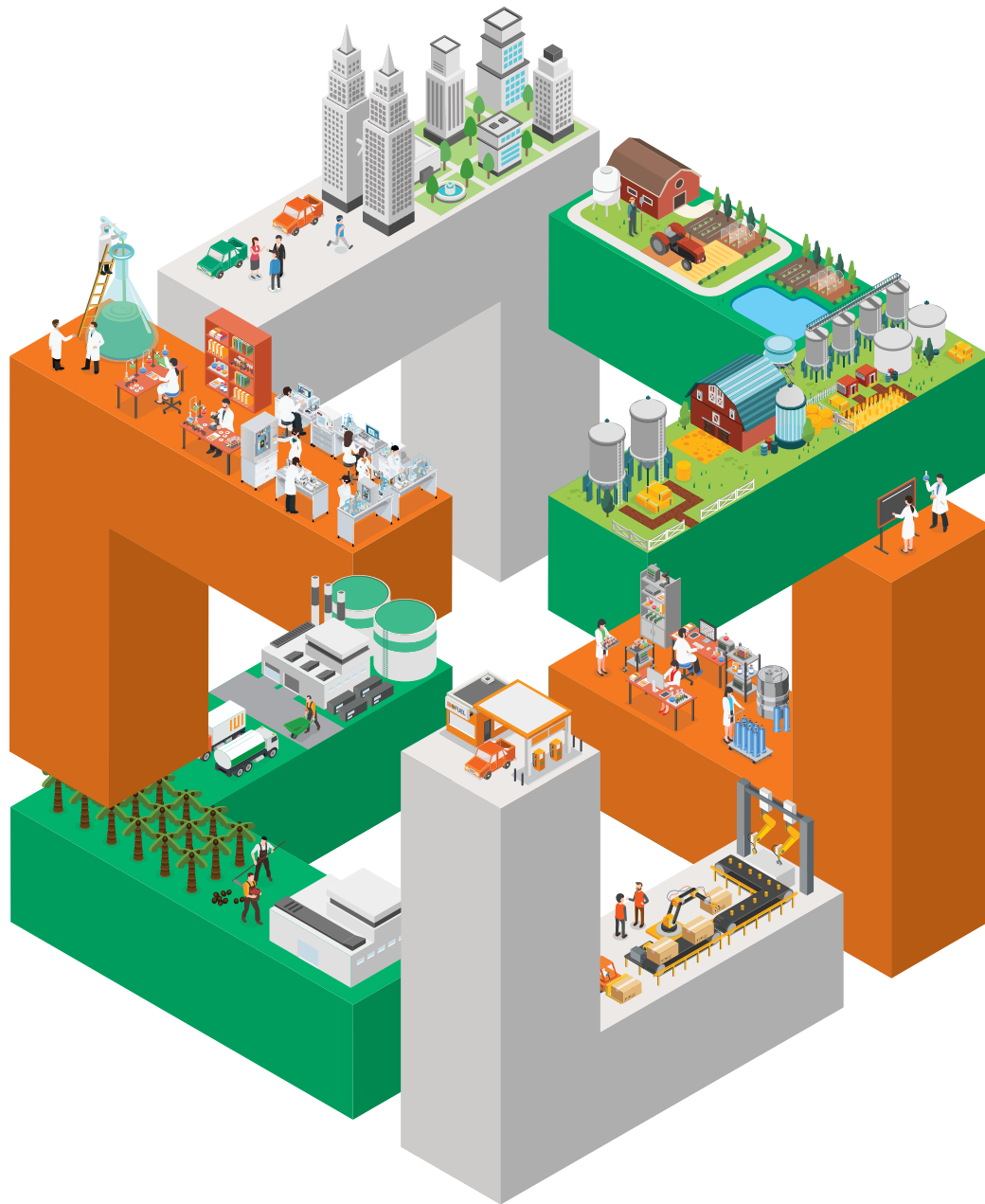


BIOECONOMY CORP

PROGRESS REPORT
2016 AND 2017



Embracing Change, **Enhancing Success**

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EMBRACING CHANGE, ENHANCING SUCCESS

RATIONALE

The colours reflect Bioeconomy Corp's corporate colours, while the symbols and icons represent the three focus areas under bioeconomy and their respective activities.

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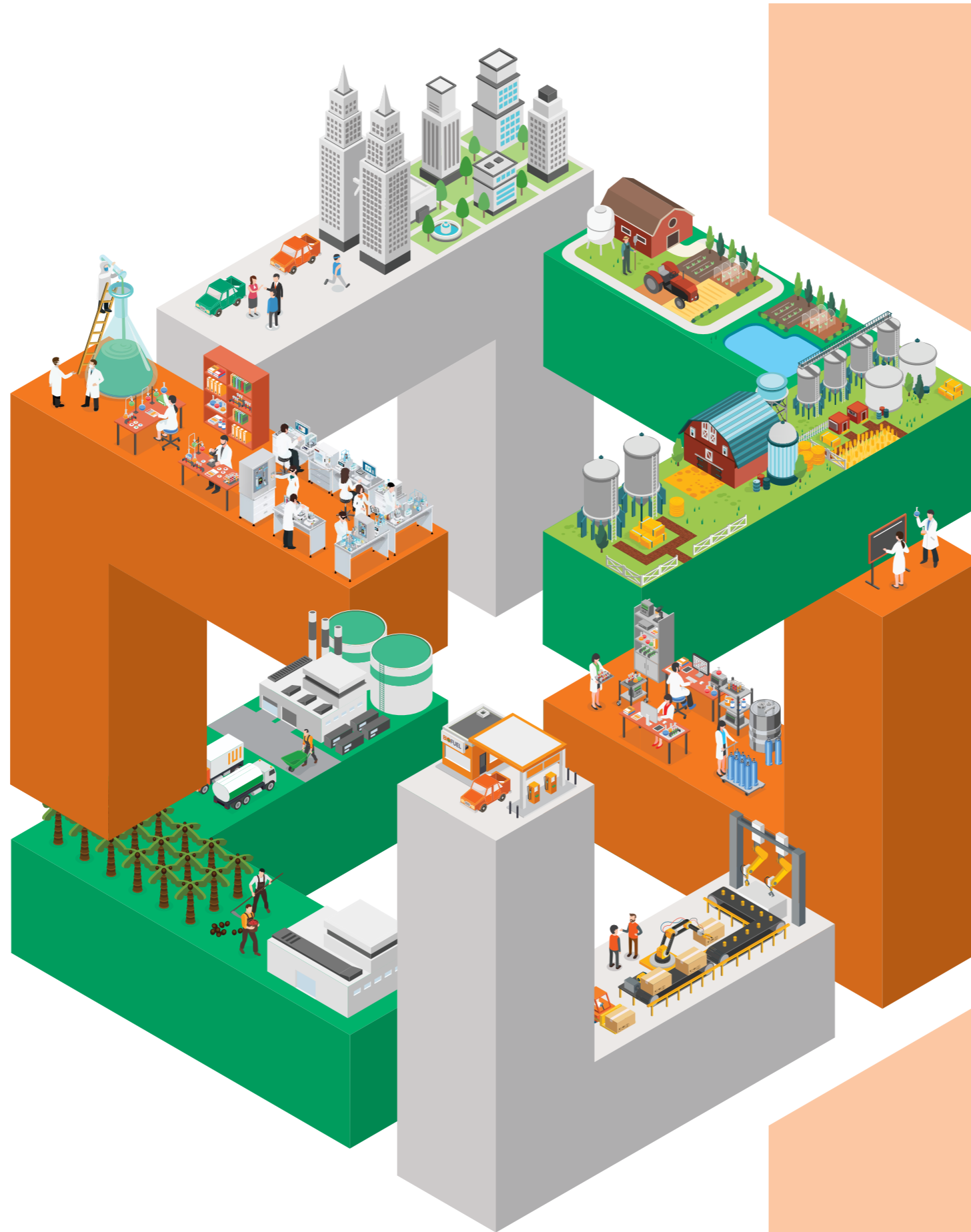
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FORMING STRUCTURES FOR A GAME CHANGER

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FOREWORD BY PRIME MINISTER OF MALAYSIA

As a progressive and forward-looking nation, the Government of Malaysia strives to plan ahead, developing strategies and policies that will deliver socio-economic growth, not just for this generation but also those to come.



Our nation's transformation began with the New Economic Policy (1971-1990), followed by Vision 2020 (1991-2020). The policy and vision outlined in these plans were crafted with a view to place Malaysia on the path to fully developed nation status. As part of this, the government over the years formulated a number of programmes and economic plans, such as Malaysia Plans and the National Transformation Programme. At present, Malaysia is embarking on a new transformation, through the National Transformation 2050 or TN50 initiative.

TN50 is unique and reflects not just the aspirations of policy makers but also those of our citizens, with the government engaging the public - our most important stakeholders - and soliciting their ideas and input towards the long-term objectives and milestones we need to set for our country.

TN50 will be driven by clear goals and targets that will transform Malaysia to be amongst the top 20 countries in the world in terms of economic development, citizen well-being and innovation capacity. It is aimed at creating a successful new generation based on five key metrics - society, environment, economy, technology and connectivity, and governance. The bioeconomy has a key role to play here. Through innovations and technological advancement, it has the potential to make a significant contribution in the journey our country is currently on towards becoming a developed, knowledge-based and high-income nation.

Indeed, it is already doing so in other countries, where the bioeconomy has emerged as a knowledge-driven economy that can help address a myriad of present day challenges. In the European Union for instance, bioeconomy is helping to trigger job creation and growth.

It also contributes towards optimising the use of biological resources while reducing dependency on the imports. The world in 2050 will be much different from the world today. Malaysia has to be ready to face the many challenges that will no doubt arise in the next 30 years.

The anticipated growth of both urban and rural areas will create unprecedented sustainability challenges. Additionally, we need to be adaptive to the increasing demands of energy, water, sanitation, education, healthcare, housing, transport and public services. The bioeconomy is important in addressing these challenges and helping us achieve our TN50 goals.

It will be a significant contributor towards Malaysia's socio-economic advancement and I wish to congratulate the Ministry of Science, Technology & Innovation and Malaysian Bioeconomy Development Corporation Sdn Bhd for their efforts in developing a sustainable bioeconomy.

I have no doubt that, through their ongoing efforts, our civil servants will elevate our nation to the next level.

**YAB Dato' Sri Mohd Najib
bin Tun Haji Abdul Razak**
Prime Minister of Malaysia

MESSAGE BY MINISTER OF SCIENCE, TECHNOLOGY AND INNOVATION

A central challenge towards the attainment of the nation's goal is the establishment of a scientifically advanced and progressive society, one that is both innovative and forward-looking.



The country cannot remain as a consumer of technology but to strive towards becoming a contributor to the scientific and technological advancement of our time. This challenge underscores the important role of Science, Technology and Innovation (STI) more so in a competitive and globalised world as the key driver that will shape the future of the country.

In the age of the Fourth Industrial Revolution (4IR), the strengthening of national STI policies is becoming more apparent for economic and social advancement. 4IR, briefly defined, is the fusion of technologies that is blurring the lines between the physical, digital and biological sphere. This trend impacts a wide range of industries, including biotechnology and bio-based industries. We need to govern it properly in order to obtain its full potential.

Globally, many countries has implemented initiatives relating to 4IR. Malaysia is exploring the use of Internet of Things (IoT) technologies for applications in bioeconomy. In the Agriculture sector, the establishment of smart farming enables farmers to increase the quantity and quality of agricultural produce by making farms more "intelligent" and more connected. In the Healthcare sector, people are benefitting from the advancement of telemedicine and personalised care.

In the BioIndustrial sector, manufacturing practices can now take advantage of ICT innovations. Smart factories represent a leap forward from traditional automation to a more integrated and flexible system where manufacturers can utilise a constant stream of data from connected operations and production systems in order to have real-time control and monitoring of the factory's production and operation.

As I see it, bioeconomy is an integral part of the 4IR. That means sustainable economic activities are undertaken alongside with the fusion of bio-based innovations with other technologies to create value for consumers. In Malaysia, the bioeconomy serves to strengthen the economy and to improve livelihoods. Through bio-based technologies, we could engineer plants as biofuel, produce biodegradable plastics from renewable biomass, tailored food products to meet specialised requirements, address food security, and improve healthcare.

In the foreseeable future, further advancement in bio-based technologies and other high-technological areas including robotics, cloud computing, IoT, are among the key areas that will actively contribute towards the development of bioeconomy in Malaysia. In the long run, it will also propel the nation's STI and socio-economic landscape to a greater height.

Accordingly, the Ministry of Science, Technology and Innovation (MOSTI), and the Malaysian Bioeconomy Development Corporation Sdn Bhd (Bioeconomy Corp) will be part of that transformation, undertaking alongside other stakeholders the promotion of bio-based innovations as an essential component of the nation's growth.



YB Datuk Seri Panglima Madius Tangau
Minister of Science, Technology and Innovation

MESSAGE BY CHAIRMAN OF BIOECONOMY CORP

Bioeconomy, being at the heart of many technological advances, has the potential to address some of the most pressing challenges such as feeding a growing population and offering alternatives to dwindling natural resources. It is a game changer for Malaysia's economic growth.



I recall that the transformation of the bio-based industry to become one of the key economic drivers in the country began in 2005 with the establishment of the National Biotechnology Policy (NBP). The target is set for the sector to contribute 5% to the nation's Gross Domestic Product (GDP) by 2020.

