CHAPTER 4

Rising to the Challenges of the Future
CHAPTER 4

Increase Value Capture of Sabah’s Resources in Downstream Manufacturing Activities

The vision for Sabah’s manufacturing sector is to be the location of choice in Asia for resource-based manufacturing by 2025. To achieve this vision, a number of programmes have been identified over three phases to stimulate growth of existing industries and attract private sector investments in targeted areas.

The first phase is about seeding and catalysing growth in existing and new industries. Initiatives will be focused on fixing the basic infrastructural gaps, investing in human capital and putting in place a pro-business and pragmatic incentives regime to make it compelling for companies to shift to higher order value-added activities in Sabah. In this phase, anchor companies for downstream activities in POIC would have been identified with committed investments.

The second phase builds on the foundation and focus will be on spawning local SMEs at POIC Sandakan and linked to the supply chain of larger established firms. In building SMEs, incentives will be provided for companies undertaking R&D, design and technology transfer activities. Management and R&D talents will be spawned from the Sandakan Education Hub. Here, emphasis will be placed on creating local intellectual properties within the resource-based technology domain. A strong SME community will serve as a platform for Sabah to source for quality investments in global resource-based manufacturing businesses.

As Sabah enters the third phase, the manufacturing sector is expected to be a key contributor to GDP, by creating high-value employment and supporting a vibrant manufacturing base. By 2025, Sabah’s sophistication in terms of mix of skills base, companies and linkages to key affluent markets in North Asia will allow it to be the preferred location for investments in resource-based manufacturing and beyond.
Current Context

Manufacturing currently contributes up to 13% share of Sabah’s GDP. The GDP share for manufacturing has been fairly constant at around 13% for the past five years. Between 2001-2005, the manufacturing sector growth in Sabah was 9.7% against a GDP growth of 5.3%. This is higher than the national manufacturing growth of 6.9%, however, the high growth rate is largely due to exports of refined palm oil, i.e. basic processing of commodities.

Figure 4.1: Gross Manufacturing Output Comparisons: Peninsula, Sarawak, Sabah

Source: Yearbook of Statistics Sabah, Sarawak and Malaysia: Various Issues

16 The primary sectors are the main contributors to Sabah’s economy with 40% share of Sabah’s GDP compared to 15% for Malaysia. This is followed by the secondary sectors (mainly manufacturing and construction) which contribute 17% to Sabah’s GDP. The tertiary sectors which include services and tourism account for 43% share of GDP.
The long run performance of the manufacturing sector shows that Sabah’s growth in manufacturing output was at 9.8% over 1994-2004, lower than Sarawak which grew at 15.7% and Peninsula at 11.7%. As of 2004, Sabah contributes to 3.2% of Malaysia’s total output. By comparison, Sarawak contributes 6.3% with the balance 90.5% coming from Peninsula.

In terms of types of manufacturing companies, up to 83% come from five sectors, namely food, apparel, wood, metal and furniture. However, when measured on the value of gross output, 87% are concentrated in two main sectors – food and wood. In food, the major contributor is oils and fats being palm oil mainly. In wood-processing, a majority of the output is derived from sawn timber, plywood, veneer sheets and laminated wood products. As a large proportion of gross output value is derived from basic processing of commodities, downstream processing based on resources is largely untapped and holds immense potential for Sabah.

Figure 4.2: Concentration of Manufacturing Industries and Share of Gross Output Value

Source: Yearbook of Statistics 2006, Sabah
Employment in the manufacturing sector accounts for 11% of the total workforce of 1.2 million in Sabah. This is in comparison to services which employ 55.5%, followed by agriculture, fishing and mining taking 33.3%. Overall, the employment trends in manufacturing have been trending up at 3.1% with value-add per paid employment at RM33,519 per annum.\(^{17}\)

**Figure 4.3: Employment Trends in Manufacturing Sector**

![Number of Employed Persons in Manufacturing](image)

**Source:** Yearbook of Statistics 2006, pg. 192, Department of Statistics Malaysia, Sabah

## 4.2 Sabah’s Strengths for Manufacturing

Sabah is endowed with natural strengths that could be harnessed for driving growth in the manufacturing sector. First, there are significant amounts of raw materials to be used as feedstock in downstream manufacturing such as oil and gas, palm oil, timber, minerals and other agriculture-related feedstock such as rubber, cocoa and jatropha.

