CHAPTER 5

Progressive Growth is Within Reach
CHAPTER 5

Develop Infrastructure and People as Key Enablers for Sabah’s Growth

Sabah’s infrastructure to date has lagged behind the rest of Malaysia. This is largely due to geographical challenges; it is a large state with an area of 74,000 km².

The future of Sabah rests on the ability to enhance its hard infrastructure (roads, ports, electricity, water and data connectivity) and soft infrastructure (human capital). These represent the key building blocks for Sabah’s development. To this end, the SDC initiative will focus on five key strategies for the state:

1) Connect Sabah
   Upgrade the transport infrastructure by ensuring seamless connectivity of road, air, sea and rail which will enable good transportation services for the tourism, agriculture and manufacturing industries.

2) Power Up Sabah
   Provide the state with sufficient and reliable electricity to enable industries to operate efficiently.

3) Quench Sabah’s Thirst
   Provide Sabah with quality water supply that can keep pace with increasing demand and enable economic and social improvements.

4) Invest in Sabah’s Talent
   Prepare the state for its knowledge-intensive industries spanning manufacturing, agriculture and tourism through a strong talent pool to enable these sectors to develop to their full potential.

5) Enhance Data Connectivity
   Ensure that Sabah is prepared and able to keep abreast with ICT developments so that the industry can remain competitive and the rural-urban digital divide can be narrowed.

While infrastructure is a major focus of the SDC, every effort will be made to ensure implementation is carried out in an environmentally sustainable manner.
5.1 Transportation

5.1.1 Road Network

Sabah’s Eastern and Western Sub-Regions are well-connected in terms of the road network. However, in 2005, 61% of all roads were still gravel and earth roads. The Central Sub-Region is separated by the Crocker range and this forms a natural barrier to better road connectivity between the Central and Western Sub-Regions.

At present the major towns of Kota Kinabalu, Sandakan, Lahad Datu, Tawau and Keningau are not well inter-connected when compared to the road network in Peninsula Malaysia. This is supported by the fact that there is a lower standard highway road that links distant towns like Sandakan, Tawau, Lahad Datu and Semporna with Kota Kinabalu.

In 2005, Sabah had 1,428 km of federal roads and 14,249 km of state roads, out of which 6,094 km were sealed roads and the remaining 9,583 km were gravel and earth roads. This indicates that only 38.9% of roads are sealed in Sabah compared to 89.4% of sealed roads in Peninsula Malaysia. Within the implementation period of the SDC Blueprint, it is projected that 80% of all these gravel roads will be sealed.

Furthermore, trunk roads constructed in the 1970s and 1980s under World Bank loans were of sufficient standards at that time. However, given present requirements, there is a need to upgrade these roads. For instance, the road pavement and shoulder width (suitable previously) are now too narrow and inadequate to meet the demand of present traffic volume.

In order to further develop the interior regions, the road network linking East to West and North to South must be developed and further enhanced.
Lack of connectivity is a key issue in Sabah at the moment. Insufficient and unreliable connections between major towns themselves and to tourist attractions such as Maliau Basin lead to opportunity costs. Also, it is difficult to advance the growth of rural areas and existing conurbation centres due to the insufficient road connections between major towns.

Secondly, the current condition of some roads are less than ideal. The reliance on gravel roads inhibits the development of industry, as transportation of goods such as local agricultural and manufactured products is constrained due to the duration of transportation and lack of accessibility to onward transport, for example, to ports or airports. As a matter of fact, Kota Kinabalu and Sipitang along the Pan Borneo Highway are not connected by a dual carriageway but only a single road. The road infrastructure to SAIP does not facilitate containerised transport and this represents a constraint on the development of this food processing cluster. These issues need to be addressed by the SDC which requires that such roads be widened to ease traffic and facilitate transportation of industrial goods. By 2025, more than 80% of all gravel roads will be sealed\(^\text{21}\). By upgrading existing graveled roads to sealed roads and improving access to major tourism, agriculture and manufacturing areas, poverty reduction will also be accelerated.

Thirdly, congestion (intra- and inter-urban traffic) due to rapid urban growth and growing population in the major towns of Kota Kinabalu, Sandakan, Tawau and Lahad Datu also hinders transportation of industrial goods, raw materials and people as it increases the duration of transportation.