The NBP, a well-crafted 15 year masterplan provided a comprehensive roadmap that helped foster a conducive ecosystem for accelerated industry growth. Since 2005, various strategies have been implemented in three 5-year phases. These phases are:

CAPACITY BUILDING PHASE I	2005 2010
SCIENCE TO BUSINESS PHASE II	2011 2015
GLOBAL BUSINESS PHASE III	2016 2020

We are now midway towards the completion of Phase III and the NBP. In the pursuit of positioning the Malaysian bio-based industry onto the global stage, Phase III consolidates the strength and capabilities in developing home-grown bio-based innovations, enhancing commercialisation and penetrating international market. At the same time, efforts are tailored towards creating greater value for Malaysian bio-based companies and helping them to become internationally competitive players.

It is targeted that Malaysia will produce at least 20 global companies to spearhead the value creation process for the bio-based industry beyond 2020. To date, there are 283 companies in the BioNexus network, with 37 companies having international presence. Moving forward, more efforts are needed in order for these companies to be truly global.

Having mentioned that, BioNexus Status and Bioeconomy Transformation Programme (BTP) companies will have to establish themselves as pioneers of leading edge bio-based businesses. Looking at the broader bioeconomy, Malaysia is well-primed to excel by focusing on high-impact, high-growth and high-technology area that is capable of driving the continuous development of home-grown technologies.

In the long run, I foresee the bioeconomy to expand and is expected to generate new economic opportunities and create a broad spectrum of novel bio-based sectors in the country. Bioeconomy, being at the heart of many technological advances, has the potential to address some of the most pressing challenges, such as feeding a growing population and offering alternatives to dwindling natural resources. It is a game changer for Malaysia's economic growth. Through the exploitation of the country's biodiversity, bioeconomy has the potential to increase the country's economic competitiveness, creating more job opportunities, enhancing healthcare, food security as well as addressing environmental and sustainability concerns.

With three years to 2020, the challenge lies in increasing the number of bio-based industry players and to have stronger global presence for locally produced products. A few notable programmes designed to achieve that are already in place. The Bioeconomy Community Development Programme (BCDP) will focus on enhancing the socio-economic well-being of the people by providing opportunity for generating higher income and employment particularly in rural areas.

On the other hand, BTP participants and BioNexus Status companies will focus more on the downstream industries through the utilisation of bio-based technologies to manufacture and provide value-added products and services. Facilitation will also be provided to bio-based companies through other mentoring and commercialisation programmes such as BioNext and BioShoppe that will enable the penetration of local bio-based products into international market.

As Malaysia aspires to build a more integrated and holistic value chain that will support bioeconomy stakeholders, the Malaysian Bioeconomy Development Corporation Sdn Bhd (Bioeconomy Corp) will continue to be the lead economic development agency for the bio-based industry.

Having mentioned that, I would like to take this opportunity to congratulate all parties who are involved in the production of this Progress Report and to the Ministry of Science, Technology and Innovation (MOSTI), and Bioeconomy Corp for its effort in advancing the national bioeconomy agenda for sustainable growth and development.

**YBhg Professor
Tan Sri Zakri Abdul Hamid**
Chairman

MESSAGE BY CHIEF EXECUTIVE OFFICER OF BIOECONOMY CORP

Malaysia's path in developing the biotechnology sector began in 2005 with the establishment of the National Biotechnology Policy (NBP). The policy is a 15-year plan aimed at making biotechnology a key contributor to economic growth. Further to that, the launch of the Bioeconomy Transformation Programme (BTP) in 2012 makes Malaysia the first country in ASEAN and the second in Asia to initiate a comprehensive plan that caters to the development of bioeconomy in the country.

The BTP comprises developmental projects that contribute towards the "Capital Economy" - focused on national economic development. A component of the BTP, the Bioeconomy Community Development Programme (BCDP) contributes to the development of the "People's Economy", which is societal development. Both programmes have significant role towards the successful implementation of the 11th Malaysia Plan (RMKe-11).

With NBP and government enhancement initiatives through BTP in place, the Malaysian Bioeconomy Development Corporation Sdn Bhd (Bioeconomy Corp) becomes the lead economic development agency for the bio-based industry.

Working in tandem with our business partners, the organisation nurtures, strengthens and develops bio-based companies in Malaysia in order to create a critical mass of industry players who will in turn increase bioeconomy's economic contribution in the country.

Securing and realising strategic bio-based investments

In the current Phase III of the NBP, Bioeconomy Corp's strategies are focused at securing more strategic investments in the bio-based sector. In the "Global Business" phase, both domestic and foreign direct investment continue to be an important component to stimulate industry growth. Efforts are channelled into securing quality investment, including those that are knowledge and capital intensive and are able to improve the country's socio-economic well-being. In the context of socio-economic impact, strategic investments are effective instruments to increase capital influx, disseminate new and innovative technologies, transferring technical expertise, skills, as well as creating employment. These are investments that will generate long lasting benefits and create multiplier effects to the economy. Realising the benefits of these investments will be the focus of Bioeconomy Corp in the coming years.

Boosting bio-based companies

Bio-based SMEs development continues to be an important focus area in the national bioeconomy agenda. Programmes are designed to enhance market penetration and commercialisation of home-grown bio-based products, and to bridge the gap from lab-bench to shelf. In Phase III, we strive to move these companies further up the value chain, and towards "Going Global" via targeted programmes and initiatives. Targeted programmes such as BioShoppe is used to position homegrown bio-based products and services in the retail markets. Since its introduction in 2013, the programme has effectively created a greater market presence for local bio-based innovations. In line with the aspirations of NBP Phase III, venturing beyond Malaysia's borders is an important step for Malaysian bio-based companies to attain global exposure and accreditation. To achieve these objectives, Bioeconomy Corp continues to provide facilitation and support industry players in order to penetrate international market.

Nurturing talents and professionals

In the context of human capital development, our strategies include nurturing bio-based talents and professionals. To realise the potential of the bio-based economy, we need an abundant supply of skilled, capable, ready-to-work talent force. General industry sentiment also show the need for quality enhancement of graduates and the workforce to enhance efficiency and knowledge capabilities. In that manner, Bioeconomy Corp has put in place initiatives including the Bioeconomy Entrepreneurship Special Training Programme (BesT) and specialised MBA programme to address the gap between supply and demand, and to match graduate skills with market needs. Having initiatives to further empower graduates aimed at strengthening the local biotech workforce will also reduce the dependency for foreign experts.

Strengthening bio-based ecosystem, promoting inclusivity and community development

As the global biotechnology industry shifted to bio-based, the business ecosystem has also changed whereby the industry acknowledges the significant contribution from bio-based companies to the development of new technology and how it influences everyday life. While the critical elements of vibrant biotechnology ecosystem are present in Malaysia, continuous facilitation and support is needed to strengthen the crucial building blocks which support the growth of the bio-based industry. Through the BioNexus Partners Laboratories (BNP), and various industry-academia linkages, we are able to link industry to research institutions, and universities for research and development support and collaboration.

In line with the people-centric concept, the BCDP stresses on the importance for inclusivity, by harnessing the power of rural farms and the farming community to supply raw materials to bio-based companies and directly impacting the upstream segment of the bioeconomy value chain. To date, BCDP has directly benefitted 2,864 farmers and indirectly impacted 13,113 lives. BCDP is characterised through its high-impact, low cost, rapid execution and sustainability component and is now part of the National Blue Ocean Strategy (NBOS) agenda. Initiatives undertaken has enabled the creation of several flagship companies to venture into global market while helping to uplift B40 households.

MESSAGE BY CHIEF EXECUTIVE OFFICER

HIGHLIGHTS OF KEY EVENTS

2016 and 2017 displayed admirable accomplishments that promote the development of the bio-based industry. A list of notable events during the period of 2016 to 2017 include:

2017

- Bioeconomy Day at Intercontinental Hotel, Kuala Lumpur
- MOSTI Social Innovation (MSI) Fund for BCDP projects in various locations:
 - a. Kg Sagil, Tangkak, Johor for the Kacip Fatimah Farming Project
 - b. Kampung Kondok, Nilai, Negeri Sembilan for the Oyster Mushrooms Farming Project
 - c. Langkawi, Kedah for the Seaweed Aquaculture Project
- Document Exchange between Free the Seed Sdn Bhd and Pertubuhan Peladang Kawasan Pendang Selatan for the BCDP Waste Rice Straws Project

2016

- Bioeconomy Day Sarawak
- BioMalaysia and Asia Pacific Bioeconomy 2016
- Signing and Exchange of Collaboration Proposal between Bioeconomy Corp and Cosmetic Valley, France
- Signing and Exchange of Collaboration Proposal between Bioeconomy Corp and BIMP EAGA Bioeconomy Development Holdings Sdn Bhd

MOVING FORWARD

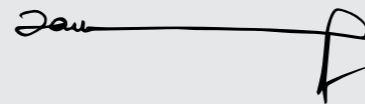
Obtaining the full benefits of the bioeconomy will require goal-oriented efforts. This will require leadership, primarily by the Ministry of Science, Technology and Innovation (MOSTI), other ministries and government agencies, public institutions and also participation of private sector firms. The formula for success is strongly dependent on effective partnerships and collaborations at many levels, across many fields, and with many active participants from the public and private sectors.

On the part of Bioeconomy Corp, the organisation is consistently fine-tuning its efforts into achieving the goals set forth by the NBP and BTP in the coming years. From the perspective of industry development, three strategies are crucial for the organisation in the foreseeable future. First, the implementation of projects and initiatives that will help address challenges face by the government and to reduce government expenditures.

For example, "Made in Malaysia" insulin products manufactured by Biocon Sdn Bhd at the Bio-XCell Park in Iskandar Puteri, Johor will help address the high incidence of diabetes in Malaysia and cater to the growing needs for affordable insulins across the country. Secondly, Bioeconomy Corp will also collaborate with strategic partners to ensure that services offered by bio-based companies are made more accessible to the public at large.

These include the provision of certification for bio-based products to ensure that Malaysia's bio-based products are at par with industry and global standards. Finally, the organisation also focuses on creating opportunities for the 'rakyat' to realise their ideas and dreams within the bio-based industry. For example, given that the social and economic benefits of promoting bio-entrepreneurship are indisputable, it is hoped that programmes currently undertaken by Bioeconomy Corp will further enhance Malaysia's scope in becoming a bioeconomy-centric nation.

While we strive towards realising these objectives, I would like to express my gratitude for the leadership given by Bioeconomy Corp's Board of Directors, led by YBhg Professor Tan Sri Zakri Abdul Hamid in ensuring that we remain on track and to carry our mandate in the best possible manner. I would also like to take this opportunity to acknowledge our stakeholders including Ministries, Government agencies as well as private sector industry players for making the biotechnology and bio-based industry the success story that it is today. Last but not least, to the management and employees of Bioeconomy Corp, I look forward to their continued support and dedication towards fulfilling the role of the organisation.



YBr Dr Mohd Shuhaizam Mohd Zain
Chief Executive Officer

02

BIOECONOMY BIOSPHERE

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18 Bioeconomy in Numbers

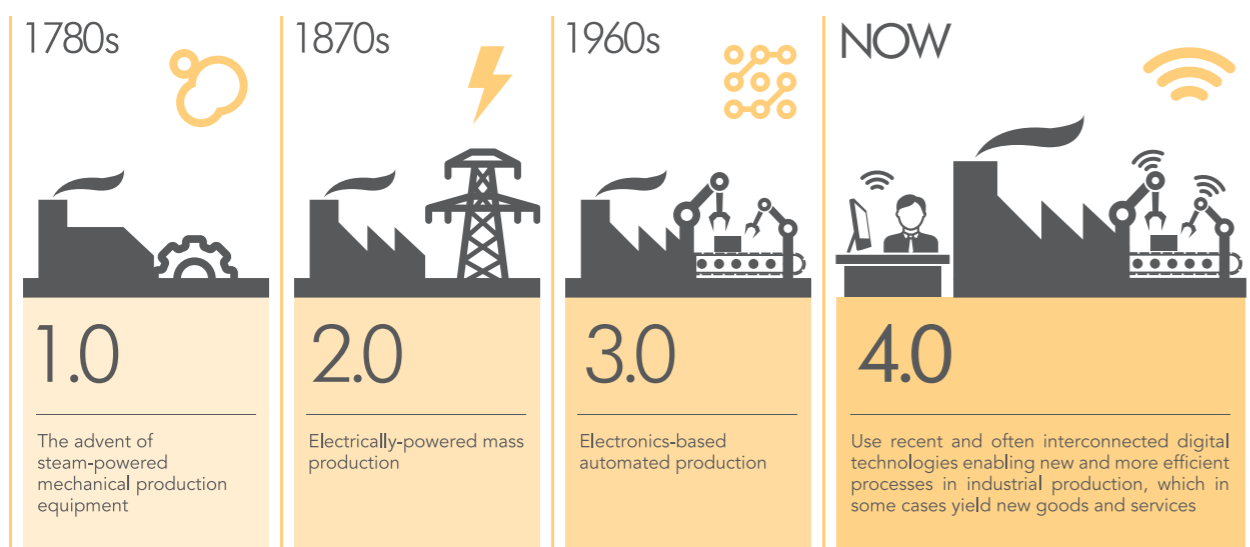


GLOBAL BIOECONOMY

Based on the Communiqué of Global Bioeconomy Summit 2015, bioeconomy is defined as “knowledge-based production and utilisation of biological resources, innovative biological processes, and principles to sustainably provide goods and services across all economic sectors”. In the past few years, the bioeconomy agenda has contributed to an increased awareness of the bioeconomy and bio-based solutions among a wider expert public. The media quite regularly features reports on bio-based innovations and research projects. Funding by relevant countries especially in the European Union has initiated a large number of interdisciplinary and cross-sectoral research projects.

As a result, there has been a strong increase in the number of specialist publications and conferences. There are also now specialised bioeconomy research networks, training courses and clusters especially in Germany that are also connected with international partners. Bioeconomy will depend on technology advances, costs and bio-based resource availability. This ties in with the aspirations of the current shifts in manufacturing and business, known as the Fourth Industrial Revolution (4IR).

