, the recommendation has been made that pilot projects should be started while the Master Plan is being completed, which would provide an opportunity to assess the implementation agency's needs for capacity building, and for resolving any other implementation issues.
- **Supporting the Master Plan.** Engaging public and private sector participation, civil society, boat users and operators, and the travelling public so that the Master Plan is accepted, owned, and supported by all stakeholders.
- **Identifying an appropriate rivers authority.** There is no integrative or authoritative rivers management authority. The SRB is charged with two core roles: safety and cleanliness; and their implementation involves supervision of navigation aids, terminals, riverbanks and related matters. The larger issues of strategic planning, river infrastructure, promotion of the rivers, and social responsibility toward the river communities and their basic amenity needs are not part of the SRB's direct responsibilities. Is this provision really adequate for such a major task?
- **Enhancing community water transport infrastructure.** Improving facilities for inland waterway transport in rural areas should be driven by the needs of the communities who use water transport for their daily activities like going to market, to school, to work on smallholdings and on plantations. Tourism should not be the primary driver for such infrastructure but should access what is developed primarily for the community; community water transport is an issue of social responsibility for the well-being of the local population.
- **Revitalizing river transportation.** Can the natural death of river transportation be avoided? As logging tracks are developed and plans for new roads are announced, existing operators stop investing in the maintenance and upkeep of boats, schedules become more irregular, patronage declines, and the demise of the system can become a self-fulfilling prophecy. Is this in anybody's best interest?
- **Holistic river management.** There is an urgent need to adopt a more holistic approach to the management of rivers in all phases of planning, development, conservation, restoration and promotion.

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