\(^{17}\) Adjusted out palm oil and Labuan-based activities such as methanol and hot briquetted iron.
Secondly, it is strategically located between two major economic regions: (1) the affluent markets of North Asia including Japan, Korea, Taiwan, Hong Kong and China, and (2) high growth developing markets in the vicinity including Southern Philippines and Kalimantan.

These dual factors of abundant natural resources and strategic location serve as a source of strength for Sabah to develop into a major trading centre for goods and services linking the two economic regions.

It is envisaged that the costs of doing business in Sabah will be reduced as more shipping vessels call at Sabah ports and with SBCP developing into a full-fledge shipping gateway into Borneo (see Chapter 2 on Logistics).

### Challenges Faced by Manufacturing Sector

While Sabah is blessed with rich and significant natural resources, a number of key challenges, if left unresolved, will continue to impact the overall competitiveness of Sabah’s manufacturing sector.

These challenges, including infrastructure, shipping costs and skilled manpower, need to be resolved to develop the manufacturing sector to its full potential. The SDC Blueprint is committed to resolving these challenges expediently.

i) Basic Infrastructure

Interviews with the private sector suggest that reliability of electricity and water supply has been improving but needs to be enhanced further.

In terms of electricity supply, a majority of the power plants in Sabah are diesel-fired and aged; hence, generation and operating costs are high and reliability is an issue. Recent upgrade of transmission grids linking Kota Kinabalu to Kudat and the Eastern Sabah grid has helped alleviate the transmission issue. In addition, there are a number of power plants which are coming on stream and the policy of diversifying away from diesel plants would assist overall electricity supply (see Chapter 5 on Infrastructure).

Shortage of water has in the past prevented investments in projects which require significant supply of clean water. To attract industries deploying wet processes and high-tech industries such as biotechnology within the SDC, the government is
committed to invest in water infrastructure so that it does not become a hindrance to industrial growth.

In terms of road infrastructure, efforts will be focused on enhancing linkage and quality of roads between major urban centres and specific rural areas supplying raw materials.

ii) Shipping Costs
The plan to make Sabah into a major trading centre between North Asia and Kalimantan/Southern Philippines will lead to an increase in shipping calls from vessels from around the region. Therefore, logistics-dependent manufacturing operations involving import of raw materials and components for export-oriented industries will enjoy lower freight costs going forward.

iii) Manpower
Sabah like other states has to tackle the issue of skilled manpower as this is a necessary ingredient in order to attract high-tech and knowledge-intensive industries. Highly trained and qualified Sabahans are part of the mobile global workforce and have options to be located anywhere in the world.

The human capital programmes detailed in the SDC Blueprint are aimed at generating the right talent for the right job via curriculum refinement with industry inputs. At the same time, the programmes will focus on leveraging on the natural attractions of Sabah to make it one of the most liveable places in Asia, hence helping to retain talented Sabahans and attract foreign talent.

iv) Competition for FDIs
Sabah is competing with countries like Vietnam, Thailand and China for FDI in the manufacturing sector. These countries are able to sustain their advantage by offering significant cost advantage, large domestic markets and attractive incentive packages.

While Sabah’s advantage is the large quantity of natural resource for feedstock, within the SDC implementation period investors will be offered a compelling incentive package with guaranteed service levels to facilitate private investments (local and foreign).
Strategies

Sabah’s manufacturing focus is to leverage its natural endowments (palm oil, rubber, biodiversity, oil and gas, minerals, and others). However, to attract private sector and foreign investments, the immediate strategies are to:

- Enhance the basic infrastructure and focus on reducing cost of doing business
- Invest in human capital for existing and new industries
- Anchor world-class companies to move into high value-add downstream processes

4.4.1 Enhance the Basic Infrastructure; Focus on Reducing Cost of Doing Business

The SDC initiative will focus on enhancing the basic infrastructure in terms of roads, power and water to enable effective and efficient manufacturing operations. The immediate goal for Sabah is to achieve infrastructural standing in line with the major manufacturing states in Malaysia such as Penang, Selangor and Johor.