\(^{21}\) JKR Sabah
Figure 5.1: Map Of Sabah Showing Existing Road Types and Planned Roads Under 9MP

Source: JKR
Planned or Proposed Projects

A total sum of RM3,187.5 million was approved under the 9MP for the provision of Road Network Linkage\(^\text{22}\).

Main Road Projects Under the SDC:

- Connect Central Sabah to the South - Tongod southwards to Sapulut
- Create a second Eastern link and bypass Tawau municipality - Kunak to Merotai
- Connect North Sabah to the Central and Western Sub-Regions - Kota Marudu towards Ranau
- Increase accessibility to tourism areas in the Eastern Sub-Region - Lahad Datu to Maliau Basin, Danum Valley and the Tabin Wildlife Sanctuary
- Construct a tourism coastal road - Tuaran to Kota Belud
- Enable transportation of industrial goods – Kota Kinabalu Industrial Park (KKIP) to Ranau
- Enable better transportation of industrial goods between Kota Kinabalu and the Sipitang Industrial Area with a dual trunk road from Kota Kinabalu to Papar and onwards to Beaufort
- Improve road infrastructure between the SAIP and Kota Kinabalu sea port urgently to cater for containerised transport
- Upgrade, widen and strengthen the road from the KKIP to the nearest port (Sapangar Bay) to enable transportation of containerised cargo

Key considerations for road projects:

- Ensure that roads for the major industrial and agricultural areas are constructed so that congestion in major towns can be bypassed
- Ensure that roads are sealed between the proposed SDC agricultural collection centres and the nearest main road to ensure that agricultural goods can be transported easily and efficiently
- Increase facilities for road users on main highways by providing rest areas
- Enhance intra-city road transportation by consolidating the various providers of public bus transportation

\(^{22}\) JKR Sabah
From figure 5.1, the continuation projects under the 9MP include:

- Jalan Sapulut – Kalabakan (linking southeast to west). There is a need to construct the road to sealed standard as this will complete the Basic Sabah Trunk Roads Network which facilitates the transportation of goods and products between Kota Kinabalu and Tawau.

The main proposed new road building projects include:

- Jalan Kota Marudu – Marak Parak – Poring Ranau
- Jalan Dari Telipok – Pekan Kiulu – Lokos – Toboh – Randagong, Ranau
- Jalan Sapulut – Pagalungan

### Rehabilitation Projects

The rehabilitation of existing trunk roads which are beyond maintenance should be carried out urgently. Upgrading of graveled to sealed road will raise the standard of living of the rural poor. These roads will be constructed to JKR standards based on the projected area of development and population served. The target is to have all graveled roads under the State Government Register sealed by post 2025.

### Manufacturing-Related Road Projects

The projects include:

- Lahad Datu Northern Ring Road (Link to POIC Lahad Datu)
- Jalan Ulu Sibuga and Jalan Bokara (Link to POIC Sandakan)
- Main roads inside the KKIP

### Tourism-Related Road Projects

The road projects under this category include Jalan Sukau (under construction) and Jalan Tabin in Lahad Datu. An access road to the Maliau Basin Studies Centre in Tawau has also been planned.
Rural and Agricultural Road Projects

Under the rural roads programme of the 9MP, more roads of minimum JKR standards 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, 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. Jalan Jeroco, Lahad Datu and the newly proposed Jalan Linuyukan – Pinangah and Jalan Lintas Libaran come under this category.

Air Network

Sabah currently has strong connectivity by air both internally and externally. Kota Kinabalu International Airport (KKIA) is the second busiest airport (based on number of passenger movements) in Malaysia after the Kuala Lumpur International Airport. The KKIA is the main gateway to Sabah and is located about 7km from the town centre.

Owing to its central location, the KKIA is less than three hours by flight from most of the ASEAN capitals and North Asia. This makes KKIA ideal for low cost carriers and as a second hub as already identified by Air Asia.

There are direct flights to Hong Kong, Macau, Shenzhen, Osaka, Seoul, Taipei, Kaohsiung, Singapore, Manila, Kuala Lumpur, Cebu, Davao, Brunei and Labuan, which provide excellent links to Kota Kinabalu, especially the Asia-Pacific rim.