BIOECONOMY AND THE FOURTH INDUSTRIAL REVOLUTION



INDUSTRIAL REVOLUTIONS AND “INDUSTRY 4.0”

The First Industrial Revolution used water and steam power to mechanise production. In its wake, the First Industrial Revolution heralded the rapid modernisation of human society, and brought about a dramatic change in the world we lived in. Following suit in the next two centuries, the Second Industrial Revolution used electric power to create mass production, and the Third Industrial Revolution used electronics and information technology to automate production. Now, the world stands once again at the brink of yet another technological revolution that will profoundly change the way we live, work, and relate to one another. A 4IR is underway, building upon the digital revolution that has been occurring since the middle of the last century. It is characterised by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.

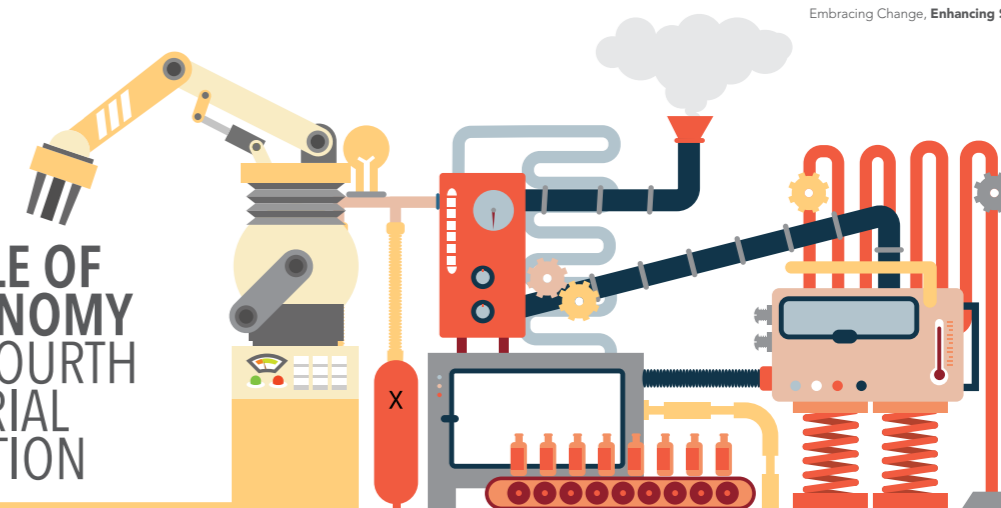
In its scale, scope, and complexity, this 4IR will bring about a transformation unlike anything humankind has experienced before. The speed of current breakthroughs has no historical precedent. When compared with previous industrial revolutions, 4IR is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country.

The breadth and depth of these changes herald the transformation of entire system of production, management, and governance. These possibilities will be multiplied by emerging technology breakthroughs in fields such as artificial intelligence, robotics, the Internet of Things (IoT), autonomous vehicles, 3-D printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing.

Already, artificial intelligence (AI) is all around us, from self-driving cars and drones to virtual assistants and software that translates or invests. Impressive progress has been made in AI in recent years, driven by exponential increases in computing power and the availability of vast amounts of data from software used to the discovery of new drugs, including algorithms used to predict cultural interests.

Digital fabrication technologies, meanwhile, are interacting with the biological world on a daily basis. Engineers, designers, and architects are combining computational design, additive manufacturing, materials engineering, and synthetic biology to pioneer a symbiosis between microorganisms, our bodies, the products we consume, and even the buildings we inhabit.

THE ROLE OF BIOECONOMY IN THE FOURTH INDUSTRIAL REVOLUTION



Like the revolutions that preceded it, the 4IR has the potential to raise global income levels and improve the quality of life for populations around the world through technological innovations.

However, humanity still faces unprecedented challenges on a global scale – climate change, population growth, changing resource availability and affordability, and health concerns all present mounting threats to our long-term future. Even with the arrival of the 4IR, the lingering challenges that remain ahead are still ever-present due to our continuing dependence on industries reliant on fossil fuels to drive our economies. Addressing and mitigating the consequences of these challenges will thus be key to humanity's enduring success.

What if manufacturing based on biology could integrate with industrial technology to transform our process industries? What if there was a way to ensure sustainability of economic activities in industrial processes?

This is where bioeconomy intersects with 4IR: by ensuring sustainability of economic activities undertaken alongside technological innovations.

Bioeconomy can be considered as any economic activity arising from the generation of products made using biological processes and using biological solutions to address the challenges we face in food, chemicals, materials, energy production, health and environmental protection. Bioeconomy espouses sustainable economic activity using renewable and bio-based raw materials in industrial processes, and therefore points towards a promising path which leads away from fossil fuel and unsustainable practices.

Examples include using highly specific microbes to transform wastes into bioenergy or biofuels which in turn are used to power smart factories and production lines, or integrating automated drug discovery systems with the use of plants as biopharmaceutical “factories” for reliable and rapid medicine production.

Similarly, cyber-physical integration brought about by the 4IR can intersect with advanced breeding technologies utilising molecular breeding and marker-assisted selection technique in fully automated and robotically controlled fresh food production plants, where LED grow lights are used to grow large varieties of edible food crops.

The importance of bioeconomy lies not only in providing solutions to pressing environmental and sustainability needs – such as reusing waste and providing alternatives to fossil fuels – but also in delivering real benefits through creating new companies, new products, new jobs, policy and advice, and contributing to an increasingly “Green” economy. Furthermore, it is not only about viable profit-making companies and tax revenues, but includes instances in which the application of bioscience brings about substantial economic savings. As it is, bio-based products and processes already support a raft of key industrial sectors around the world, including agriculture and food, energy and chemicals, pharmaceuticals and healthcare, and consumer goods.

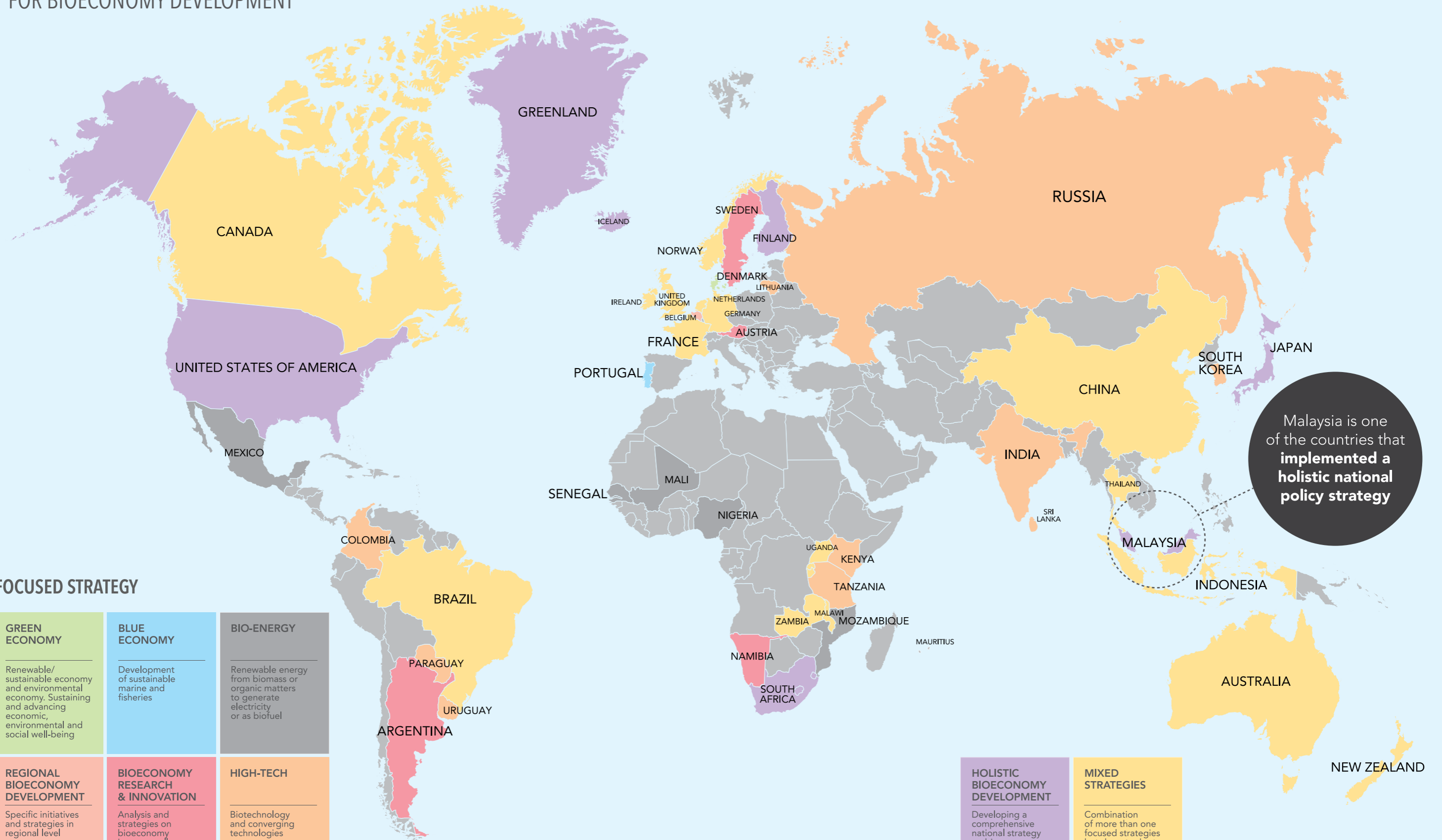
SHAPING THE FUTURE

Neither technology nor the disruption that comes with it is an exogenous force over which humans have no control. All of us are responsible for guiding its evolution, in the decisions we make on a daily basis as citizens, consumers, and investors. We should thus grasp the opportunity and power we have to shape 4IR and direct it towards a future that reflects our common objectives and values.

To do this, we must develop a comprehensive and globally-shared view of how technology is affecting our lives and reshaping our economic, social, cultural, and human environments. There has never been a time of greater promise, or one of greater potential peril. To adopt this new, broader future, we need to react appropriately to the grand challenges presented to deliver sustainable solutions, including continuing to nurture world-class research, training and innovations in all intersecting and related sectors.

In the end, it all comes down to people and values. We need to shape a future that works for all of us by putting people first and empowering them. In its most pessimistic, dehumanised form, the 4IR may indeed have the potential to “robotise” humanity and thus deprive us of our heart and soul. But as a complement to the best parts of human nature - creativity, empathy, stewardship - it can also lift humanity into a new collective and moral consciousness based on a shared sense of destiny. It is incumbent on us all to make sure the latter prevails.

GLOBAL BIOECONOMY STRATEGIES FOR BIOECONOMY DEVELOPMENT



Malaysia is one of the countries that **implemented a holistic national policy strategy**

FOCUSED STRATEGY

<p>GREEN ECONOMY</p> <p>Renewable/sustainable economy and environmental economy. Sustaining and advancing economic, environmental and social well-being</p>	<p>BLUE ECONOMY</p> <p>Development of sustainable marine and fisheries</p>	<p>BIO-ENERGY</p> <p>Renewable energy from biomass or organic matters to generate electricity or as biofuel</p>
<p>REGIONAL BIOECONOMY DEVELOPMENT</p> <p>Specific initiatives and strategies in regional level</p>	<p>BIOECONOMY RESEARCH & INNOVATION</p> <p>Analysis and strategies on bioeconomy issue as well as implementation on the research development</p>	<p>HIGH-TECH</p> <p>Biotechnology and converging technologies</p>

HOLISTIC BIOECONOMY DEVELOPMENT

Developing a comprehensive national strategy on bioeconomy development

MIXED STRATEGIES

Combination of more than one focused strategies but do not adopt a holistic perspective

Adapted from Bioeconomy Policy (Part II) : Synopsis Strategy Around the World by German Bioeconomy Council (2015)

BIOECONOMY MALAYSIA

INTRODUCTION OF THE CONVERGENCE OF TECHNOLOGY

Convergence of Technology (CT) is the combination of two or more existing technologies to create one that will perform more effectively, efficiently and innovatively. The use of phones to listen to music compared to the traditional radio is an example of technological convergence.

The 20th century focused on the development and enhancement of information and communication technologies, biotechnology and nanotechnology.


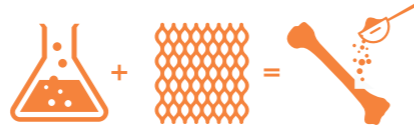
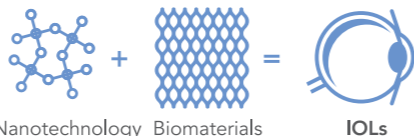


In the 21st century, the world faces a new era as people start to converge various technologies into new and more advanced technologies. The convergence of Nanotechnology, Biotechnology and Information Technology has transformed the way we apply technology in our lives.