In addition to fixing the basic infrastructure, the programmes will focus on reducing the overall costs of doing business. This is fundamental to potential investors’ choice of location. Critical areas which impact existing business efficiencies are as follows:

- Cycle-time reduction for approval processes at federal, state and local authority levels
- Progressive liberalisation of the Cabotage Policy for market forces to determine best shipping tariffs
- Review of port handling charges to make Sabah ports competitive in the region
- Review of haulage charges with association of haulage operators to eliminate non-competitive pricing

4.4.2 Invest in Human Capital for Existing and New Industries

The existing skills training centres, vocational institutes, polytechnics and universities will be leveraged to tailor curriculum suited to targeted industries (for example, timber processing courses, advanced furniture fabrication methods, food processing and packaging methods among others). A consultative forum comprising industry members, expert consultants and academia representatives will be set up to ensure planning or review of curriculum and training programmes are appraised according to targeted industries.
To enhance the quality of the workforce and improve work ethics, investments in training courses for manufacturing operators, supervisors and managers will focus on:

- Quality methods – waste reduction, root-cause analysis, quality circles, process control and Six Sigma
- Marketing – branding, packaging, distribution channels, pricing and customer segmentation
- Design and innovation – design for manufacturability, techniques for anticipating customer demand, customer focus groups and new product development methodology

Anchor World-Class Companies to Move into High Value-Add Downstream Processes

The first two strategies deal with the basic ingredients for engendering a sound manufacturing base. To further catalyse the growth of manufacturing especially in new targeted areas where there is currently a lack of activities and expertise, a third strategy which aims to anchor world-class companies is crucial. It allows Sabah to accelerate the growth of downstream manufacturing activities effectively, and move up the value chain into higher order manufacturing.

The programmes designed will be underpinned by a compelling package of incentives (fiscal, financial and non-financial) which would include other requisite supporting services that investors look at, namely (but not limited to):

- Facilitation of relocation including expedited working visa approval for spouses
- Ability to mobilise foreign talents such as foreign scientists including tax waivers on plant and equipment
- Availability of shared common facilities such as industrial steam, piped gas and clean water
- Expedient approval and follow-through process to enable business activity

The promotion team will be selectively targeting best-in-class companies with a genuine interest for technology transfer to local companies and human capital via strategic alliances, screening for *inter alia*:

- Proportion of local content in sourcing
- Proportion of skilled workforce
- Share of revenue invested in training and R&D
These strategies when executed in full with clear accountabilities and explicit performance targets would catalyse change and provide a compelling business case for investments to be located in Sabah. The programmes underpinning the strategies will be implemented over three phases through to 2025.

**Programmes**

<table>
<thead>
<tr>
<th>Phase 1: 9MP</th>
<th>Phase 2: 10MP</th>
<th>Phase 3: 11-12MP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2008-2010</strong></td>
<td><strong>2011-2015</strong></td>
<td><strong>2016-2025</strong></td>
</tr>
<tr>
<td>Enhance infrastructure and catalyse growth in downstream industries</td>
<td>Further growth in new industries</td>
<td>Location of choice in Asia for resource-based manufacturing</td>
</tr>
<tr>
<td>• Enhance existing infrastructure</td>
<td>• Further boost to growth in new industries</td>
<td>• Recognised as one of the most preferred locations within Asia for resource-based manufacturing</td>
</tr>
<tr>
<td>• Invest in building human capital</td>
<td>• Build critical mass of SMEs linked to large manufacturing companies</td>
<td></td>
</tr>
<tr>
<td>• Incentivise local and foreign companies to move into high value-add downstream activities</td>
<td>• Enhance research, design and marketing to generate local IPs</td>
<td></td>
</tr>
<tr>
<td>- Palm oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Wood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Biotech</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Oil and gas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Anchor world-class companies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sabah’s Palm Oil Industrial Clusters (POIC) will serve as the most important palm oil export clusters in the region, much like Rotterdam in the Netherlands. These clusters will create jobs and investment opportunities engendering a RM100 billion industry in the next 10 years. The Palm Oil Belt spanning Sandakan, Kunak, Lahad Datu and Tawau will be the prime focus for anchoring investors in downstream processing based on palm oil feedstock.

