



# IMPROVING INFRASTRUCTURE, UTILITIES AND URBAN TRANSPORTATION

# 18

## I. INTRODUCTION

18.01 Infrastructure and utilities development during the Eighth Plan period contributed to the expansion of the transportation, water supply and sewerage networks. Infrastructure projects contributed to economic growth through its linkages and spillover benefits. Measures were undertaken to increase the efficiency and reliability of infrastructure facilities and services to support trade and business activities as well as improve the quality of life.

18.02 The thrust for infrastructure and utilities development in the Ninth Plan period will focus on increasing the coverage of the networks and optimising the utilisation of existing facilities to support economic activities. Increasing accessibility to infrastructure facilities in rural areas, better integration of transport modes and services as well as higher quality and reliability of the water supply system will be the thrust in the planning and implementation of infrastructure projects. Measures will be implemented to improve multimodal public transport, particularly in urban centres, to reduce traffic congestion and air pollution. Environmental considerations will be emphasised in project planning and implementation to ensure sustainable development.

## II. PROGRESS, 2001-2005

18.03 Recognising that efficient and reliable infrastructure facilities and services were vital to support economic development, infrastructure development continued to be given priority during the Eighth Plan period. A total of RM38.7 billion was expended to increase the capacity as well as upgrade and refurbish the infrastructure and utilities networks to meet rising demand and improve service delivery.

### Roads

18.04 The road development programme was implemented based on a three-pronged strategy, namely to increase capacity, provide access to rural and new development areas as well as improve road safety. A total of RM18.5 billion was

expended on road development while 22 projects costing RM4 billion were undertaken through the deferred payment scheme. Several major roads such as the East Coast Highway Phase 1 from Karak to Kuantan in Pahang, Muar Bypass Road in Johor, Nangoh-Kanibungan Road in Sabah and Tanjung Kidurung-Suai-Bakam Road in Sarawak were completed to support the development of the eastern corridor of Peninsular Malaysia as well as Sabah and Sarawak. Under the privatization programme, about RM4 billion was invested to complete four toll roads and initiate six new projects.

18.05 Under the road safety programme, 34 accident-prone spots were improved while 280 slope failures were repaired to ensure safety of road users. In addition, 122 kilometres of motorcycle lanes were constructed along major roads to reduce accidents. Better coordinated safety campaigns were undertaken to promote a road safety culture, which contributed to the reduction in the number of accidents. The fatality rate declined from 5.7 deaths per 10,000 registered vehicles in 2000 to 4.2 deaths in 2005.

18.06 Emphasis was also given to improve the accessibility of rural areas, whereby RM714 million was spent to construct 340 kilometres of rural roads with minimum JKR-R3<sup>1</sup> standard. In addition, RM1.6 billion was spent to construct and maintain 500 kilometres of village roads benefiting about 2.5 million people.

18.07 The rapid rate of new road construction improved road connectivity and the total road length increased from 66,391 kilometres in 2000 to 77,673 kilometres in 2005. In tandem with this, the National Road Development Index (RDI) increased from 0.75 to 0.85. Most of the states in Peninsular Malaysia recorded a higher RDI compared with the national index, as shown in *Table 18-1*.

### **Urban Transport**

18.08 Urban transportation strategies focused on the development of an integrated, efficient and reliable public transport system to encourage a modal shift from using private vehicles to public transport, particularly in the Klang Valley. Measures undertaken included the restructuring of the public transport system through the *Integrasi dan Penyusunan Semula Pengangkutan Awam di Lembah Klang* (INSPAK) programme. Under the INSPAK programme, bus services were improved, particularly to support the urban rail systems, thereby optimising the potential of the rail systems as the backbone for public transport services in the Klang Valley. Infrastructure projects that improved connectivity between urban rail transit stations were implemented such as construction of overhead pedestrian bridges and covered walkways. During the Plan period, the average daily ridership for all urban rail services increased, as shown in *Table 18-2*.

---

<sup>1</sup> JKR-R3 standard roads have a minimum width of 3 metres and speed limit of 70 kilometres per hour.