- Nanotechnology, for example, converges engineering at the molecular level; molecules of a nerve-cell can be combined with an artificial sensor in order to restore vision in certain cases of blindness

- Another CT example is the use of biological substrates as in DNA chips for the diagnosis of personal or environmental health

HOW DOES CONVERGENCE OF TECHNOLOGY IMPACT BIOECONOMY IN MALAYSIA

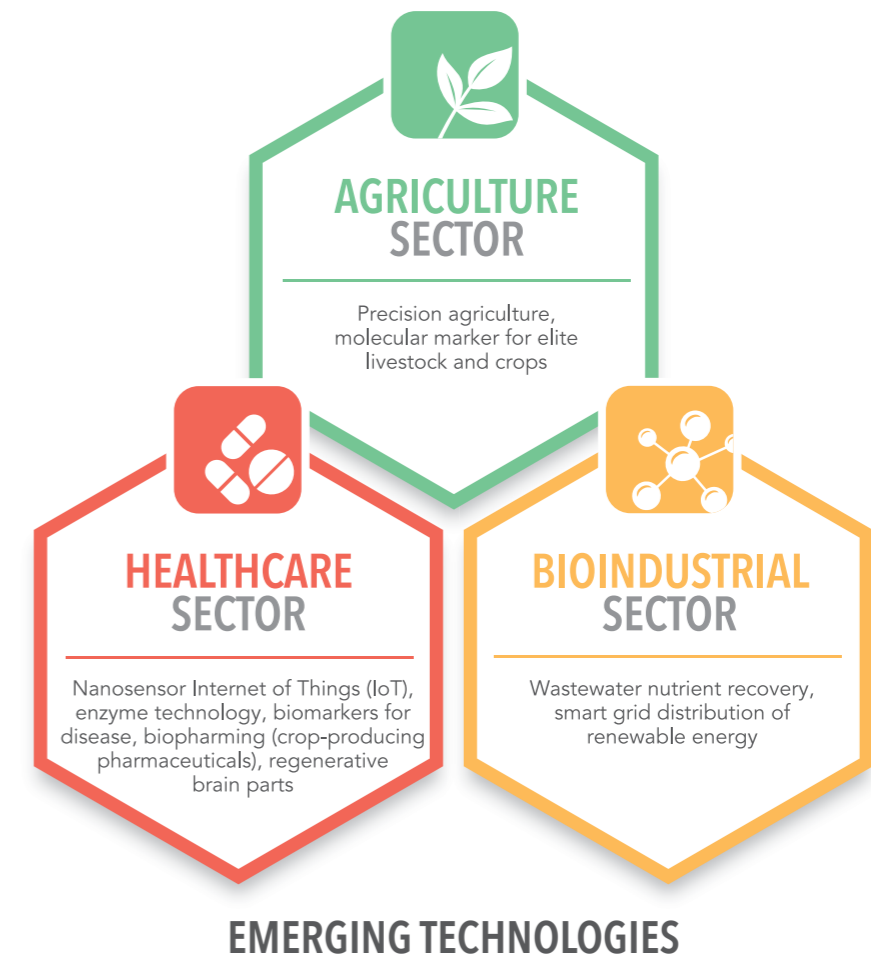
Since the launching of National Biotechnology Policy in 2005, Malaysia has acknowledged the vital role of bio-based or biotechnology industry in bringing Malaysia's economy forward. The application of biotechnology was tremendous, evident from the emergence of many bio-based and biotechnology companies in the country, and Malaysia began to technologically converge its conventional systems and technologies:

01	<p>ADVANCED DNA ANALYSIS</p> <p>Convergence of biotechnology and information technology has formed bioinformatics, a new technology used to capture and interpret biological data. Companies such as Novocraft Technologies Sdn Bhd, Bioeasy Sdn Bhd and Malaysia Genomics Resource Centre are now providing bioinformatics services such as next-generation genomics (NGS) analysis</p>	 <p>Biotechnology + IT = Bioinformatics</p>
02	<p>IMPROVING ORTHOPAEDICS</p> <p>New materials engineering for synthetic bone to improve orthopaedic and maxillofacial deficiencies result from the convergence of biopharmaceutical, device and delivery technology and biomaterial technology. Granulab (M) Sdn Bhd has successfully developed and patented the osteoconductive granular synthetic bone graft material</p>	 <p>Material Science + Biomaterials = Bone Graft</p>
03	<p>RENEWED VISION</p> <p>Abbot Medical Optics has developed intraocular lenses (IOLs) which are used to replace the eye's natural lens when it is removed during cataract surgery. IOLs are created through nanotechnology and biomaterials</p>	 <p>Nanotechnology + Biomaterials = IOLs</p>
04	<p>HYBRID PLANTS</p> <p>Agriculture sector has also seen improvements. Green World Genetics Sdn Bhd has successfully improved production of high quality tropical seeds and development of hybrid seeds using Marker Assisted Selection (MAS) and DNA fingerprinting. This is a result of converging biotechnology and information technologies</p>	 <p>Biotechnology + IT = DNA Fingerprint</p>
05	<p>RESILIENT COMMODITY</p> <p>Green Rubber Malaysia produces rubber-based products through its facility that utilises informative and digital technologies to form a fully automated operation system. It has also utilises material science and biology disciplines to recycle used tires into new rubber products including new tires</p>	 <p>Material Science + Biology = Green Rubber</p>

MOVING FORWARD

Although Malaysia has made significant progress in CT, there are still many areas to be explored especially with the emergence of 4IR where digital approach will come into the picture to further enhance the current systems and technologies used in Malaysia. During this new era, digital, physical, and biological technologies will converge to form technology that integrates knowledge, tools, and ways of thinking from life and health sciences, physical, mathematical, and computational sciences, engineering disciplines, and beyond to form a comprehensive framework for tackling scientific, societal and economic challenges that exist.

IN THE FUTURE, MALAYSIA FORESEES THE EMERGENCE OF THE FOLLOWING TECHNOLOGIES:



BIOECONOMY IN NUMBERS

Bioeconomy refers to all economic activity that is derived from the continued commercial application of biotechnology.

It encompasses the production of renewable biological resources and their conversion into food, feed, chemicals, energy and healthcare wellness products via innovative and efficient technologies. Under this definition, bioeconomy includes the sectors of agriculture, forestry, fisheries, as well as food production, organic chemicals, pharmaceuticals, and renewable energy industries.

BCI IN

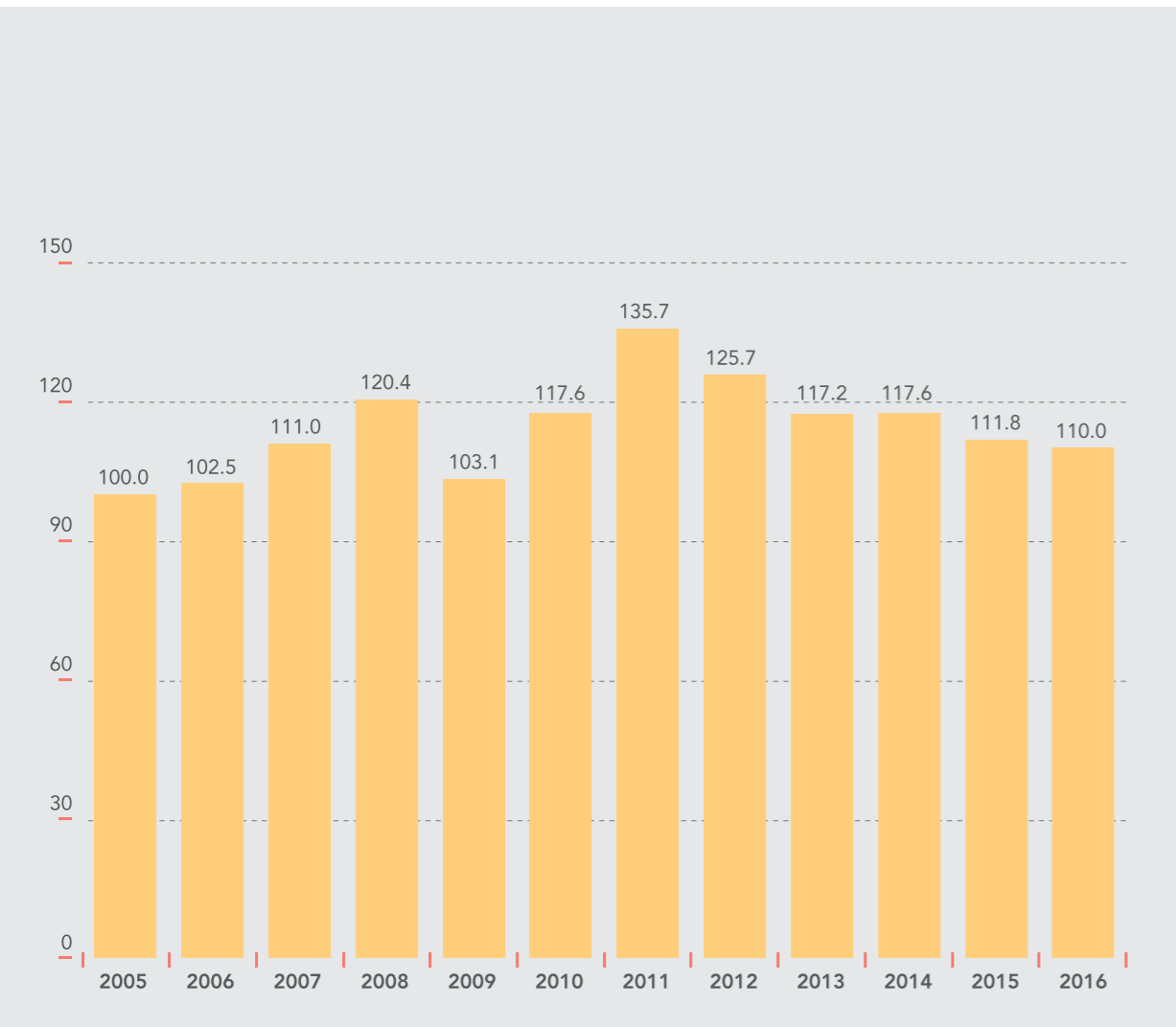
2016

The BCI for 2016 showed a slight decline of 1.6% compared to the previous year. The moderation of the BCI index was due particularly to weaker Employment index as the number of employment within the agriculture sectors declined. Exports also exerts a moderate downward pressure to the index, particularly due to lower exports of raw and basic biological products. On the other hand, the performance of the other three sub-components showed consistent positive contribution.

Bioeconomy value-added (or gross domestic product, GDP) contributed to about RM141.8 billion into the economy or at 11.5% of GDP compared to 11.3% last year. Bioeconomy investments accounted for RM18.8 billion, a 11.8% growth compared to previous year. Finally, productivity performance in bioeconomy indicates a 3.5% growth at RM67,848 per unit of labour in 2016.

For more information on the BCI construction, please refer to the paper "Developing a Measure for Quantifying Economic Impacts: The Bioeconomy Contribution Index" (2016) by Dr Quasem Al-Amin, available at Bioeconomy Corp.

THE BIOECONOMY CONTRIBUTION INDEX

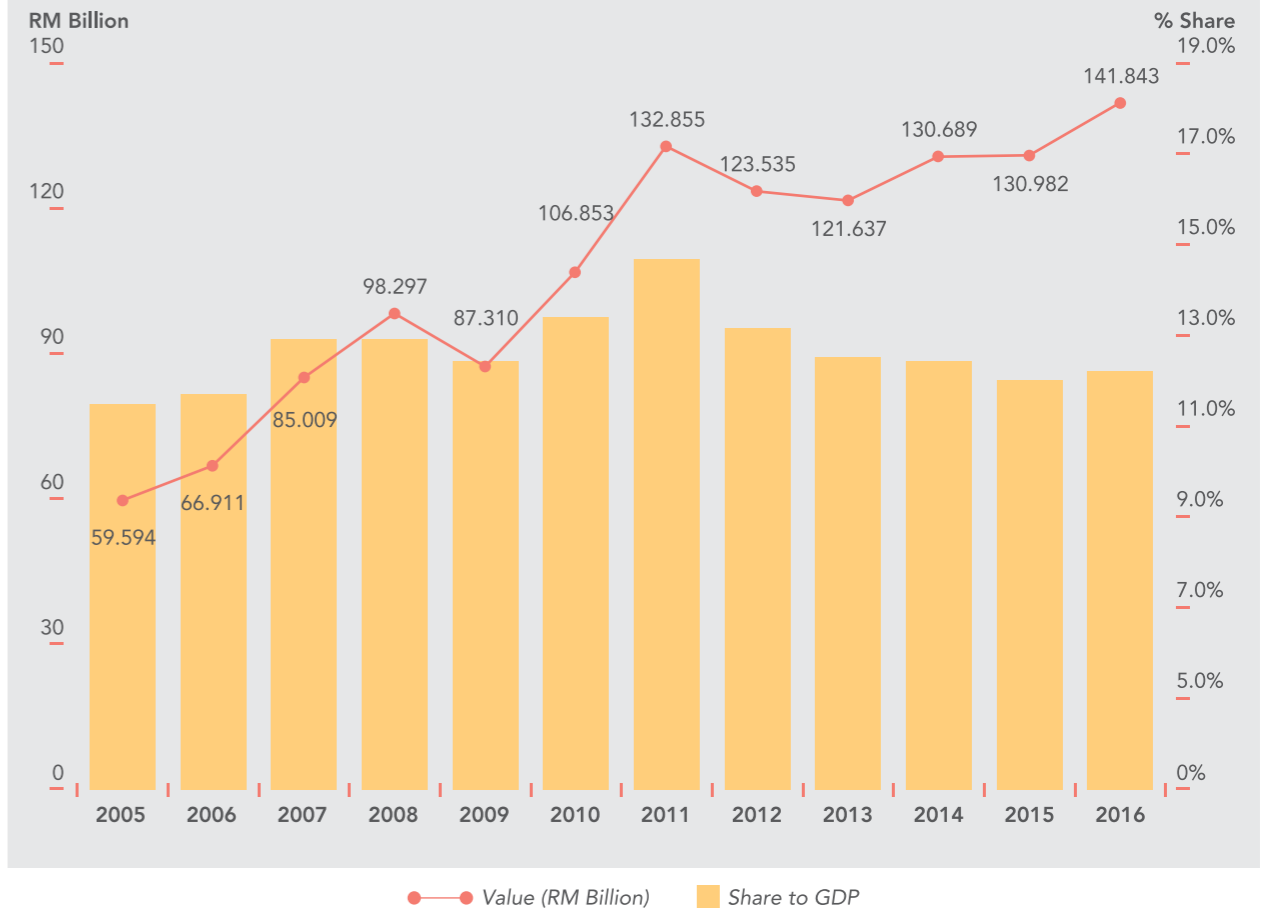


The Bioeconomy Contribution Index (BCI) is designed to provide a holistic look of the bioeconomy industry through the combined measurements of these components - Investments, Value-Added, Productivity, Exports, and Employment - reflected in a single comprehensive index.