The POIC in Sandakan and Lahad Datu are located close to millions of hectares of palm oil plantations in Sabah\(^\text{18}\) and Kalimantan. Sabah is the largest CPO producing state in Malaysia. In Lahad Datu alone, there are more than 24 CPO mills with a combined processing capacity of 5,170,000 MT of FFB/year producing about 1,153,315 MT of CPO and 264,384 MT of PKO in 2005. Sabah’s strategic location also affords it the potential to bring in CPO from nearby regions.

POIC Lahad Datu is blessed with a deep, sheltered natural harbour (20m draught) with convenient shipping routes to key markets globally. It has good infrastructure and support services. In addition, the research and educational institutions in Sabah provide a ready source of skilled and semi-skilled manpower for downstream industries.

\(^\text{18}\) Sabah produced 5.4 million MT of CPO in 2006, being the largest CPO producer in Malaysia (34% share of total production). Johor at 2.8 million MT (17%), Pahang at 2.3 million MT (14%), Perak at 1.7 million MT (11%) and Sarawak at 1.5 million MT (9.5%).
The POIC is designed based on the “clustering” concept – co-location of companies and institutions in a specific locale linked by interdependencies thus enabling companies to enjoy knowledge spillover, access to suppliers, human capital, and learning from close interactions. Co-location thus increases efficiencies in terms of cost and product innovation.

The POIC development team has been operational since July 2005. Based on recent interviews, all the basic infrastructure (roads, drainage, water supply, sewerage, telecommunications and electricity) have been completed to date, while the dedicated jetty will be due for completion in August 2008. Total area for development at POIC Sandakan is 2,800 acres, while POIC Lahad Datu (Phases 1 and 2) is 1,150 acres. Companies located in the POIC would enjoy cost savings in terms of common facilities (industrial steam, piped gas, bulking and others).
Phases 1 and 2 of Development of POIC Lahad Datu

In terms of land use planning for POIC Lahad Datu, the promoted sectors for downstream manufacturing are as follows:

• Biodiesel, refineries, PKE, oil-based = 510 acres, 37 parcels
• Oleo-chemicals = 13 acres, 2 parcels
• Fertiliser plants = 81 acres, 7 parcels
• Port and bulking facilities = 62 acres, 5 parcels
• Warehouse and logistics = 81 acres, 3 parcels
• Services and utilities = 41 acres, 10 parcels
• Commercial and others = 55 acres, 5 parcels

To date, there are two existing manufacturing plants on site with a number of deals in the pipeline which are due to be announced.

Figure 4.5: Status Update on Investment in POIC Lahad Datu

<table>
<thead>
<tr>
<th>Breakdown of Investment Enquiries, Sep 2007</th>
<th>Investment Value, Sep 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RM billion</td>
</tr>
<tr>
<td>Biodiesel</td>
<td>50</td>
</tr>
<tr>
<td>Support industries</td>
<td>13</td>
</tr>
<tr>
<td>(Spent Bleach Earth, Petroleum Supplier,</td>
<td></td>
</tr>
<tr>
<td>Packaging Plant, Treatment Plant)</td>
<td></td>
</tr>
<tr>
<td>Fertiliser</td>
<td>11</td>
</tr>
<tr>
<td>Palm oil refinery</td>
<td>10</td>
</tr>
<tr>
<td>PIC crusher</td>
<td>6</td>
</tr>
<tr>
<td>Oleo-chemical</td>
<td>5</td>
</tr>
<tr>
<td>Warehouse and logistics</td>
<td>5</td>
</tr>
<tr>
<td>Power generator</td>
<td>5</td>
</tr>
<tr>
<td>Food-based, phytonutrients</td>
<td>4</td>
</tr>
<tr>
<td>Biomass</td>
<td>4</td>
</tr>
<tr>
<td>Animal food</td>
<td>3</td>
</tr>
<tr>
<td>Bulking investment</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>6.76</td>
</tr>
</tbody>
</table>
POIC Lahad Datu is building on natural strengths and within the vicinity, there are major established industry players such as KWANTAS, LDEO, KLK and FELDA which form a natural cluster. That said, competition for investments is intense and global. For instance, the POICs would have to compete against markets with significant local demand such as China, India or Pakistan, which are attractive from a demand point of view for potential investors.