TABLE 18-1  
ROAD DEVELOPMENT INDICATORS, 2000-2005

State	Road Length (Km)		Road Density <sup>1</sup>		Road Service Level <sup>2</sup>		Road Development Index <sup>3</sup>	
	2000	2005	2000	2005	2000	2005	2000	2005
Johor	6,780.3	7,179.0	0.34	0.36	2.45	2.31	0.91	0.91
Kedah	5,469.8	5,494.8	0.58	0.58	3.27	2.97	1.36	1.32
Kelantan	2,704.4	2,843.6	0.18	0.19	1.99	1.89	0.60	0.60
Melaka	1,698.4	2,013.3	1.03	1.22	2.63	2.82	1.64	1.86
Negeri Sembilan	3,842.6	4,162.3	0.58	0.63	4.44	4.40	1.60	1.66
Pahang	7,753.4	7,791.6	0.22	0.22	5.98	5.46	1.14	1.09
Perak	5,017.0	7,058.0	0.24	0.34	2.40	3.13	0.76	1.03
Perlis	544.6	716.1	0.67	0.88	2.62	3.19	1.33	1.68
Pulau Pinang	1,736.2	2,098.6	1.64	1.99	1.30	1.43	1.48	1.69
Sabah	10,975.1	16,090.7	0.15	0.22	4.22	5.49	0.80	1.10
Sarawak	6,228.6	6,471.6	0.05	0.05	3.01	2.80	0.39	0.38
Selangor	7,871.3	9,815.0	0.99	1.23	1.88	2.07	1.36	1.60
Terengganu	4,345.7	4,515.4	0.34	0.35	4.81	4.44	1.27	1.24
Wilayah Persekutuan	1,423.4	1,423.4	3.67	3.67	0.95	0.87	1.87	1.79
<b>Malaysia</b>	<b>66,390.8</b>	<b>77,673.4</b>	<b>0.20</b>	<b>0.24</b>	<b>2.83</b>	<b>2.97</b>	<b>0.75</b>	<b>0.85</b>

Source: Economic Planning Unit

Notes: <sup>1</sup> Measures road lane length over the total area.

<sup>2</sup> Measures total road lane length per 1,000 population.

<sup>3</sup> Measures the level of road development taking into account both area and population size of the country.

TABLE 18-2  
AVERAGE DAILY RIDERSHIP ON URBAN RAIL SERVICES,  
2001-2005

	2001	2002	2003	2004	2005
STAR LRT (Ampang/Sri Petaling Line)	88,801	91,702	107,082	120,426	125,208
PUTRA LRT (Kelana Jaya Line)	143,778	149,105	154,869	160,361	165,695
KLIA Express and KLIA Transit	-	4,983	7,323	9,990	12,075
KL Monorail	-	-	23,872	33,837	44,442
KTM Komuter	57,339	60,504	67,522	74,960	85,733

Source: Economic Planning Unit

18.09 The National Transport Policy and Strategy Study, which was completed in 2003, provided an inventory and status of transport and transport-related plans, studies as well as projects undertaken by the Government. The Study highlighted that current policy statements were mostly mode-specific and related only to the development of individual transport modes. In this regard, the needs and issues in developing a comprehensive national transport policy, including urban transport, were identified.

18.10 The Integrated Transport Information System (ITIS) project, covering 243 square kilometres of Kuala Lumpur City and its surrounding area, was completed by the end of 2005. Public transport operators and other road users were able to utilise the ITIS to obtain real-time information on traffic situations as well as track the location of their vehicle to plan their journey effectively. The real-time information was accessible from the ITIS website, ITIS call centre, visual display boards and over the radio.

18.11 Major urban road projects implemented to improve traffic flow in Kuala Lumpur included the Stormwater Management and Road Tunnel (SMART) project as well as the Kampung Pandan-Sultan Ismail and Jalan Mahameru-Jalan Sentul flyovers. Other road projects that commenced construction included grade separated interchanges at Jalan Tebrau-Pasir Gudang in Johor and Karamuning, Kota Kinabalu in Sabah as well as the Butterworth Outer Ring Road (BORR) in Pulau Pinang.

### **Rail Transport**

18.12 The railway subsector development was focused on enhancing the efficiency and quality of rail services to provide safe, efficient, reliable and integrated rail services for passengers and goods. Major projects undertaken to upgrade railway infrastructure included the Rawang-Ipoh electrified double tracking project, track and bridge rehabilitation works, modernisation of signalling and communications systems as well as purchase of rolling stock. Dedicated rail connections from Kempas to the Port of Tanjung Pelepas (PTP), Johor and from Kerteh to Kuantan Port were completed. However, the completion of the Rawang-Ipoh double tracking project was rescheduled from October 2004 to December 2007.

18.13 A corporate restructuring exercise was undertaken to improve the operational viability of *Keretapi Tanah Melayu Berhad* (KTMB). The exercise involved, among others, the reorganisation of KTMB into three major strategic business units (SBU), namely Freight, Inter-city and *Komuter* to operate as autonomous business entities while the corporate headquarters provided support in terms of policy formulation and strategic directions. The Freight SBU remained the major contributor to the total revenue of KTMB.

18.14 To improve rail services in Sabah, an upgrading project from Tanjung Aru to Tenom was jointly implemented by KTMB and the Sabah State Railway. The replacement of sleepers and minor repairs of rolling stock were completed in 2003 while the upgrading and strengthening of tracks, bridges and stations as well as signalling and communications systems commenced in 2005.