THE PERFORMANCE OF THE BCI COMPONENTS

01 BIOECONOMY VALUE-ADDED

Measures the value of production of bioeconomy-related sectors

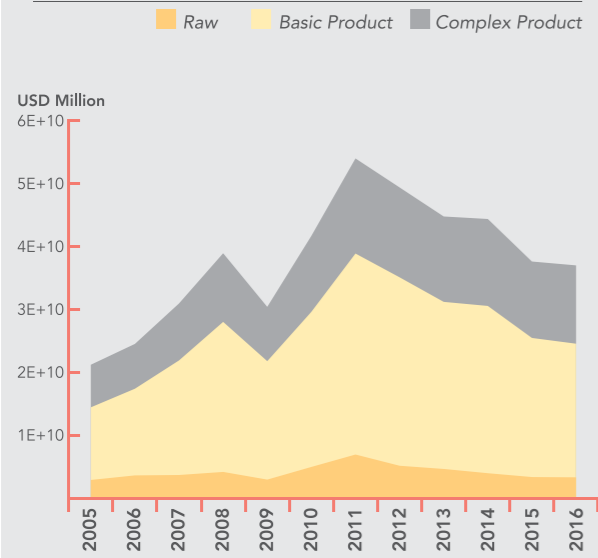


BIOECONOMY IN NUMBERS

THE PERFORMANCE OF THE BCI COMPONENTS

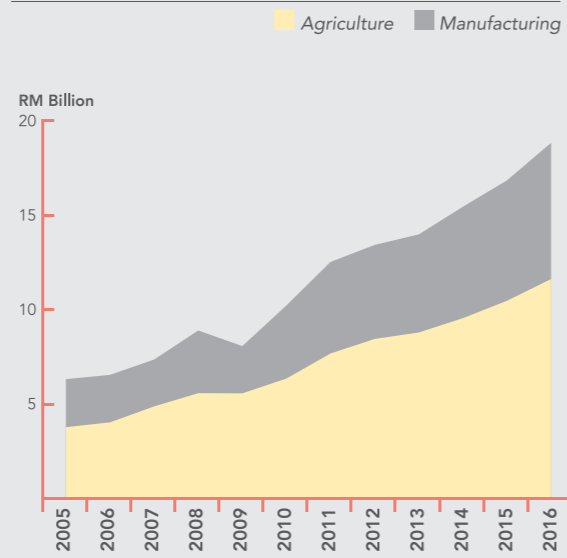
02 BIO-BASED EXPORTS

Measures exports products that are derived from biological sources



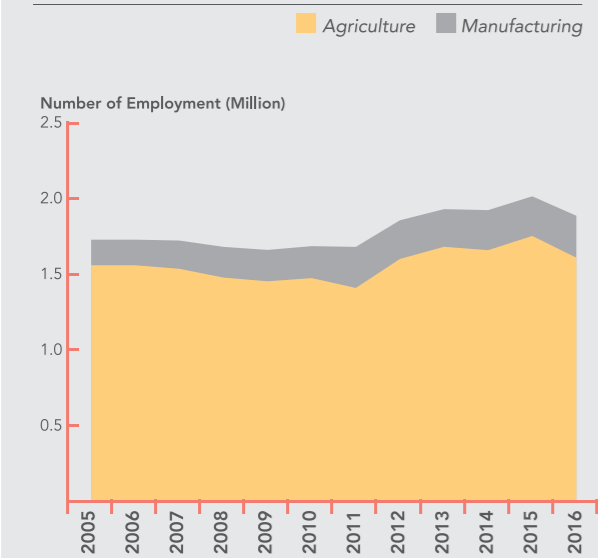
03 BIOECONOMY INVESTMENTS

Measures the fixed capital formation of all bioeconomy-related sectors



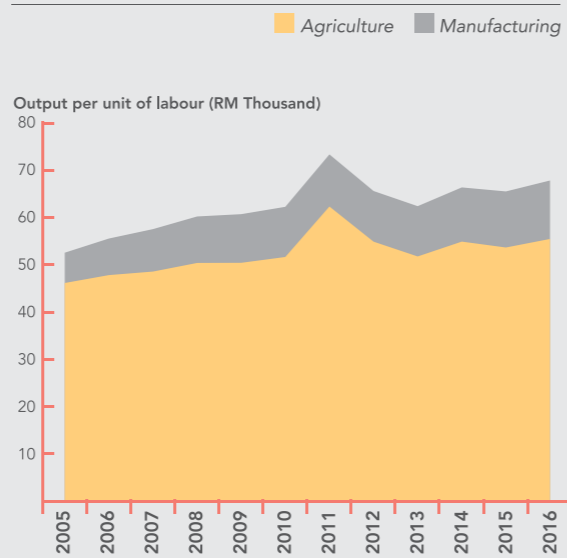
04 BIOECONOMY EMPLOYMENT

Measures employment within the bioeconomy-related sectors

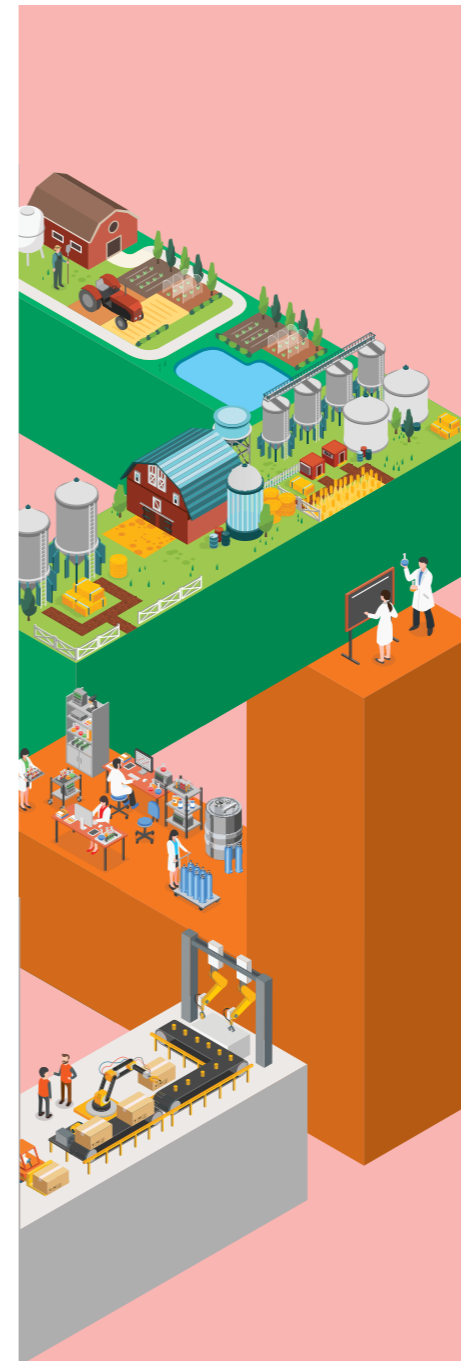


05 BIOECONOMY PRODUCTIVITY

Measures the efficiency of production



The BCI is envisioned as a tool to assess the status of the bioeconomy in a quick, consistent and comprehensive manner to enable targeted and timely policy and strategy. Going forward, it is hoped that the BCI methodology be further utilised to compare impacts across nations, and even used in other sectors or industries, to provide even greater insights and foundations for national and international economic policy.



03

THE ESSENCE OF THE ORGANISATION

- 22 Board of Directors
- 24 Senior Management

**BOARD OF
DIRECTORS**



**ENCIK
AMIRUL
FARES WAN
ZAHIR**

DIRECTOR

**YBHG DATUK
WAN AHMAD
SHIHAB ISMAIL
W ISMAIL**

DIRECTOR

**YBHG
PROFESSOR
TAN SRI ZAKRI
ABDUL HAMID**

CHAIRMAN

**YBHG DATUK
SERI DR
MOHD AZHAR
HJ YAHAYA**

DIRECTOR

**YBHG DATUK
DR ABD
HAPIZ
ABDULLAH**

DIRECTOR

**YBHG DATUK
DR NOOR
HISHAM
ABDULLAH**

DIRECTOR

**YBRS
DR MOHD
SHUHAIZAM
MOHD ZAIN**

DIRECTOR

**YBHG DATUK
SERI DR
ISMAIL
HJ BAKAR**

DIRECTOR

**YBHG DATUK
DR
AMINUDDIN
HASSIM**

DIRECTOR

SENIOR MANAGEMENT



NORA MOHAMED
SENIOR VICE PRESIDENT,
BUSINESS ADVISORY AND
DEVELOPMENT

ZURINA CHE DIR
SENIOR VICE PRESIDENT,
PROGRAMMES AND DELIVERY
MANAGEMENT

**YBRS DR MOHD
SHUHAIZAM MOHD ZAIN**
CHIEF EXECUTIVE OFFICER

**ZAINAL AZMAN
ABU KASIM**
SENIOR VICE PRESIDENT,
BUSINESS DEVELOPMENT AND
INVESTMENT - BIOINDUSTRIAL

ADNAN BAHARUM
SENIOR VICE PRESIDENT,
CORPORATE AFFAIRS

**DR HARCHARAN
SINGH**
SENIOR VICE PRESIDENT,
INNOVATION ENABLEMENT

JAY PADASIAN
SENIOR VICE PRESIDENT,
BUSINESS DEVELOPMENT AND
INVESTMENT - HEALTHCARE BIO

**SYED AGIL
SYED HASHIM**
CHIEF FINANCIAL
OFFICER

**DR KODI ISPARAN
KANDASAMY**
SENIOR VICE PRESIDENT,
BUSINESS DEVELOPMENT AND
INVESTMENT - AGBIOTECH

**SHARIFAH HANIFAH
SYED ABDUL AZIZ**
SENIOR VICE PRESIDENT,
LEGAL AND SECRETARIAL

“
The formula for success is strongly dependent on **effective partnerships and collaborations at many levels, across many fields, and with many active participants** from the public and private sectors”

YBrs Dr Mohd Shuhaizam Mohd Zain
Chief Executive Officer



04

REALISING ACHIEVEMENTS

28 About Bioeconomy Corp

29 Bioeconomy Corp Key Achievements



ABOUT BIOECONOMY CORP

Malaysian Bioeconomy Development Corporation Sdn Bhd (Bioeconomy Corp) (Company No. 691431-D) was incorporated under provisions of the Companies Act 1965 on 13 May 2005 to identify value propositions in research and development (R&D) and commerce for the bio-based industry, as well as to support and facilitate these ventures through financial assistance and advisory services.

Bioeconomy Corp is an agency of the Ministry of Science, Technology and Innovation (MOSTI) and owned by the Ministry of Finance Incorporated and Federal Lands Commissioner (one share). It is governed by the National Bioeconomy Council (formerly known as Biotechnology Implementation Council) and counselled by the Bioeconomy International Advisory Panel.

KEY MANDATES

- Act as a focal point for all bio-based technology initiatives in Malaysia
- Nurture and accelerate growth of Malaysian bio-based companies
- Actively promote foreign direct investments in bio-based industry
- Create a conducive environment for the bio-based industry in Malaysia

VISION

To enhance the economic, health and social wellbeing of the nation

MISSION

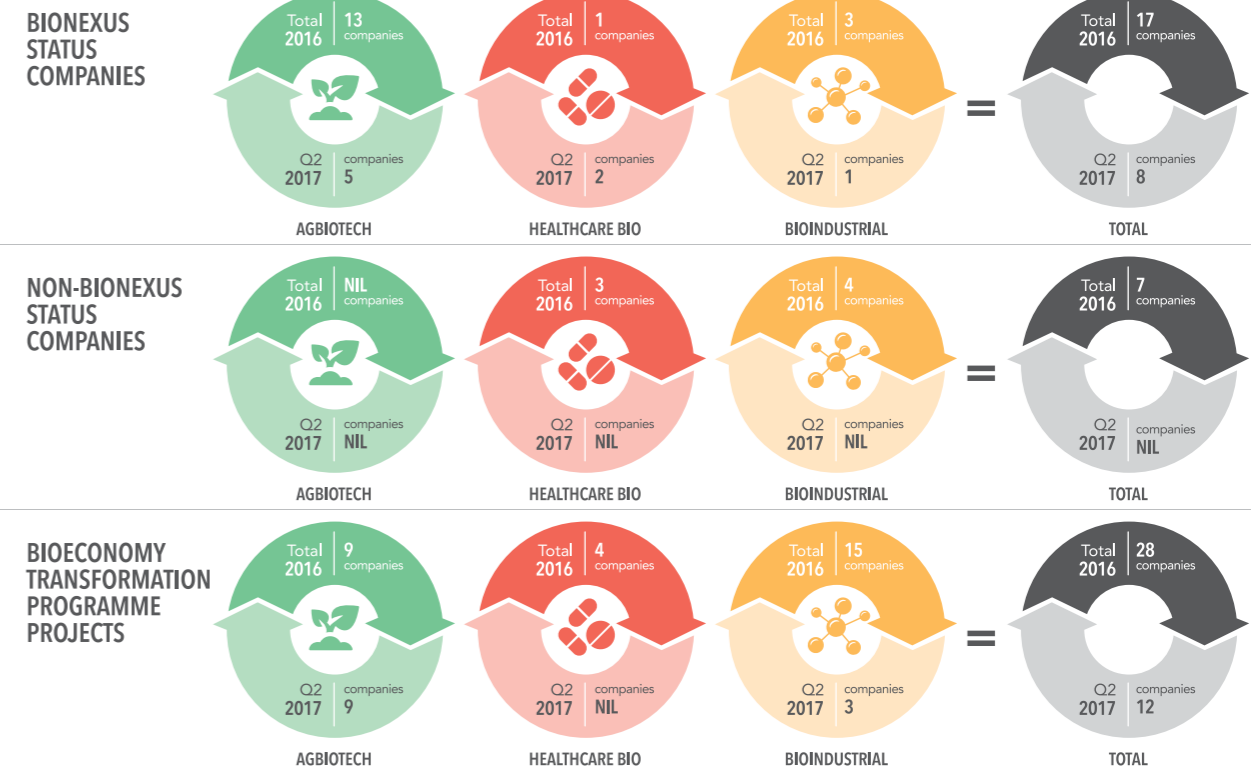
Lead the economic development of the bio-based industry in Malaysia