To make POIC Sandakan and Lahad Datu compelling to investors, the SDC Blueprint is committed to putting in place a highly attractive incentive package plus business set-up facilitation guarantees. The incentive package would include *inter alia:*
• Proportionate rebates of Sabah state sales tax for existing plantation companies investing in downstream palm oil processing; rebates will increase the further downstream
• Quotas on export of CPO from Sabah to ensure sufficiency and reliability of feedstock for developing downstream industries
• Pioneer status tax exemption (5+5 years) for qualifying investments
• Training grants for upskilling of workforce
• Tax exemption on pre-qualified list of raw materials as well as plant and equipment
• Guaranteed service levels from investment promotion officers (SEDIA and POIC) in:
  ○ Securing Manufacturing Licence and Environmental Impact Assessment among others
  ○ Construction of factories and all associated approvals (water, electricity, fire protection, sewerage, schedule waste, and local authority approvals among others)
  ○ Human capital sourcing and mobility of skilled professionals
  ○ Immigration matters including spouse and education for dependents

4.5.2 Enhance Participation of Sabah Industries in Oil and Gas

Value-Added Services
Value-added services is an area where Sabah companies and entrepreneurs could enhance their participation. The procurement spending of exploration and production in oil and gas business in Malaysia is expected to grow at 14% CAGR between 2003-2008, reaching RM20 billion per year by 2008. Given the trend, companies in Sabah stand to gain in terms of value-added services such as fabrication, piping, transportation, ship repair and overhaul.

Petronas and its production sharing partners have committed to build an oil and gas terminal on a 50 hectares site in Kimanis to receive and transfer crude oil and natural gas from oil fields off Sabah. The Sabah Oil and Gas Terminal (SOGT) is an integral part of a larger infrastructure project worth RM2.5 billion which comprises the construction of a subsea pipeline linking the offshore oil and gas reserves to the onshore processing terminal in Kimanis. From Kimanis, a 480km transfer pipeline connects SOGT with the Petronas LNG complex in Bintulu.
The SOGT is to have facilities for storing 300,000 barrels of oil and one billion cubic feet of gas per day. The completion date for this project is slated for early 2010 to cater for Gumusut-Kakap\textsuperscript{19} and Malikai oil drilling projects which are due to start production around that time. With the construction of the Kimanis gas landing site, Petronas has committed to support a facility in Sabah for gas pipes coating. This is expected to lead to further opportunities for future contracts from other countries in the region.

Aside from this specific facility, local manufacturers such as Sabah Shipyard could participate actively in offshore modules and sub-structures including:

- Ship repair works
- Oil and gas landing base, onshore plant
- Fabrication of oil and gas offshore modules
- Skid packages

Facilities at the existing yards need to be fully equipped for high-end engineering works. This expertise could be built by forming strategic alliances with leading players in the business.

**Maritime Academy**

In order to increase value capture in the oil and gas services, a Maritime Academy will be established in Sipitang, which is located within the immediate vicinity of the energy-intensive clusters of Labuan, Brunei and Bintulu. The Maritime Academy will build the necessary human capital needed by the logistics, shipping as well as oil and gas industries.

**Downstream Oil and Gas Potential**

Apart from participating in value-added services to the oil and gas industries, Sabah is blessed with huge oil and gas reserves. As at 2004, according to Petronas Berhad, up to 30\% of Malaysia’s crude oil reserves and 11\% of natural gas reserves are in Sabah state. This does not include potential and existing new finds. Six of the last eight major oil finds in Malaysia were located off Sabah.