The KKIA is designed to accommodate aircrafts up to Boeing 747. The main domestic airports are located in Sandakan, Lahad Datu and Tawau. All these airports are capable of accommodating Boeing 737 aircraft except for Lahad Datu (Fokker 50) which will be upgraded in the near future.
Figure 5.2 Map of Domestic Flight Connections

Source: MAS, Air Asia, IDS
Figure 5.3 Map of International Flight Connections

Source: MAS, IDS
Figure 5.4 Latest Figures in Passenger Traffic at Airports Across Sabah

Including transit passengers
Source: Malaysia Airports Sdn Bhd, 2006
5.1.2.1 Challenges

The major issue with airports is cargo handling capacity. As of 2006, cargo volume discharged was at 19.2 million kg and cargo loaded was at 18.5 million kg. This represents an increase of 10.5% and 11.1% over the 2005 figures, respectively.

There is increasing demand from local manufacturers to utilise air freight. However, the existing KKIA is not able to handle a full cargo airplane. This suggests that current cargo handling capacity at Sabah’s airports (especially KKIA) needs to be expanded in order to meet industry demands in the near future.

5.1.2.2 Planned or Proposed Projects

- KKIA has two existing terminals. Terminal 1 is currently used for regular fare airlines and Terminal 2 for low cost carriers. KKIA is currently being expanded to cater for 10 million passengers annually and Terminal 2 will be upgraded to a full-fledged cargo terminal
- Expansion of the terminal at Sandakan airport, which is currently considered a second eastern gateway to Sabah
- A new airport at Lahad Datu able to accommodate the Airbus 320 to support activities of POIC, aquaculture and the growing tourism development

5.1.3 Sea Network

Sabah is well-served via a sea network comprising eight ports including the newly developed SBCP. The following map shows the various ports and their locations along the Sabah coastline.
Sabah’s ports play a pivotal role in the total logistics chain, enabling trade and economic development. As can be seen from Table 5.1, the ports of Kota Kinabalu, Sandakan, Tawau and Lahad Datu are used mainly for containers and dry cargo. Sapangar Bay Oil Terminal (SBOT), Sandakan, Lahad Datu, Kunak and Tawau are also heavily utilised for transportation of liquid cargo (mainly palm oil). SBCP is dedicated solely as a container port and has been in operation since June 2007. SBCP expects to draw larger and more vessels from within Sabah, Sarawak and neighbouring countries (Brunei, Indonesia, Southern Philippines) as well as North Asia to call at the port. Services from the existing Kota Kinabalu Port are expected to be moved to SBCP within three years. Kota Kinabalu Port is currently handling
transhipment of containers from Indochina and the Indian sub-continent, along with other regional and local destinations.

**Table 5.1 Sabah Ports and Facilities / Capacity**

<table>
<thead>
<tr>
<th>Ports</th>
<th>Primary / Feeder Port</th>
<th>Conventional Cargo Maximum Capacity, 2006</th>
<th>Main Cargo Handled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sapangar Bay Container Port*</td>
<td>Primary</td>
<td>500,000 TEU</td>
<td>Container</td>
</tr>
<tr>
<td>Kota Kinabalu Port</td>
<td>Primary</td>
<td>16,000 DWT</td>
<td>General cargo / Dry bulk</td>
</tr>
<tr>
<td>Sandakan Port</td>
<td>Primary</td>
<td>75,000 DWT</td>
<td>Container / General cargo / Dry bulk / Palm oil</td>
</tr>
<tr>
<td>Sapangar Bay Oil Terminal</td>
<td>Feeder</td>
<td>40,000 DWT</td>
<td>Specialised berth handling liquid bulk, refined petroleum products and chemical cargo</td>
</tr>
<tr>
<td>Tawau Port</td>
<td>Feeder</td>
<td>30,000 DWT</td>
<td>Container / General cargo / Bulk cargo / Liquid petroleum / Palm oil</td>
</tr>
<tr>
<td>Lahad Datu Port</td>
<td>Feeder</td>
<td>45,000 DWT</td>
<td>Container / General cargo / Dry bulk / Palm oil</td>
</tr>
<tr>
<td>Kunak Port</td>
<td>Feeder</td>
<td>28,000 DWT</td>
<td>Palm oil products</td>
</tr>
<tr>
<td>Kudat Port</td>
<td>Feeder</td>
<td>4,000 DWT</td>
<td>General cargo</td>
</tr>
</tbody>
</table>