CORPORATE VALUES

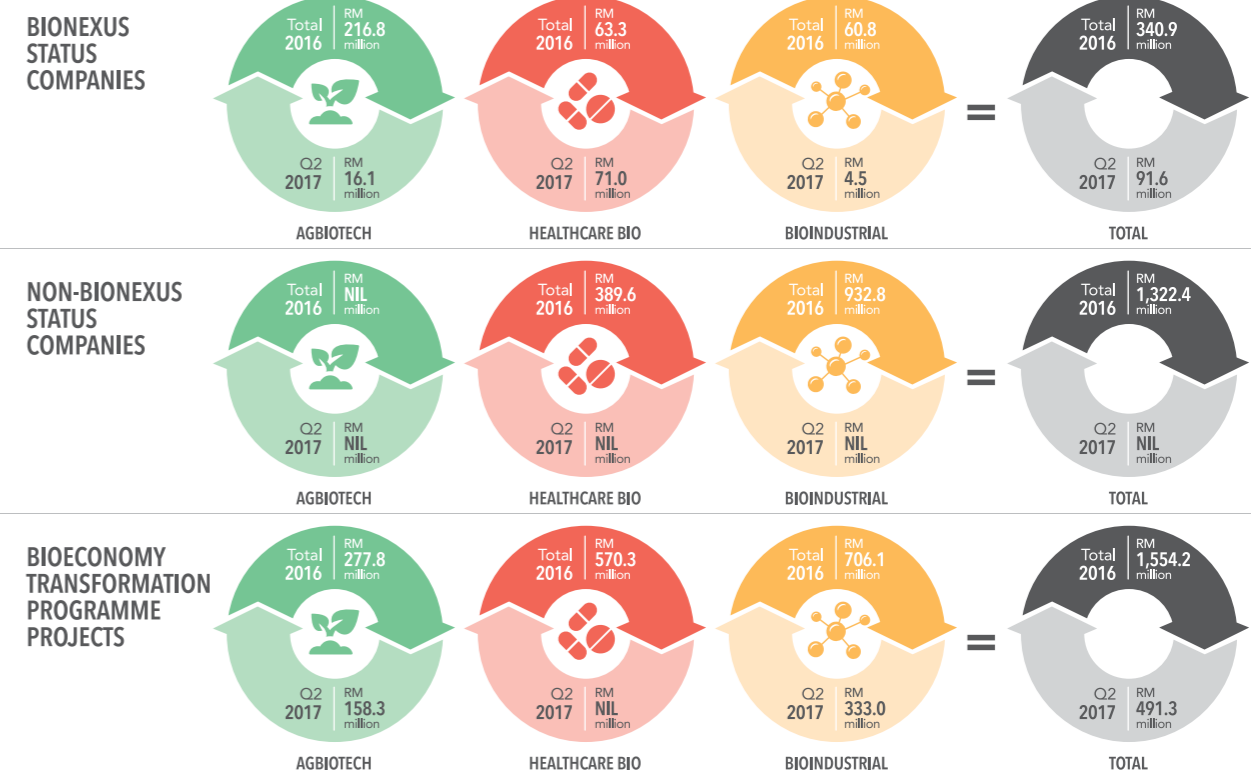


BIOECONOMY CORP KEY ACHIEVEMENTS

NUMBER OF COMPANIES APPROVED



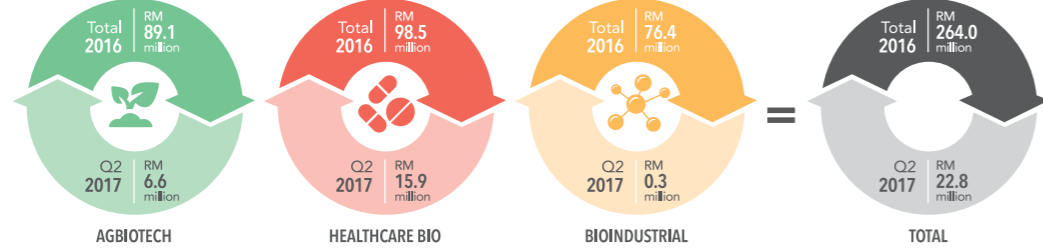
INVESTMENT APPROVED



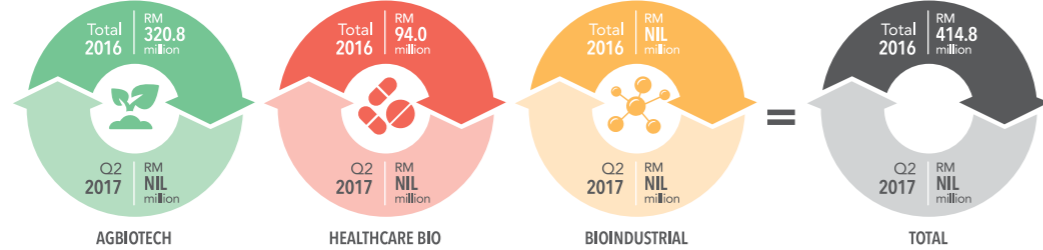
BIOECONOMY CORP KEY ACHIEVEMENTS

INVESTMENT REALISED

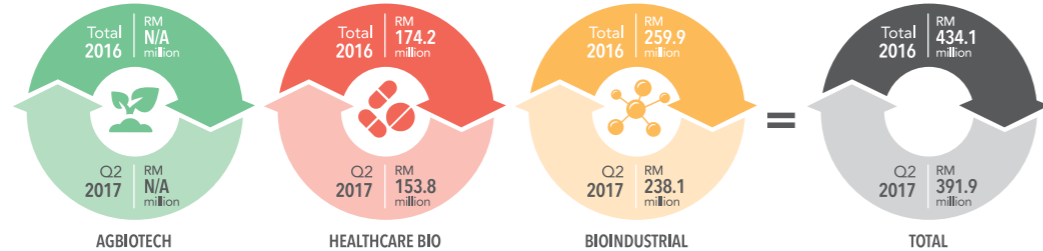
BIONEXUS STATUS COMPANIES



NON-BIONEXUS STATUS COMPANIES

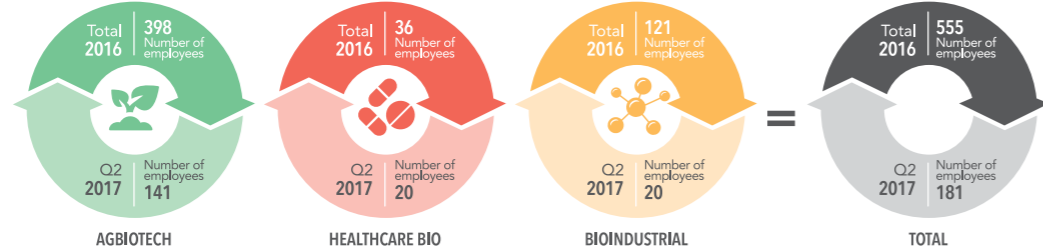


HIGH IMPACT

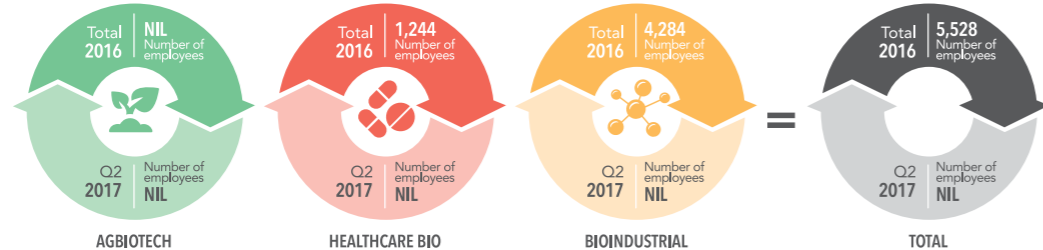


TOTAL PLANNED EMPLOYMENT

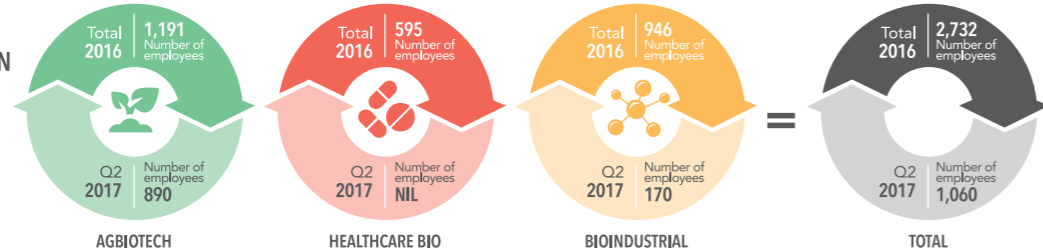
BIONEXUS STATUS COMPANIES



NON-BIONEXUS STATUS COMPANIES



BIOECONOMY TRANSFORMATION PROGRAMME PROJECTS



05

REMARKING ENGAGEMENTS

- 32 Programmes and Delivery Management
 - BioNexus Status
 - Bioeconomy Transformation Programme (BTP)
 - Bioeconomy Community Development Programme (BCDP)
- 44 Innovation Enablement
 - BioNexus Partners (BNP)
 - Academia Industry Support (AIS)
 - Technology Management and Innovation (TMI)
- 49 Business Advisory and Development
 - BioAcademy
 - Library BIO (1310)
 - Regulatory Advisory
 - Funding Advisory
 - BioShoppe
- 58 Business Development and Investment
 - AgBiotech
 - Healthcare Bio
 - BioIndustrial
- 68 Legal and Secretarial
- 70 Branding and Communications
- 72 Key Events and Milestones in 2016 and 2017



PROGRAMMES AND DELIVERY MANAGEMENT

BIONEXUS STATUS

INTRODUCTION

National Biotechnology Policy (NBP) was formulated in 2005, in accordance with Biotechnology Master Plan (2005-2020). The BioNexus Status was launched by the then Prime Minister of Malaysia, Tun Abdullah Haji Ahmad Badawi, on 7 September 2006 during the inaugural Biotechnology Implementation Council Meeting. The BioNexus Status is:



- A recognition awarded by the Malaysian Government through Bioeconomy Corp
- Awarded to qualified companies undertaking value-added biotechnology and/or life sciences activities
- Comes with a set of incentives and privileges contained within the BioNexus Bill of Guarantees