---

\textsuperscript{19} Gumusut-Kakap includes oil fields under the purview of Shell and Murphy Oil drilled in collaboration with Petronas Carigali Sdn Bhd.
Kikeh is estimated to have around 0.7 billion barrels and Gumusut is held to be as big as Kikeh. In total, Sabah’s oil reserves could potentially be more than existing finds suggest. This bodes well for possible downstream activities that could potentially be set up in the state which would engender huge multiplier effects throughout the state by way of high-value jobs, increase in household income and creation of services supporting the oil and gas industries. A critical mass of oil and gas companies operating out of Sabah would support attraction and retention of highly-skilled talents in the state.
A detailed study will be commissioned on the possibilities and economic viability of downstream activities emanating from Sabah’s rich oil and gas reserves. Development of this sector in Sabah will be conducted in collaboration with national oil company Petronas.

### SME Manufacturing Leaders Programme

SMEs are an indispensable part of the economy in that they form a reciprocal relationship with large corporations which rely on them as support industries and distribution networks. A common characteristic of SMEs in most countries is the lack of capital, technology and management skills which makes it difficult for them to compete in new markets.

To further the growth of local SMEs, the SDC Blueprint proposes the SME Manufacturing Leaders Programme aimed at developing local SME leaders with significant technology, marketing and management capabilities.
Targeted incentives will be provided for companies undertaking R&D, design and technology transfer activities. In addition, targeted training and incentives for productivity enhancements will be provided. This programme is targeted at SMEs based in Sabah mainly for their operatives, supervisors and engineering managers. The SME Manufacturing Leaders Programme will be administered through the BusinessLink centres to be strategically located across major cities and larger towns.

**BusinessLink Centres**
The BusinessLink centres will deliver practical business advice for SMEs and entrepreneurs starting up their businesses. These centres will be staffed with case managers sourced from the private sector with business, technology and marketing backgrounds who are able to provide consultancy services, business support and information on critical areas of concern for SMEs, including *inter alia*:

- Start-up of a business (licences, regulations and business case among others)
- Business plan writing
- Financing, grants and taxes
- Sales and marketing
- Human resources
- IT and e-commerce
- International trade
- Manufacturing improvement techniques

Working with the National Productivity Council, the BusinessLink centres will systematically collect baseline data on productivity via surveys and case-studies to continuously encourage SME manufacturers to adopt best practices in cycle-time reduction, quality enhancement and cost reduction.

**Human Capital Training**
The existing skills and training centres including vocational institutes in Sabah will be enhanced with funding and training exchanges sought through strategic alliances with institutions such as the German-Malaysian Institute and Malaysia France Institute for short and customised courses in the following areas *inter alia*:

- Quality – waste reduction, root-cause analysis, quality circles, process control and Six Sigma methodologies
- Marketing – branding, packaging, distribution channels, pricing and customer segmentation
- Design and innovation – design for manufacturability, techniques for anticipating

---

20 Currently, there are five institutions in Sabah focusing on technical education with a capacity for 10,450 trainees, on skills and training: MARA Skills Institute, Sabah Skills & Technology Centre (SSTC), Industrial Training Institute (ILP), Malaysian Timber Industry Board (WISDEC), and KK Politeknik.
customer demand, customer focus groups and new product development methodology

- Sector-specific courses (via industry inputs, matching their needs)
  - Timber-processing techniques
  - Food-processing and packaging technologies and advancement
  - Furniture-processing techniques and design courses

To off-set the costs of sending employees to the programme, approved companies will receive a proportionate rebate on the course fees. In addition, to ensure sustainability of the programme, a Manufacturing Leaders Circle will be instituted. This will put in place a systematic structure for sharing of best practices in performance enhancement on the manufacturing shop floor including design and innovations in product and processes.

**Export Promotion Fund**

An export promotion fund will be set up within the BusinessLink centres to allow SME recipients to:

- Participate in domestic and foreign trade fairs
- Market and brand their products
- Conduct study tours to access new markets or seek new business opportunities

In particular, an export promotion cluster group will be formed to develop a quality branding mark for Sabah which will showcase the excellence and sustainability of Sabah products to international markets featuring wood products (furniture, plywood, moulding, veneer, fibreboard, flooring, parquet), agri-food produce, and handicraft products among others. The export promotion cluster group would eventually become a branding organisation for Sabah-based manufactured products.