*Operational since June 2007

Source: The Prospect and Challenges in Logistics Industry in Sabah, 10 May 2007

Overall volume of container throughput in Sabah ports is projected to increase by 10% per annum from 230,000 TEUs in 2006 to 880,000 TEUs in 2020. Transhipment volume is projected to increase by 20% per annum from 10,000 TEUs in 2006 to 130,000 TEUs in 2020.

**Figure 5.6 Total Cargo Throughput**

Source: Sabah Ports
5.1.3.1 Challenges

The key challenge for ports in Sabah is in relation to other regional ports and the ability to attract major shipping liners to make scheduled calls. However, port operator Sabah Ports is currently in active discussions with shipping liners and other ports to build strategic alliances which will enable better sea connectivity to and from Sabah.

5.1.3.2 Planned or Proposed Projects

Sabah Ports currently has the following projects in the pipeline:

- Sandakan POIC in Mowtas
- Lahad Datu Port for POIC
- Lahad Datu fertiliser conveyor system and storage
- Sapangar Bay Oil Terminal extension
- Oil storage and depot at Sapangar, Lahad Datu and Sandakan
- New Sapangar Bay Container Port (relocation of KK port)
- New incentive structure linking cargo volume to reduced port charges for feeder vessel operators

Plans are underway to strengthen Sabah’s logistics further.
Utilities

5.2

Power

Sabah’s current electricity coverage is 67% of the population. By 2010, rural electricity coverage is expected to increase to 80.6% and overall coverage to 90%\(^{23}\).

Current electricity demand is 600MW and generation capacity is 680-785MW, of which 59% of the total units generated are purchased from independent power producers. Sabah Electricity Sdn Bhd (SESB) generates, transmits and distributes electricity in Sabah to 374,023 customers spread over a wide area.

The installed capacity of the West Coast Grid which supplies electricity to Kota Kinabalu, Federal Territory Labuan, Keningau, Beaufort, Papar, Kota Belud, Kota Marudu and Kudat is 488.4MW and the maximum demand is 396.5MW.

The East Coast Grid 132kV Transmission Line connecting the major towns in the East Coast has an installed capacity of 333.02MW and the maximum demand is 203.3MW.

The forecast demand growth of electricity is in the region of 7.7% per annum up to the year 2010. In order to support the growing demand, various generation, transmission and distribution projects will be implemented such as the 300MW plant in Lahad Datu, with exact location to be determined by a detailed environment impact assessment study.

A fully integrated grid connecting the West Coast Grid to the East Coast Grid was completed in July 2007, and about 90% of customers are now connected to this integrated grid.

\(^{23}\) Ninth Malaysia Plan
Figure 5.7 Electricity Transmission Lines, Major, Rural, Mini Hydro and IPP Stations

Source: Sabah Electricity Sdn Bhd
Challenges

Sabah’s electricity network is not as reliable as that in other parts of Malaysia. System Average Interruption Duration Index (SAIDI) for Sabah was 2,540 minutes in 2005 compared to Peninsula Malaysia’s SAIDI of 101.6 minutes. This is due to the fact that the current distribution network is not strong and requires reinforcement. However, this is being mitigated by the construction of the new East-West transmission grid which will stabilise power supply to the East Coast.

Currently, approximately 50% of Sabah’s electricity generation capacity is via diesel (see Figure 5.8). Electricity generation via diesel power plants is costly (RM0.26 per kWh versus RM0.09 for gas and RM0.03 for hydro generation) and presents an environmental challenge. Furthermore, the persistent rise in fuel costs and fuel scarcity implicates an incessant rise in generation costs.