### **Ports**

18.15 Development of ports continued to focus on increasing capacity, upgrading equipment and facilities as well as enhancing the efficiency of port and port-

TABLE 18-3  
**PORT CAPACITY, NUMBER OF BERTHS, CRANES,  
 SHIP CALLS AND VOLUME OF CARGO HANDLED AT PORTS<sup>1</sup>,  
 2000-2010**

	2000	2005	2010
Port Capacity (million tonnes)	324.9	443.3	570.0
Number of Berths	221.0	233.0	242.0
Number of Cranes <sup>2</sup>	131.0	217.0	265.0
Number of Ship Calls	81,313.0	98,345.0	130,000.0
Volume of Cargo Handled (million tonnes)	223.9	369.4	539.0
General	23.3	44.7	47.0
Liquid Bulk	87.5	103.8	202.0
Dry Bulk	28.6	38.2	44.0
Containerised Cargo	84.5	182.7	246.0
Container (million TEUs)	4.9	12.1	18.0

Source: Economic Planning Unit

Notes: <sup>1</sup> Includes Port Klang, Penang, Pasir Gudang, Tanjung Pelepas, Kuantan, Kemaman, Bintulu, Kota Kinabalu, Lahad Datu, Sandakan, Tawau, Kuching, Miri, Rajang, Lumut, Teluk Ewa, Kuala Perlis, Kuala Kedah, Tanjung Bruas, Port Dickson, Kerteh, Sungai Udang, Tanjung Lempung and Labuan.

<sup>2</sup> Includes gantry and multipurpose cranes.

related services. Major projects undertaken to expand the capacity of ports included the construction of additional berths at West Port of Port Klang, PTP, Penang Port and Kuantan Port as well as a container terminal and oil jetty in Sepangar Bay, Sabah and the Second Inner Harbour Basin of Bintulu Port in Sarawak.

18.16 The volume of cargo handled at ports increased from 223.9 million tonnes in 2000 to 369.4 million tonnes in 2005, as shown in *Table 18-3*. Among the major ports, Port Klang registered an increase of 57 per cent from 70 million tonnes in 2000 to 110 million tonnes in 2005 while PTP registered an increase of 102 per cent from 29.5 million tonnes to 59.6 million tonnes. Port Klang and PTP were ranked 13<sup>th</sup> and 16<sup>th</sup> in the world in 2004 in terms of volume of containers handled as reported in the Containerisation International Yearbook 2005.

18.17 Rivers were utilised for transportation as well as promotion of tourism, particularly in Sarawak and Melaka. Express boat terminals and jetties were built and upgraded to enhance the safety and convenience of river transportation in Sarawak. A project to clean and beautify the Melaka River was also implemented including the construction of river embankments, pedestrian walkways and bridges.

## Airports

18.18 During the Plan period, the number of passengers handled at airports increased from 32.9 million in 2000 to 42.8 million in 2005. Airport facilities were

enhanced to meet the increasing air traffic demand. In Sarawak, new airports were built in Limbang and Bintulu while the Miri and Sibu airports were upgraded to complement other modes of transport, particularly to the rural areas. Upgrading works on the Alor Setar and Kota Bharu airports were also completed.

18.19 Efforts to promote KL International Airport (KLIA) as an aviation hub resulted in increased frequencies by existing airlines as well as new airlines commencing operations. The number of passengers handled at KLIA increased from 16.8 million in 2000 to 23.2 million in 2005. In a survey conducted by the Airports Council International (ACI) and International Air Transport Association (IATA) in 2005 on customer satisfaction, KLIA was ranked third in the best airport worldwide category and first in the 15-25 million passengers per year category.

### **Water Supply**

18.20 Among the major projects undertaken to ensure adequate and sustainable water supply to meet domestic and industrial water demand were the Rasa Phase II Water Treatment Plant (WTP) and Bukit Badong Phase II WTP in Selangor, Gadek WTP in Melaka, Gemencheh WTP in Negeri Sembilan and Bintulu WTP in Sarawak. The construction of four dams was also completed, namely the Beris Dam in Kedah, Chereh Dam in Pahang, Jus Dam in Melaka and Kelalong Dam in Sarawak. The production capacity increased from 11,917 million litres per day (mld) in 2000 to 14,226 mld in 2005. Water supply coverage increased from 92 per cent to 95 per cent during the same period.

18.21 A total of RM640 million was expended to reduce non-revenue water (NRW). Measures undertaken included the replacement of 3,380 kilometres of old pipes and old water meters and the reduction of water pilferages as well as the rehabilitation and upgrading of water distribution systems and WTPs. The national NRW rate decreased from 40 per cent in 2000 to 38 per cent in 2005.

18.22 In line with the policy of providing potable water to rural areas, a total of RM734 million was expended for the *Bekalan Air Luar Bandar* (BALB) programme. This programme comprised the construction of pipe connections from public water mains to rural areas, upgrading of existing WTPs and water supply systems as well as the construction of reticulation systems. The programme also included the implementation of alternative water supply systems. The BALB programme benefited 41,000 people in Peninsular Malaysia, 207,000 in Sabah and 106,000 in Sarawak.