### Biomass Recovery and Reuse

Sabah is producing a sizeable amount of biomass from the oil palm, rubber, cocoa and timber industries. As it stands, methane (a potent greenhouse gas) is produced from rotting oil palm biomass. Therefore, using biomass productively (electricity generation, animal feed, paper and furniture among others) would directly help to reduce the emission of methane, CO₂, and other major greenhouse gases which cause global warming.

Against the backdrop of global climate change, the optimum utilisation of biomass would open up opportunities for entrepreneurs and businesses in Sabah and Malaysia as a whole not only to profit from processed biomass but to claim carbon credits sold to countries which are emitting pollutants exceeding their quota under the Kyoto Protocol.
A Biomass Policy for the state is timely and vital to the long-term development of spin-off activities which utilise biomass and to position Sabah as an environmentally-conscious state. The policy would contain *inter alia*:

- Maximum and systematic utilisation of biomass
- Sustainable development
- Creation of new business opportunities
- Pricing mechanism
- Incentives and regulatory framework for biomass collection and utilisation

**Biomass Trading Exchange**

A vital component in the development of a biomass industry is the issue of pricing. Biomass producers would clearly want to be fairly compensated for their biomass, while end-users would want to obtain large quantities of biomass at a viable cost.

Both producers and end-users would certainly base their pricing on prevailing market rates. For biomass that is already being bought and sold in the market such as palm kernel shell, mesocarp fibre and even empty fruit bunches (EFB), the pricing may be easier to ascertain. However, this may not be as clear cut for other biomass that is currently not actively traded in the market such as oil palm trunk and oil palm fronds.

One method of determining fair pricing is to institute an exchange for trading of biomass where buyers and sellers can be matched and pricing for the biomass is set in a transparent manner – the seller is compensated for more than its secondary use as fertiliser, the buyer paying slightly less for alternative raw materials after factoring transportation and processing costs as well as the projected selling price of the biomass end products.

The exchange will also facilitate collection of the pre-processed biomass from producers and deliver these to end-users. Operated by one or more government appointed parties or a GLC, the exchange will also act as a clearing house for payment and delivery upon parties agreeing on the quality and condition of the biomass.

The project will synchronise the efforts of the POIC by selectively targeting two or three leading industry players in biomass recovery and reuse to be established in Sabah. This is expected to spawn new downstream industries based on biomass, including *inter alia*:

- EFB conversion into ecomat or biodegradable packaging materials
- Blending ingredients for animal feed
- Raw material for medium density boards
Establish Industrial Biotech Programme

Biodiversity is the key to the future of high-growth biotech industries and Sabah possesses some of the richest biodiversity in terms of fauna and flora in the world. There is also great potential for biomass in the development of cellulose-based industry to produce industrial biotech products such as bio-plastics, bio-fibres and ethanol. Access to rich biodiversity and biomass can be leveraged for future industries especially in biotechnology. That said, investments in the biotech industry require a long gestation period, strong science base and skilled manpower with significant technological bets.

In order to add value to its rich biodiversity, Sabah requires a systematic programme ranging from research to development through to commercialisation. To develop the biotech sector, the state already has a legislative and policy framework, through the Sabah Biodiversity Enactment 2000 and Sabah Biotechnology Action Blueprint and some experience in related biotech initiatives. Sabah should therefore leverage existing biotech initiatives and conservation work as a sustainable force to draw research and commercialisation activities into Sabah. The Industrial Biotech Programme shall be linked to the Sabah Bio-X Programme (see Chapter 7), which is designed as a cross-disciplinary, collaborative network of research centres of excellence in biodiversity and biotech. It is based on a decentralised structure where the nexus links the diverse research activities that are on-going across the state.

Minerals Policy

Allocation will be requested for the formulation of a sustainable mineral extraction policy that could guide future development of potential downstream industries based on Sabah’s rich mineral deposits.