**Figure 5.8 Sabah Grid Generation Capacity Mix FY2006/07**

![Figure 5.8 Sabah Grid Generation Capacity Mix FY2006/07](image)

Source: Sabah Electricity Sdn Bhd

Generation and supply of electricity to rural areas is a challenge due to geographical factors and lack of infrastructure, which cause implementation to be very expensive and difficult. Moreover, land access is another hindrance to implementation of unitary power stations.
Planned or Proposed Projects

New capacity of approximately 2,700 MW will be required between now and 2025 to fulfil projected electricity demand.

Figure 5.9 Projected Electricity Demand and Generation Capacity for Sabah

Source: Sabah Electricity Sdn Bhd

i) Increase Capacity

Under 9MP, a new gas-based plant with a capacity of 190 MW will be commissioned in 2008. To meet demand as well as improve the reliability of supply in the East Coast, a 300 MW plant will be constructed for operation in 2009/2010. There will also be six major generation development plans up to 2010. In addition, POIC co-generation in the Eastern Sub-Region will be promoted.
ii) Strengthen Grid
There will be 23 transmission development plans up to 2010. Additionally, other projects will include the KK Outer Ring (KKOR) to increase the city’s supply security. The first phase is scheduled to be completed by February 2008, while the second phase will be completed in January 2009. New transmission network linking the southern part of the east and west coast grid will be built and worn cables and poles in the grid system will be strengthened and rehabilitated.

iii) Promote Rural Electrification
The implementation of the rural electrification programme will be intensified under the 9MP using solar hybrid and micro-hydro systems. By the end of the Plan’s period, rural electricity coverage is expected to increase to 80.6% in Sabah. In comparison, rural electricity coverage for Malaysia is at 98.6%\(^2\).

5.2.2 Water
All main towns are supplied with treated water. There are currently 39 water treatment plants with a total production capacity of 762 million litres per day (MLD) supplying to 200,000 consumers. Current demand is 937 MLD. At the moment, demand outstrips effective supply by 23%. In 2005, 90% of Sabah’s urban population was served with piped water, while 61% was served in the rural areas. Overall, 75.5% of the population was served with piped water whereas Malaysia’s overall population served with piped water was 95% in 2005. By the end of the 9MP, it is targeted that urban coverage will reach 92% and rural coverage will be 70% in Sabah.

Water demand for domestic and industrial use is expected to increase in line with population growth per annum. New water supply of approximately 1,318 MLD will be required between now and 2025.

\(^2\) Economic Planning Unit 2005
Water production in Kota Kinabalu, Sandakan, Tawau and Lahad Datu is undertaken by private companies, and by the Water Department for other areas. Water distribution throughout the state is, however, solely undertaken by the Water Department.

### Challenges

Water supply to rural areas remains a key issue. Building water pipes and treatment plants in remote rural areas is prohibitively expensive due to the lack of infrastructure and water sources in some areas.

Non-Revenue Water (NRW), arising from leakages from water pipes and pilferages in Sabah, stands at 57%. In comparison, the national NRW average is 37%. Urban areas fare better than suburban and rural areas in terms of having a lower NRW. In some suburbs, NRW can increase to more than 60%.

Pollution of natural water sources such as rivers due to waste dumping and sewage needs to be urgently addressed. This concern has caused water treatment costs to increase and affects water production capacity.
5.2.2.2 Planned or Proposed Projects

Under the 9MP, RM1.313 billion has been allocated to the State Water Department to undertake projects throughout the state. The additional capacity from such water projects will be 380 MLD by 2010. Major projects include the construction of Milau Dam and four other water treatment plants in Tuaran, Papar, Kudat and Sandakan.

The SDC will:
- Implement more groundwater abstraction and rainwater harvesting systems in rural areas to increase supply
- Focus on reducing NRW by ensuring strict enforcement against water pilferage, pipe and meter replacements, Geographical Information System (GIS) mapping of distribution networks, rehabilitation of distribution systems and upgrading of existing treatment plants
- Encourage industry and manufacturers, especially within the POIC, to recycle water by offering tariff incentives
- Continue to enforce planning and protection of water catchments and natural water sources by increasing awareness on the importance of water conservation

5.2.3 Telecoms

Telekom Malaysia (TM) is the main telecommunication company operating in Sabah. It provides fixed line and cellular phone facilities. Five other telecommunication companies also operate in the state but they currently provide cellular phone facilities only. Sabah has the lowest Direct Exchange Line (DEL) penetration rate, cellular penetration and internet dial-up penetration rate per 100 inhabitants.
Figure 5.11 DEL Penetration Rate Per 100 Inhabitants by State, 2007