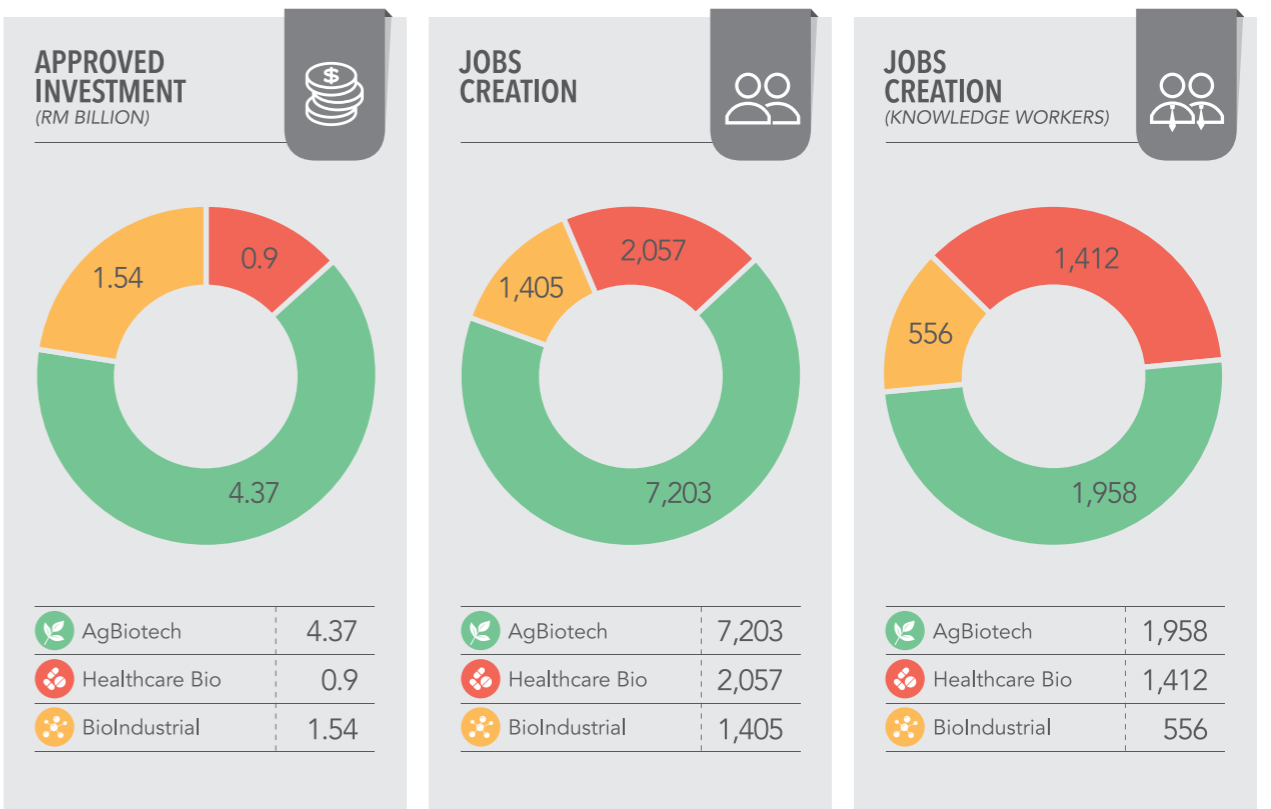
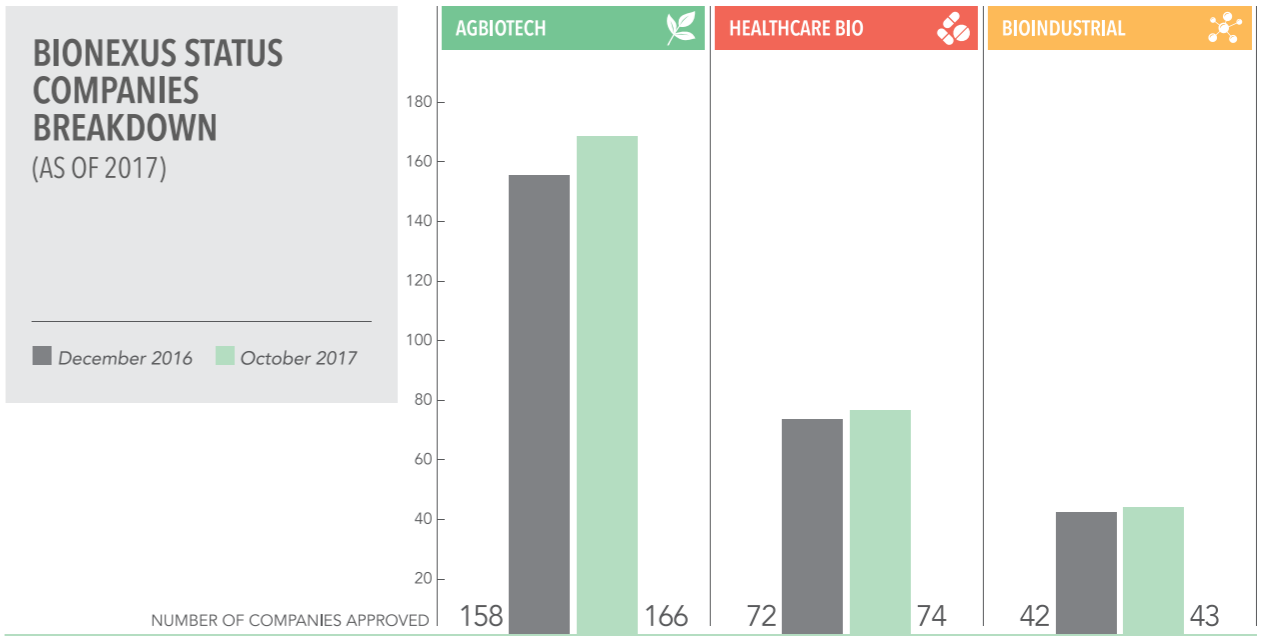
TAX INCENTIVES

- 100% tax exemption starting from first statutory income
- Concessionary tax rate of 20%
- Tax exemption on dividends
- Import duty exemption on imported raw material and machineries
- Double deduction on expenditure incurred for R&D and promotional of export
- Tax deduction for investor equivalent to the amount of investment made in BioNexus Status company
- Industrial Building Allowance for a period of ten years on building used solely for the biotechnology research activities

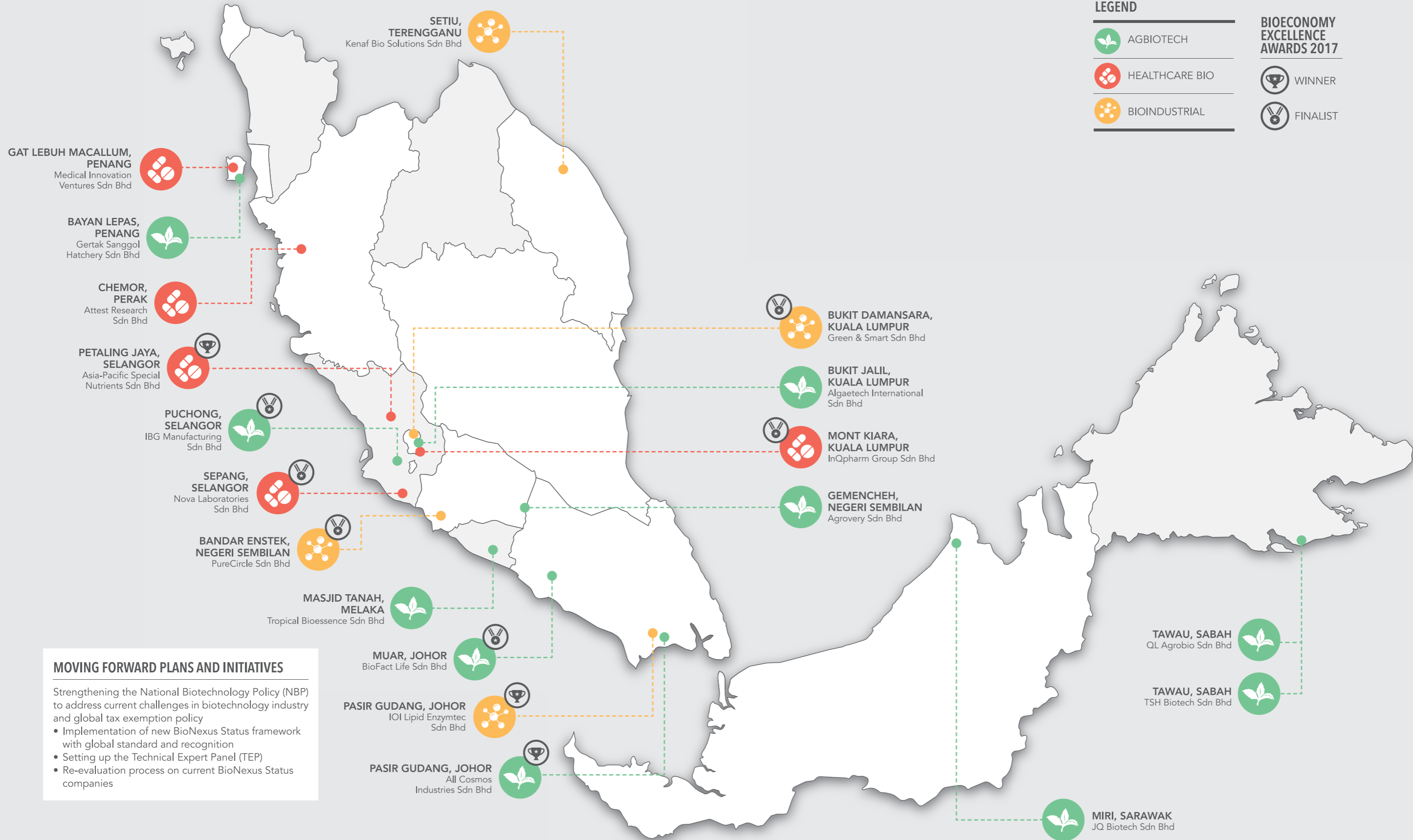
BIONEXUS STATUS ACHIEVEMENTS/CURRENT ACHIEVEMENTS

	AS OF 2016	AS OF 2017
NO. OF COMPANIES APPROVED	272	283
APPROVED INVESTMENT (RM)	6.66 billion	6.81 billion
JOB CREATION	10,238 jobs	10,665 jobs
JOB CREATION (KNOWLEDGE WORKERS)	3,777 workers	3,926 workers

BIONEXUS STATUS COMPANIES BREAKDOWN (AS OF 2017)



VARIOUS BIONEXUS STATUS COMPANIES OPERATING THROUGHOUT MALAYSIA



LEGEND

- AGBIOTECH
- HEALTHCARE BIO
- BIOINDUSTRIAL

BIOECONOMY EXCELLENCE AWARDS 2017

- WINNER
- FINALIST

MOVING FORWARD PLANS AND INITIATIVES

Strengthening the National Biotechnology Policy (NBP) to address current challenges in biotechnology industry and global tax exemption policy

- Implementation of new BioNexus Status framework with global standard and recognition
- Setting up the Technical Expert Panel (TEP)
- Re-evaluation process on current BioNexus Status companies

PROGRAMMES AND DELIVERY MANAGEMENT






BIOECONOMY TRANSFORMATION PROGRAMME (BTP)

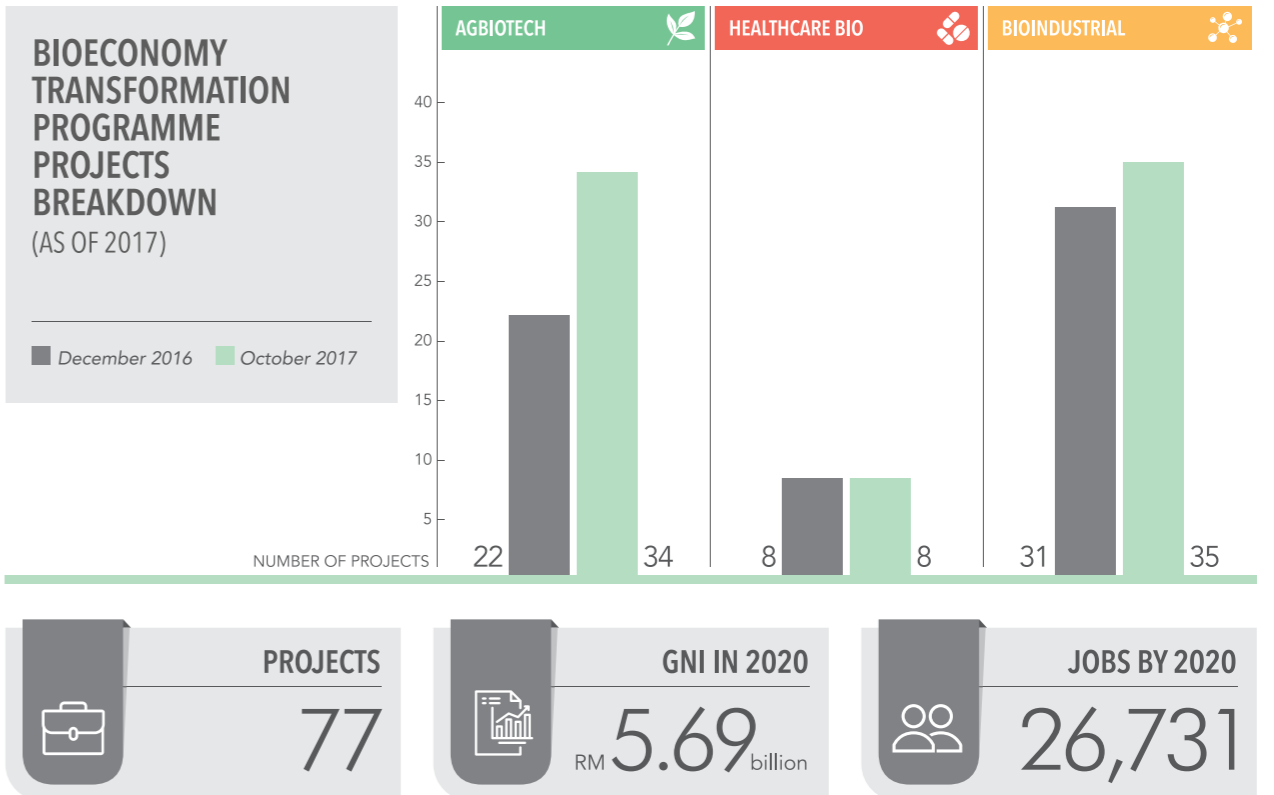
- BTP has been endorsed by Malaysia's National Bioeconomy Council and launched by the Honourable Prime Minister of Malaysia on 30 October 2012
- It is a platform provided by the government for the private sectors to channel and maximise commercial opportunities in bio-based industries
- Through BTP, the government and leading industry players will work in tandem to set the national goals for the application of biotechnology in agriculture production, industrial manufacturing and human health, put in place the structural conditions required and develop necessary mechanisms to ensure that policy can flexibly adapt to new opportunities
- BTP will promote a knowledge based bioeconomy through the establishment of a sustainable ecosystem of Research and Development (R&D) and commercialisation in the areas of agriculture, healthcare and industrial biotechnology
- In addition to the bio-based industry, BTP focuses on other industries and economic sectors that produce, manage and utilise biological resources, including agriculture, forestry, fisheries, food production, healthcare, chemicals and renewable energy
- BTP's vision is to develop Malaysia as a global high income bioeconomy by 2020 and is a continuation of the implementation of strategies outlined in the National Biotechnology Policy

BTP FOCUS AREAS

 <p>AGBIOTECH Enhance agri-based industry: Producing high-value end products using innovative technology</p>	 <p>HEALTHCARE BIO Innovative healthcare products and services: Cheaper and more accessible to medicine</p>	 <p>BIOINDUSTRIAL Use of renewable resources: Energy, chemical and material productions</p>
---	--	---

BTP ACHIEVEMENTS AND TARGETS

	AS OF 2016	AS OF 2017
 NUMBER OF TRIGGER PROJECTS	61	77
 GNI IN 2020 (RM)	6.22 billion	5.69 billion
 GNI BY 2020 (RM)	25.25 billion	23.35 billion
 JOB CREATION BY 2020	26,550 jobs	26,731 jobs
 INVESTMENT BY 2020 (RM)	18.59 billion	17.20 billion