18.23 The Federal Constitution was amended in January 2005 to transfer matters related to water supply services from the State List to the Concurrent List. The amendment enabled the Federal Government to regulate water supply services while ownership and control of water resources, dams and catchment areas remained with the state governments. Two bills were drafted, aimed at

creating an effective and efficient water services industry and the formation of the *Suruhanjaya Perkhidmatan Air Negara* (SPAN) as the water services regulator.

### **Sewerage**

18.24 One of the major projects implemented to provide efficient, reliable and environmentally safe sewerage services was the National Sewerage Project (NSP). The construction of Phase 1 of the NSP, which comprised five projects in Kuala Lumpur and Selangor, began in 2004. The construction of several sewerage treatment plants (STPs) was completed such as the plants in Bayan Baru, Kuala Terengganu, Port Dickson as well as in Padang Mat Sirat and Pantai Tengah in Langkawi. Other sewerage facilities such as septic tanks and communal treatment plants were also constructed and existing systems were upgraded and rehabilitated. The population served by these sewerage facilities increased from 6.7 million in 2000 to 8.1 million in 2005.

### **Flood Mitigation**

18.25 A total of RM1.8 billion was expended to reduce flood hazards, especially in urban areas. In the Klang Valley, efforts undertaken to reduce floods included the construction of SMART, Batu and Jinjang flood retention ponds as well as flood diversions. The frequent flooding problems along Sungai Muda and within the towns of Baling, Kuala Ketil and Sik in Kedah were addressed with the implementation of the Sungai Muda Phase 1 project that involved river improvement works and the construction of a barrage. Other major flood mitigation projects undertaken included the Sungai Perai and Bertam-Kepala Batas projects in Pulau Pinang and the Sungai Air Hitam and Sungai Rasau projects in Selangor.

### **Export of Expertise**

18.26 The Government facilitated Malaysian construction firms to venture overseas, capitalising on the capacity and capability acquired from infrastructure development in the country. A total of 76 construction firms undertook 316 projects overseas worth RM17.6 billion, mainly in the South Asian and the Middle East regions.

## **III. PROSPECTS, 2006-2010**

18.27 The thrust of infrastructure development during the Ninth Plan period will be on greater utilisation of existing facilities with emphasis on better delivery and quality of services, expansion of networks to underserved areas as well as capacity expansion. In this regard, infrastructure will be developed to facilitate the growth of other sectors and be guided by the following strategies:

- ❑ *enhancing accessibility to quality infrastructure facilities in rural areas to reduce the development gap between urban and rural areas;*



- ❑ *providing efficient and reliable services to ensure optimal utilisation of infrastructure facilities as well as improving the safety and comfort of users;*
- ❑ *optimising the use of resources, particularly water, through sustainable management and better infrastructure facilities;*
- ❑ *encouraging the use of public transport as the preferred mode of travel, particularly in urban areas, by promoting seamless integration of various transport modes;*
- ❑ *increasing the competency and capability of service providers of infrastructure services; and*
- ❑ *encouraging the export of expertise in construction and project management.*

## **Roads**

PAGE

**382**

18.28 The road development programme will be undertaken with emphasis on improving accessibility to less developed areas, particularly those with potential for tourism, agriculture development and rural growth centres. The review of the Highway Network Development Plan (HNDP), which is expected to be completed in 2006, will identify priority projects to improve the national road network in Peninsular Malaysia. The review will also identify road projects that can be implemented under the privatization programme. Another study will be undertaken to identify the road networks required to expedite development of Sabah and Sarawak.

18.29 Under the rural roads programme, more roads with minimum JKR-R3 standard will be constructed to improve transportation of agriculture produce. In addition, the programme will be expanded to connect resettlement areas to rural industrial areas and estates, particularly in Sabah and Sarawak, to enhance the mobility of the rural population to work in these areas. This will contribute towards reducing the development gap between urban and rural areas.

18.30 Road safety will be emphasised by improving the physical aspects of roads and inculcating good road ethics among users. Measures will continue to be undertaken to improve accident-prone spots on major roads as well as state and local authority roads. These include the straightening of roads, providing lanes for over-taking and improving road markings. Reinforcement works will be implemented on slope failures to prevent landslides. More pedestrian crossings will be provided, especially in the vicinity of schools. Road safety programmes will be intensified to reduce accidents including more stringent enforcement of traffic regulations.