<table>
<thead>
<tr>
<th>State</th>
<th>Penetration Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulau Pinang</td>
<td>23.1</td>
</tr>
<tr>
<td>W. P. Kuala Lumpur</td>
<td>23.0</td>
</tr>
<tr>
<td>Selangor</td>
<td>21.4</td>
</tr>
<tr>
<td>Melaka</td>
<td>19.9</td>
</tr>
<tr>
<td>Negeri Sembilan</td>
<td>17.7</td>
</tr>
<tr>
<td>Perak</td>
<td>17.6</td>
</tr>
<tr>
<td>Johor</td>
<td>17.5</td>
</tr>
<tr>
<td>W. P. Labuan</td>
<td>16.3</td>
</tr>
<tr>
<td>Kedah and Perlis</td>
<td>12.8</td>
</tr>
<tr>
<td>Pahang</td>
<td>11.9</td>
</tr>
<tr>
<td>Terengganu</td>
<td>11.9</td>
</tr>
<tr>
<td>Sarawak</td>
<td>10.8</td>
</tr>
<tr>
<td>Kelantan</td>
<td>8.2</td>
</tr>
<tr>
<td>Sabah</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Source: Yearbook of Statistics, Sabah, 2006

DEL connects a customer’s equipment to the Public Switched Telephone Network (PSTN) and has a dedicated port on a telephone exchange. The penetration rate is the number of DELs per 100 inhabitants.
Figure 5.12 Cellular Phones Penetration Rate Per 100 Inhabitants by State, 2006

Source: Yearbook of Statistics, Sabah, 2006

Figure 5.13 Broadband Penetration Rate Per 100 Inhabitants by State, 2007

Source: Yearbook of Statistics, Sabah, 2006
5.2.3.1 Challenges

Sabah's scale makes implementation costly and difficult. Construction of a network requires significant capital expenditure and current low demand in rural areas does not justify such high expenditure.

Generally, low income levels mean that people would rather spend on mobile phones and use Internet at their offices instead of setting up Internet access at home.

At the moment, TM is unable to build low cost networks and provide low cost pricing to consumers due to the high cost of equipment which are sourced from abroad.

Source: Yearbook of Statistics, Sabah, 2006
Planned or Proposed Projects

- To increase coverage in rural areas, mobile phone networks offer GPRS services. Currently Celcom is the largest provider in rural areas
- To begin at the end of 2007, a high speed broadband project
- To spend RM60 million on improving telecommunication networks in new development areas
- To set up more Wi-Fi hotspots to encourage higher data connectivity and broadband penetration
- To introduce WiMAX in the medium to long term

Solid Waste and Sewerage

Solid Waste

At present there are 23 solid waste disposal sites in Sabah under the jurisdiction of each district. Responsibility for waste collection, removal and disposal lies with the individual District Council. Residents in non-rated areas and informal settlements are not covered by formal waste collection services and resort to waste burning, dumping of waste on nearby open land and disposal of waste in the rivers and sea.

Challenges

Poorly designed waste disposal sites with a lack of operation and maintenance procedures result in poorer quality of life due to adverse environmental impact. Pollution of natural waterways, groundwater, marine environment and the air are just some of the side effects. In addition, disposal sites that are not properly rehabilitated have become an eyesore and a health issue for both locals and tourists. Major challenges include the lack of awareness of better management of solid waste (3Rs – Reuse, Recycle, Reduce) and lack of expertise in the efficient treatment of solid waste.
5.2.4.1.2 Planned or Proposed Projects

Current programmes in place include the first Material Recovery Facility (MRF) of landfills system in Malaysia. Previously when DBKK collected domestic waste, 100% of the waste would be disposed into the landfill. With this new system, companies first recover some of the recyclable waste. Organic waste is recovered and converted into compost. They have found that almost 70-75% of the waste is recoverable. The benefits include a decrease in leachate, an increase in the lifespan of landfills and most importantly the system is environmentally friendly. The MRF system costs RM14 million.

Projects to include:
- Improving the planning, management and regulation of operation and maintenance of waste disposal systems
- Introducing large scale vermiculture where earthworms are used to consume and convert organic waste into odourless, natural fertilisers
- Generating awareness on waste disposal and recycling through education. Currently, composting has been encouraged at three levels: commercial, communal and individual households
- Managing waste in the water villages via Dewan Bandaraya Kota Kinabalu’s (DBKK) efforts to promote recycling by encouraging people to collect garbage which DBKK then buys from them

5.2.4.2 Sewerage

Currently Sabah uses a mixture of common and individual wastewater treatment systems and sludge treatment systems. Common wastewater collection and treatment systems are used in town centres and main residential areas. Individual septic tanks are being used mainly in the older and rural residential areas.

5.2.4.2.1 Challenges

Challenges with respect to wastewater stem mainly from lack of maintenance of the sewerage system due to lack of funding and expertise as well as aging of the pipes. Moreover, overall treatment efficiency is very low and consequently some systems are unable to cope with the increasing amount of sewage.
5.2.5.1 Challenges

The main challenges arise from poor management of water sources, water pilferage from irrigated land and lack of suitable farming applications and practices (due to a lack of ploughing machinery).

5.2.5.2 Planned or Proposed Projects

- Increase irrigation and drainage infrastructure through execution of new projects, both for paddy and non-paddy crops
- Upgrade and extend irrigation infrastructure to identified potential areas in the vicinity of existing schemes
- Improve utilisation of irrigation and drainage facilities already provided in the existing paddy areas
- Improve irrigation water management practices
- Provide technical assistance in infrastructure development and crop diversification from paddy to other profitable crops in identified non-granary areas

For the sustainability of the availability of water for irrigation, development works for irrigation and drainage schemes will be undertaken on an environmentally friendly basis.

5.3 Human Capital Development

Based on the latest population census, Sabah had a population of 2,603,485 in 2000. Between the period 2000 to 2005, the population of Sabah recorded an average annual growth rate of 2.29%. Sabah’s population is relatively young with the majority (80%) of the population aged below 39 years old. As of 2007, Sabah’s population is estimated at 3.1 million (Department of Statistics).

In 2006, Sabah’s labour force stood at 1,264,100 with 1,190,782 people employed while the number of unemployed was 73,318\(^{25}\). The labour force participation rate was at 64.8%. The unemployment rate for Sabah stood at 5.8% in 2006 which was higher than the national level of 3.1%.

\(^{25}\) Department of Statistics
Agriculture, hunting and forestry is by far the largest sector by percentage of employed persons by industry (30%). This is followed by the wholesale, retail trade and repair of motor vehicles, and household goods industry (15.5%).
There are numerous ministries, departments, agencies and statutory bodies that contribute towards human capital development in Sabah. The services offered range from direct scholarship and funding to training and provision of resources.

5.3.1 Challenges

Within the SDC implementation period, human capital requirements would need to be met by local supply to ensure sustainability. Interviews with prospective investors suggest that most employers require graduates in science, technical or vocational fields (for example, leisure management, technicians and plantation management). However, evidence from interviews suggest that currently there is a surplus of graduates in arts and humanities and a shortage of science and technology graduates.
Strategies

There is a need for greater precision in generating human capital that meets industry requirements in tourism, agriculture and manufacturing. This will be addressed by the following strategies:

- Increase the number of skilled workers to enable full support of the development of the tourism, agriculture and manufacturing sectors
- Improve skills and competency levels to facilitate transition from a production-based to a knowledge-based economy
- Develop a regularly updated database of existing talents \textit{vis-a-vis} skills required by industries operating in Sabah:
  - Current stock of talents
  - Skilled manpower requirements study (based on industrialists’ projections)
  - Students who have been awarded scholarships