## Urban Transport

18.31 The development of urban transport will focus on encouraging a modal shift from private vehicles to public transport to alleviate traffic congestion. In the Klang Valley, the usage of public transport has declined from 34 per cent in 1985 to 16 per cent in 2003. In this regard, measures will be implemented to improve the public to private transport split and achieve a ratio of 30:70. These include the expansion of Light Rail Transit (LRT) and *Komuter* services, procurement of more rolling stock and buses, enhancement of stations as well as park and ride facilities. In addition, integrated transport terminals will be constructed as transit hubs to enable inter-city passengers to access the central areas of Kuala Lumpur by urban rail systems.

18.32 A commission will be established to regulate public transport systems in the Klang Valley. The commission will also be responsible for the planning, coordinating and licensing of all public transport modes in the Klang Valley.

18.33 Several urban roads will be constructed or upgraded to improve traffic flows and dispersal in major cities. These include the construction of ring roads and bypasses in Georgetown, Pulau Pinang; Seremban, Negeri Sembilan; and Johor Bahru, Johor. The SMART project in Kuala Lumpur is scheduled for completion in December 2006. The motorway section of the tunnel is expected to ease traffic congestion at the southern gateway to Kuala Lumpur.

18.34 The growing need for an efficient, affordable and safe transport system requires an orderly and integrated long-term transport policy. Towards this end, the national transport policy will outline the objectives and strategic directions of the transport sector, its relationship with other sectors as well as future development.

## Rail Transport

18.35 During the Plan period, the development of rail transport will focus on increasing operational efficiency as well as promoting rail transport as a major mode of freight transportation and an efficient alternative inter-city transport for passengers. Towards this end, rail infrastructure will be upgraded and the communications system modernised. These include the track realignment and improvement works from Taiping to Padang Rengas, rehabilitation and strengthening of tracks and bridges as well as computerising the signalling systems. Spur lines will be constructed to provide dedicated freight services from industrial areas to major cities and ports. In addition, rolling stock will be refurbished and new ones procured. New stations will also be built to serve new growth areas as well as replace old ones. However, old stations, which have heritage value, will be restored.

18.36 Rail services in Sabah will be enhanced with the completion of the rehabilitation and upgrading programme of rail infrastructure, rolling stock as well as signalling and communications system from Tanjung Aru to Tenom. This programme will improve safety of the rail services as well as reduce travel time between the two destinations by half. It will also increase access to rural areas as well as support agriculture development and tourism along this corridor.

## Ports

18.37 Efforts to enhance the performance and productivity of ports will be continued in view of the stiff competition from regional ports. Measures to be undertaken include promotions to attract more main line operators and forging strategic alliances with international ports as well as further develop ancillary services. To improve turnaround time at ports, additional gantry cranes and other operating equipment will be purchased and cargo storage facilities upgraded. Approach channels and port basins will be dredged to enable very large vessels to call as well as free trade zones developed to enhance port operations. Malaysian ports will continue to forge cooperation with international ports to enhance networking as well as attract more main line operators to call, particularly at Port Klang and PTP.

18.38 The use of information and communications technology (ICT) will be intensified and expanded to further improve the efficiency of ports. In this regard, electronic documentation systems will be extended to smaller ports and usage of ICT in port operations will also be increased such as e-billing and e-commerce.

18.39 Focus will continue to be given to improving navigational safety and reducing sea pollution. Measures to be undertaken include the upgrading and expansion of the navigational safety system as well as intensifying the monitoring of vessel movements. Disposal of wrecks as well as dredging works will also be undertaken. Surveillance on Malaysian territorial waters will be further strengthened when the *Agensi Penguatkuasa Maritim Malaysia* (APMM), which was established in 2005, increases its personnel and acquires additional ships.

18.40 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.

## Airports

18.41 Passenger traffic is forecasted to grow at an average rate of 5.8 per cent per annum to 54.5 million passengers in 2010, as shown in *Table 18-4*. The forecasted growth in air traffic will require the continued expansion of airport capacity and facilities. KLIA is expected to reach its capacity limit of 25 million passengers per annum (mppa) by 2008. Work to increase the capacity

to 45 mppa is scheduled to commence during the Plan period. Upgrading works on Kuching, Kota Kinabalu, Labuan and Kuala Terengganu airports will be completed by the end of the Plan period. Accessibility to the interior of Sarawak will also be improved with the expansion of existing airstrips.

TABLE 18-4  
**TRAFFIC AT MALAYSIAN AIRPORTS, 2000-2010**

<i>Traffic</i>	2000	2005	2010
<b>Passengers ('000)</b>			
Domestic	19,838	25,639	30,418
International	13,066	17,189	24,086
<b>Total</b>	<b>32,904</b>	<b>42,828</b>	<b>54,504</b>
<b>Cargo (tonnes)</b>			
Domestic	122,098	197,783	268,086
International	653,045	809,031	1,213,415
<b>Total</b>	<b>775,143</b>	<b>1,006,814</b>	<b>1,481,501</b>
<b>Commercial Aircraft Movements (number)</b>			
Domestic	282,435	344,630	416,855
International	98,978	137,378	194,640
<b>Total</b>	<b>381,413</b>	<b>482,008</b>	<b>611,495</b>

Source: Malaysia Airports Holdings Berhad, Senai Airport Terminal Services Sdn. Bhd.

18.42 The expected increase in flight frequencies will require sophisticated air traffic control equipment. Communications and navigation equipment for air traffic control such as radar, flight processing and voice recording equipment as well as aeronautical information systems will be upgraded to enable more accurate and efficient handling of air traffic. Satellite equipment and digital communications will be used to further increase flight safety as well as conform to International Civil Aviation Organisation (ICAO) requirements. Compliance with these requirements is important to attract more airlines to fly into Malaysia. Continuous training of air traffic control personnel will also be emphasised to increase their competency.

18.43 In line with the trend towards liberalisation of air services, the Government will continue to negotiate for additional traffic rights under the liberal or open sky policy with key countries including member states of the European Union. More air services agreements will increase connectivity, which will facilitate trade and tourism. In this regard, ASEAN airlines will have unrestricted access to ASEAN capitals by 2008.

18.44 During the Plan period, Malaysia Airlines (MAS) will focus on building a more viable and sustainable network and increasing its market share in the regional market. This will involve increasing capacity and frequency as well as route rationalisation and establishing new destinations.

## Water Supply

18.45 Efforts will be undertaken to conserve the quantity and improve the quality of existing water resources as well as identify potential water resources to be developed to ensure adequate and sustainable supply of water. Water demand for domestic and industrial use is expected to increase at an average rate of 6.6 per cent per annum to 16,270 mld in 2010, as shown in *Table 18-5*. The construction of new dams, water intakes, WTPs and distribution systems will be undertaken. With the expansion in capacity, the water supply coverage is expected to increase to 96.8 per cent, as shown in *Table 18-6*.

TABLE 18-5  
**PRODUCTION CAPACITY AND QUANTITY OF WATER SUPPLY,  
2000-2010**  
(Mld)

State	2000		2005		2010	
	Production Capacity	Quantity of Water Supply	Production Capacity	Quantity of Water Supply	Production Capacity	Quantity of Water Supply
Johor	1,285	1,158	1,436	1,325	1,747	1,489
Kedah	988	804	1,194	1,098	1,904	1,175
Kelantan	214	212	276	239	448	401
Melaka	386	324	405	398	661	572
Negeri Sembilan	528	490	702	620	722	665
Pahang	762	500	912	676	1,340	1,187
Perak	969	812	1,306	897	1,595	1,567
Perlis	91	84	102	92	225	123
Pulau Pinang	1,050	741	1,166	802	1,227	1,003
Sabah	718	706	761	740	1,201	1,004
Sarawak <sup>1</sup>	918	602	948	745	1,166	1,050
Selangor <sup>2</sup>	3,437	2,858	4,390	3,740	5,150	5,000
Terengganu	511	334	568	400	1,036	986
Labuan	60	30	60	34	60	49
<b>Malaysia</b>	<b>11,917</b>	<b>9,655</b>	<b>14,226</b>	<b>11,806</b>	<b>18,482</b>	<b>16,271</b>

Source: Water Supply Department, Ministry of Energy, Water and Communications, Malaysia

Notes: <sup>1</sup> Includes partly treated water to rural areas.

<sup>2</sup> Includes Wilayah Persekutuan Kuala Lumpur and Wilayah Persekutuan Putrajaya.

18.46 The efficiency of water supply will be improved through the NRW reduction programme. Measures to be undertaken include strict enforcement against water theft, pipe and meter replacements, Geographical Information System (GIS) mapping of distribution networks, rehabilitation of distribution systems and upgrading of existing WTPs as well as setting up operation centres. The national NRW rate is expected to decrease to 30 per cent in 2010, as shown in *Table 18-7*.

TABLE 18-6  
URBAN AND RURAL WATER SUPPLY COVERAGE, 2000-2010  
(% of population)