Challenges

<table>
<thead>
<tr>
<th>Existing Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Tourism</td>
</tr>
<tr>
<td>• Agriculture</td>
</tr>
<tr>
<td>• Palm oil downstream</td>
</tr>
<tr>
<td>• Biotech</td>
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<table>
<thead>
<tr>
<th>New Industries</th>
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<tbody>
<tr>
<td>• Tourism</td>
</tr>
<tr>
<td>• Agriculture</td>
</tr>
<tr>
<td>• Palm oil downstream</td>
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<td>• Biotech</td>
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<table>
<thead>
<tr>
<th>Proposed Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Set up Human Capital Planning Council (HCPC) under 1-stop implementation agency</td>
</tr>
<tr>
<td>• Co-ordinate between industry and academia</td>
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<tr>
<td>• Industry internships</td>
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<tr>
<td>• Enhance career service centre</td>
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<tr>
<td>• Some industries not present yet</td>
</tr>
<tr>
<td>• Potential investors would need to be convinced that manpower sourcing is not a problem</td>
</tr>
<tr>
<td>• Within SEDIA &amp; HCPC investment officers will guarantee services in terms of sourcing skills, manpower for industry</td>
</tr>
<tr>
<td>• HCPC will collect manpower statistics and build database of Sabahan returnees</td>
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</tbody>
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Programmes

- Set up a Human Capital Planning Council (HCPC) to take charge of collecting relevant manpower statistics, co-ordinating academia and industry, co-ordinating recruitment fairs and building a database of skilled Sabahan returnees
- Drastically ramp up internship programmes whereby students can work in the industry during the course of study with the potential to gain permanent employment after graduation. It should be made compulsory for all Yayasan Sabah scholars to do internships
• Expand the capacity of science and technology education, training and enrolment to provide for the future development of the agricultural and manufacturing sectors.
• Increase ratio of students in Sabah’s higher education institutions to 70:30 (science to humanities)
• Increase and improve the profile and importance of careers in agriculture, manufacturing and tourism. This can be achieved by bringing well-respected figureheads in their respective industries to give motivational talks and insights into their jobs to students at universities and training colleges
• Increase Sabah’s profile as a choice destination for aspiring scientists and researchers in manufacturing and agriculture and ensure the transfer of skills and knowledge to local manpower
• Create incentives (start-up grants, etc) to encourage talented Sabahans to invest in Sabah’s future. Funds can be channelled towards collaborative research work. Scientists and ex-MNC executives should be able to apply for soft loans for research purposes and then be incentivised to hit key targets by having the ability to convert their soft loans into grants. Such programmes will require peer review panels to ascertain the viability of such projects
• Upgrade existing skills and training centres such as MARA Skills Institute (IKM), Sabah Skills Technology Centre, Industrial Training Institute (ILP) and KK Politeknik to generate the right human capital for Sabah’s requirements

5.3.3.1 Sandakan Education Hub

In line with the second thrust of the National Mission to enhance human capital, the state will strengthen capacity building in order to develop knowledgeable, skilled and innovative human capital in the move towards a knowledge-based economy. One of the flagship projects to achieve this goal is the development of an Education Hub in Sandakan.

The Sandakan Education Hub (SEH) covers a total area of 1,356 acres where institutions of higher learning, research centres, private colleges and polytechnics will be located. It is a key component of the Agrobio Innovation Zone.

The SEH will also provide the necessary infrastructure for agriculture, forestry and ecological research such as science laboratories. R&D centres and skills training centres for biodiversity, wildlife and environmental conservation, biotech industry and the palm oil and downstream manufacturing industries will also be planned for the hub.

To date, five colleges have expressed an interest in establishing campuses in Sandakan. The five colleges are:
• MRSM / MARA
• Universiti Malaysia Sabah – Sekolah Pertanian
5.3.3.2 Interior Education Hub

The Central Sub-Region has been earmarked as the Sabah’s agricultural hinterland and food production belt. It is also home to the world-renowned icon, Mount Kinabalu, and rich cultural heritage. Unfortunately however, poverty is widespread in the Central Sub-Region. In order to enable these natural endowments to be capitalised to generate income for the people, there is a need to establish an Interior Education Hub within the Central Sub-Region to build the necessary human capital.

The Interior Education Hub may be initiated by Yayasan Sabah to build human capital for the tourism and agriculture sectors, especially in handicrafts, SNP, food and livestock industry, as well as to train rural agropreneurs and develop agribusinesses. Yayasan Sabah may also consider establishing schools and colleges along the MRSM-Yayasan Terengganu model for high achievers from rural schools especially those from the low income families (see Chapter 6).