State	2000			2005			2010		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Johor	100.0	98.0	99.0	100.0	99.0	99.5	100.0	100.0	100.0
Kedah	100.0	97.0	98.0	100.0	99.0	99.5	100.0	100.0	100.0
Kelantan	63.0	48.0	53.0	80.0	60.0	70.0	85.0	70.0	78.0
Melaka	100.0	99.0	99.0	100.0	99.5	99.8	100.0	100.0	100.0
Negeri Sembilan	100.0	99.0	99.0	100.0	99.5	99.8	100.0	100.0	100.0
Pahang	98.0	89.0	93.0	99.0	92.0	95.5	100.0	100.0	100.0
Perak	100.0	99.0	99.0	100.0	99.5	99.8	100.0	100.0	100.0
Perlis	100.0	97.0	98.0	100.0	99.0	99.5	100.0	100.0	100.0
Pulau Pinang	100.0	99.0	99.0	100.0	99.5	99.8	100.0	100.0	100.0
Sabah	89.0	60.0	74.0	90.0	61.0	75.5	92.0	70.0	81.0
Sarawak <sup>1</sup>	100.0	92.0	96.0	100.0	92.0	96.0	100.0	95.0	98.0
Selangor <sup>2</sup>	100.0	98.0	99.0	100.0	99.0	99.5	100.0	99.5	100.0
Terengganu	84.0	78.0	81.0	100.0	92.0	96.0	100.0	98.0	99.0
Labuan	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>Malaysia</b>	<b>97.0</b>	<b>85.0</b>	<b>92.0</b>	<b>98.0</b>	<b>92.0</b>	<b>95.0</b>	<b>98.0</b>	<b>95.2</b>	<b>96.8</b>

Source: Water Supply Department, Ministry of Energy, Water and Communications, Malaysia

Notes: <sup>1</sup> Includes partly treated water to rural areas.

<sup>2</sup> Includes Wilayah Persekutuan Kuala Lumpur and Wilayah Persekutuan Putrajaya.

TABLE 18-7  
NON-REVENUE WATER, 2000-2010

State	2000		2005		2010	
	%	Mld	%	Mld	%	Mld
Johor	32	371	36	477	35	521
Kedah	46	370	41	450	36	423
Kelantan	44	93	41	98	36	144
Melaka	31	100	33	131	30	172
Negeri Sembilan	45	221	50	310	45	299
Pahang	38	190	47	318	40	475
Perak	38	309	30	269	28	439
Perlis	44	37	37	38	35	43
Pulau Pinang	23	170	19	152	17	171
Sabah	72	508	55	407	45	452
Sarawak <sup>1</sup>	30	181	25	186	23	242
Selangor <sup>2</sup>	42	1,200	37	1,414	23	1,130
Terengganu	39	130	30	120	29	286
Labuan	32	45	20	32	20	45
<b>Malaysia</b>	<b>40</b>	<b>3,925</b>	<b>38</b>	<b>4,402</b>	<b>30</b>	<b>4,842</b>

Source: Water Supply Department, Ministry of Energy, Water and Communications, Malaysia

Notes: <sup>1</sup> Includes partly treated water to rural areas.

<sup>2</sup> Includes Wilayah Persekutuan Kuala Lumpur and Wilayah Persekutuan Putrajaya.

18.47 The development of inter-state and inter-basin water transfers will be given priority to address water shortage and uneven distribution of water resources in the country. The Inter-State Raw Water Transfer Project from Pahang to Selangor (Pahang-Selangor ISRWT), which will commence construction during the Plan period, is expected to address the increasing water demand in Selangor, Kuala Lumpur and Putrajaya. In addition to the NRW reduction programme, the protection of water resources, rainwater harvesting, the use of water from stormwater management ponds for non-potable purposes and development of groundwater will be promoted as interim measures to address the anticipated shortage of water in Selangor, Kuala Lumpur and Putrajaya.

18.48 To increase accessibility to potable water in rural areas, priority will be given to states with low supply coverage such as Sabah, Sarawak, Pahang, Kelantan, Terengganu and Kedah. Emphasis will be given to isolated areas such as villages of *Orang Asli* and other indigenous groups, small estates and rural schools. In this regard, groundwater abstraction, rainwater harvesting and gravity feed water supply systems will be implemented. The groundwater exploration and development programme will also be undertaken to supply water to other water shortage areas and for irrigation. The use of horizontal wells, underground dams and groundwater accumulated from padi fields will be promoted.

18.49 The Integrated Water Resources Management (IWRM) approach will be promoted to achieve sustainable water resources development. The National Study for the Effective Implementation of Integrated Water Resources Management in Malaysia, which commenced in 2005, is scheduled for completion during the Plan period. The study will formulate action plans and programmes to raise awareness on IWRM and achieve efficient and sustainable water resources management. IWRM will also involve the management of physical resources as well as reforming systems and practices to enable people to reap sustainable and equitable benefits from these resources.

18.50 Non-structural measures to improve water supply services will continue to be implemented including the promotion of wise use of water. More campaigns will be conducted to raise awareness on the importance of water conservation. Consumers will be encouraged to use water saving devices and appliances such as the dual-flushing system while state governments will be encouraged to amend their Water Enactments with respect to the installation of 6-litre toilet flushing systems in buildings. The Guidelines for Installing a Rainwater Collection and Utilisation System will be revised to improve the practical aspects of collecting rainwater. These measures are expected to reduce water demand and contribute towards environmental conservation.

18.51 The SPAN will be operationalised during the Plan period to regulate water supply and sewerage services in Peninsular Malaysia. Water service providers and owners of water service systems will be licensed by SPAN and

required to comply with its service standards and key performance indicators. In addition, the Water Asset Management Company (WAMCO) will be established to develop future water supply infrastructure.

### **Sewerage**

18.52 Sewerage services will continue to be expanded to ensure the quality of effluent discharged into receiving water bodies comply with environmental standards and safeguard public health. Upgrading, rehabilitation and refurbishment of existing sewerage treatment systems, which are in the catchments of public water supply systems, will continue to be given priority. The programme on rationalisation of sewerage systems will be continued. Small and scattered STPs will be decommissioned after the construction of centralised STPs within their catchment areas to reduce the high cost of operation and maintenance.

18.53 Awareness campaigns on the importance of managing wastewater and sewerage systems for maintaining cleanliness and protecting the environment as well as water resources will be intensified. Research and development on reuse of sludge for industrial, agricultural and landscape purposes as well as wastewater reclamation for non-potable purposes will be undertaken. The provisions in the Sewerage Services Act, 1993, which mandates properties within 30 metres of centralised sewerage systems be connected to the system, will be fully enforced. The increase in connections to the centralised system will facilitate the improvement of public and environmental health as well as effectiveness of the centralised STPs.

### **Flood Mitigation**

18.54 Continuous efforts will be undertaken to reduce flood hazards in the Klang Valley as well as other flood prone areas throughout the country with the implementation of both structural measures such as the construction of flood retention ponds, river improvement works and flood diversions as well as non-structural measures such as landuse controls and integrated flood forecasting, warning and response systems. New flood mitigation works will be undertaken for Kota Bharu and other selected areas along Sungai Kelantan in Kelantan. Floodplain management and the implementation of the *Manual Saliran Mesra Alam* (MSMA) for Malaysia, a controlling water at source approach that also addresses erosion and siltation problems, will be extended to new development areas throughout the country. These measures will contribute to the reduction of flood losses and improvement of river water quality.

### **Export of Expertise**

18.55 Efforts will be intensified to facilitate the private sector to export local expertise, particularly in the construction sector. Greater coordination will be



undertaken among various agencies such as the Construction Industry Development Board Malaysia, Professional Services Development Corporation and ministries in exploring new markets in the Middle East and Eastern Europe, which are rapidly expanding their infrastructure facilities.

#### IV. INSTITUTIONAL SUPPORT AND ALLOCATION

18.56 Infrastructure and utilities development will be undertaken through the coordinated efforts of ministries and agencies. Road development will be undertaken by the Ministry of Works. Transport-related projects including road safety will be undertaken by the Ministry of Transport. The Ministry of Energy, Water and Communications will spearhead water supply and sewerage services development while the Ministry of Rural and Regional Development will undertake the rural roads and BALB programmes. The Ministry of Natural Resources and Environment will oversee the implementation of flood mitigation projects. A total of RM46.8 billion will be allocated to develop the respective subsectors, as shown in *Table 18-8*.

TABLE 18-8  
**DEVELOPMENT EXPENDITURE AND ALLOCATION FOR  
INFRASTRUCTURE AND UTILITIES, 2001-2010**  
(RM million)

<i>Sector</i>	<i>8MP Expenditure</i>	<i>9MP Allocation</i>
<b>Transport</b>	<b>30,936.5</b>	<b>30,304.4</b>
Roads	18,451.4	17,303.1
Urban Transport	706.6	1,565.5
Rail	5,270.1	3,634.9
Ports	2,443.0	1,290.0
Airports	1,779.3	2,868.5
Rural Roads <sup>1</sup>	2,286.1	3,642.4
<b>Utilities</b>	<b>7,752.7</b>	<b>16,540.5</b>
Water Supply	3,882.9	8,203.6
Sewerage	1,347.9	3,132.8
Rural Water	733.9	1,206.5
Flood Mitigation	1,788.0	3,997.6
<b>Total</b>	<b>38,689.2</b>	<b>46,844.9</b>

Source: Economic Planning Unit

Notes: <sup>1</sup> Includes village roads.

## V. CONCLUSION

18.57 During the Eighth Plan period, the capacity of the infrastructure and utilities networks was expanded to meet the increasing demand of users as well as stimulate growth through its linkages and spillover benefits. The public transport system in the Klang Valley was restructured through the implementation of the INSPAK programme. Infrastructure and utilities development during the Ninth Plan period will emphasise the provision of more facilities to rural areas as well as improving delivery of services to support economic activities and improve the quality of life. Road safety will be emphasised by improving the physical aspects of roads and inculcating good road ethics among users. Public transport facilities and services will be upgraded and further integrated to encourage a modal shift from private vehicle usage to public transport. Efficiency of water supply services will be improved with the establishment of SPAN as well as the implementation of the NRW reduction programme. Measures will also be undertaken to increase the competency and capability of service providers to ensure efficient and optimal utilisation of infrastructure facilities.