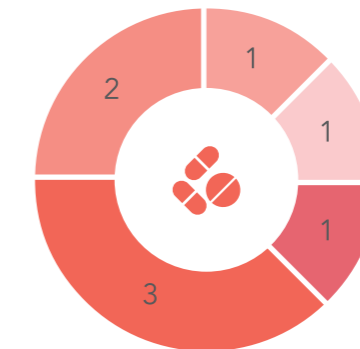


AGBIOTECH



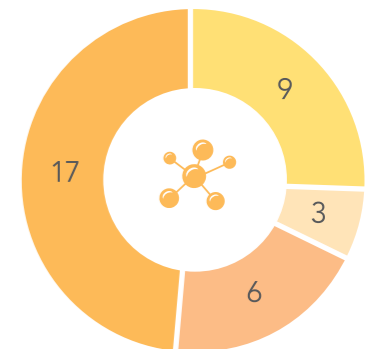
- 16 High-value Food Varieties
- 9 High-value Bioingredients
- 7 Bio-based Farm Inputs
- 2 High-value Horticulture

HEALTHCARE BIO



- 3 Biopharmaceuticals
- 2 Molecular Screening & Diagnostics
- 1 Medical Devices
- 1 Stem Cells & Regenerative Medicine
- 1 Bio-based Materials

BIOINDUSTRIAL



- 17 Industrial Bio-Inputs
- 9 Bio-based Chemicals
- 3 Bioremediation
- 6 Biomaterials

BIOECONOMY TRANSFORMATION PROGRAMME

TRIGGER PROJECTS HIGHLIGHTS

LEGEND



AGBIOTECH



HEALTHCARE BIO



BIOINDUSTRIAL



MOVING FORWARD PLANS AND INITIATIVES

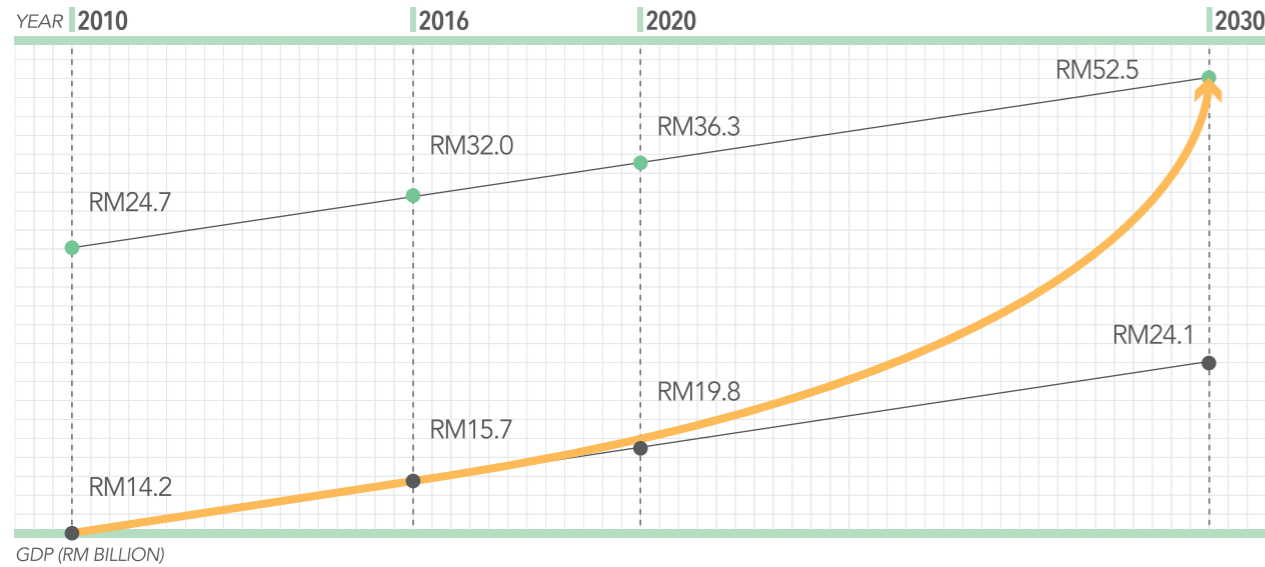
- Increase the number of BTP Trigger Projects
- Leverage on identified Domestic Direct Investments
- Promote further geographical balance
- Conduct Bioeconomy Day and create awareness
- Facilitate funding for the BTP projects

PROGRAMMES AND DELIVERY MANAGEMENT

BIOECONOMY COMMUNITY DEVELOPMENT PROGRAMME (BCDP)

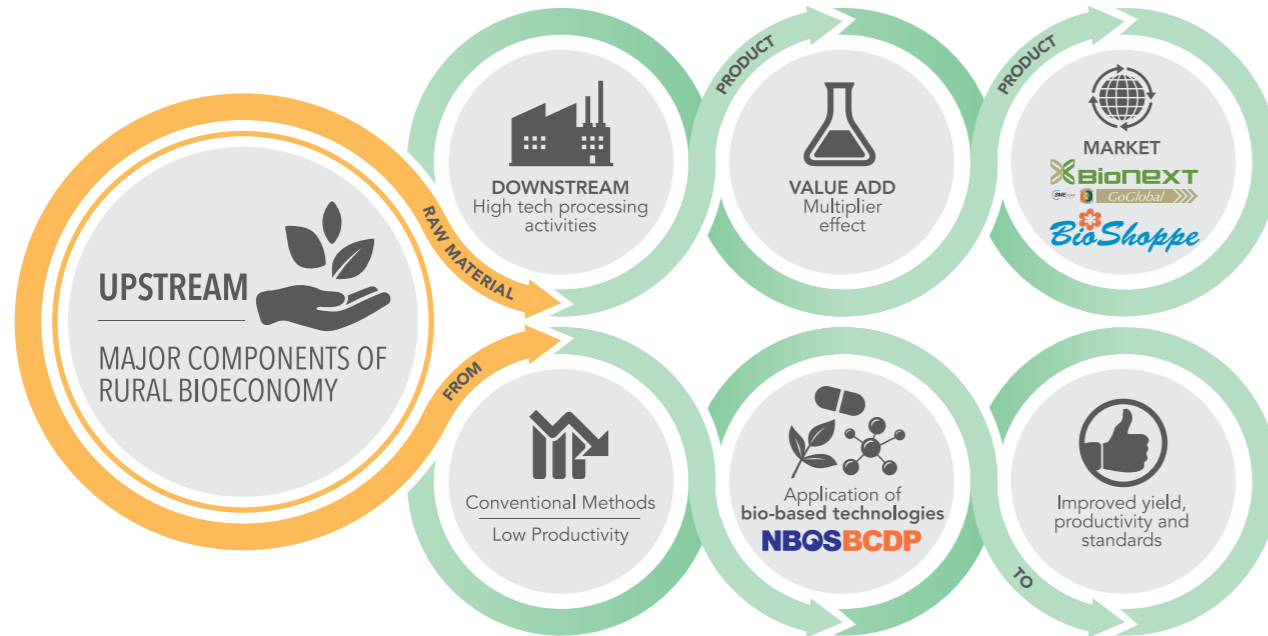
THE FOCUS TOWARDS RURAL BIOECONOMY

Rural Bioeconomy plays a significant role as a central upstream component in production. It is expected that by the year 2030, up to RM24.1 million of Rural Bioeconomy will be driven by advanced bio-based technology. Moreover, through proper strategic direction, facilitation and nurturing, another RM28.4 million can be added, leading to a total Rural Bioeconomy potential approaching RM52.5 million and beyond by 2030. With this in mind, Bioeconomy Corp has initiated efforts as the prime mover for the implementation of the BCDP.



TARGETING THE UPSTREAM PRODUCTION VALUE CHAIN

Bioeconomy Corp implements a holistic approach to optimise the entire industry value chain through its introduction of various programmes and incentives. Through BCDP specifically, applying an element of bio-based technology in the upstream sector optimises supply dynamics by securing a steady, high quality local source of raw materials for the downstream sector.



CONTRACT FARMING WITH THE APPLICATION OF TECHNOLOGY

BCDP's mechanism involves direct transfer of knowledge, training and technology from anchor companies in the bioeconomy sector to the rural communities. The inclusion of a "buyback guarantee" component in the BCDP mechanism ensures a steady demand for the outputs. This secured demand ensures easy access to ready market for the community, meanwhile, constant supply of outputs enables the downstream company to expand production capacity, address new markets and thus drive further demand for raw materials.

MECHANISM

- 01 Funding Agency disburses funding for BCDP to farmers/cooperatives/associations
- 02 Farmers/cooperatives/associations will utilise funding for training & necessary farming purchases
- 03 Guaranteed buyback by BioNexus Status companies and/or BTP Trigger Project owners from the farmers to ensure guaranteed income to the farmers
- 04 BioNexus Status companies and/or BTP Trigger Project owners will provide technical/training assistance to the farmers/cooperatives/associations
- 05 Farmers/cooperatives/associations will pay back the funding assistance to the funding agency
- 06 Bioeconomy Corp as the lead agency to facilitate BCDP



Being a significant contributor to the Rural Economy, BCDP has been included under the National Blue Ocean Strategy (NBOS) initiative on 27 April 2015.

BCDP BENEFITS BOTH SIDES OF THE PARTY

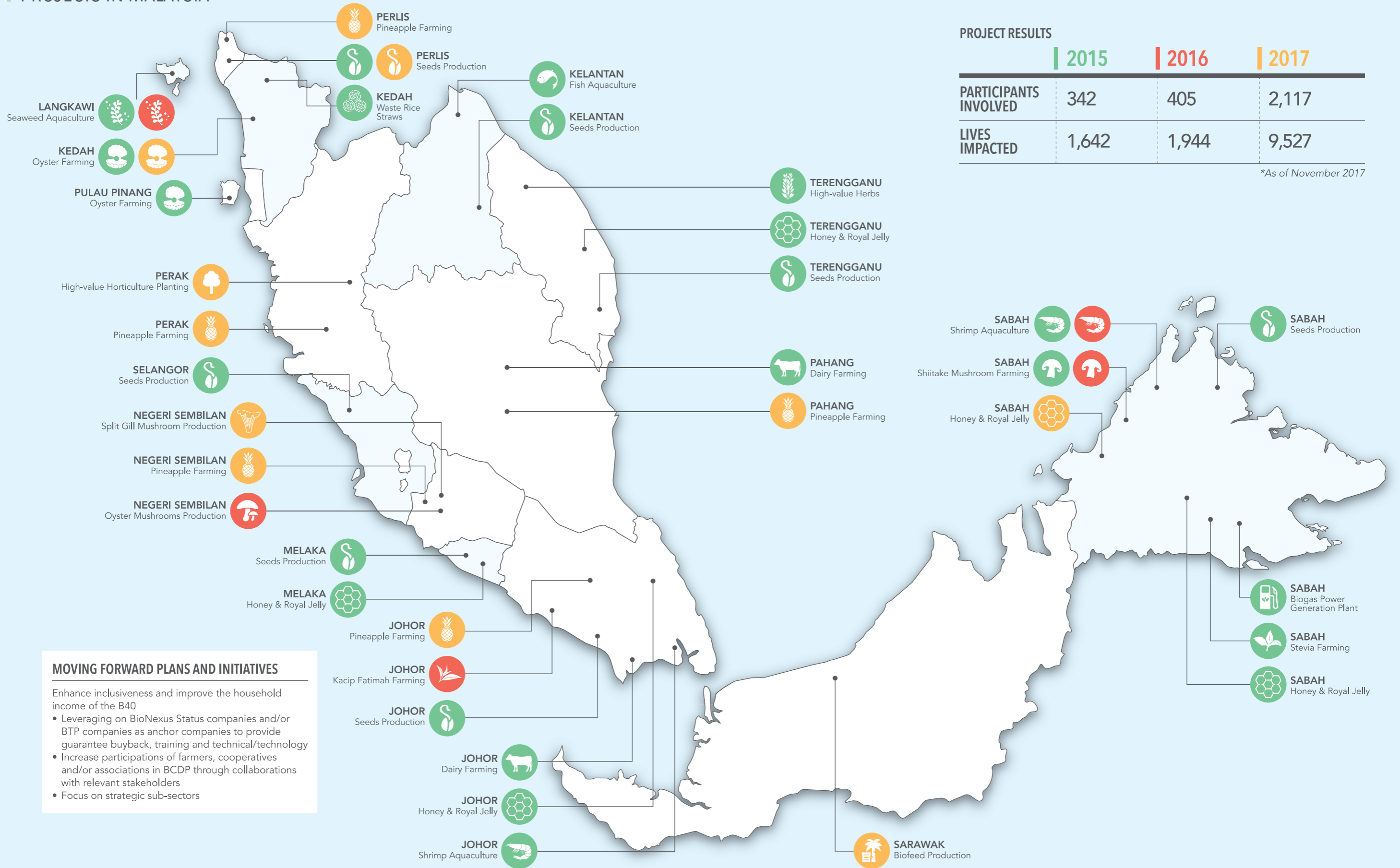
FARMERS COOPERATIVES ASSOCIATIONS

- Potential additional income to the farmer
- Increase multiplier effects on the economy, positive impact on the income and welfare of the people
- Guaranteed income for contract farmers through buyback agreement from BioNexus Status companies/BTP Trigger Project owners
- Link community with the bio-based industry

BIONEXUS STATUS COMPANIES/BTP TRIGGER PROJECT OWNERS

- Increase revenue for BioNexus Status companies and/or BTP Trigger Project owners
- Obtain sustainable supply and high-value raw materials
- Increase import substitution to the country

BIOECONOMY COMMUNITY DEVELOPMENT PROGRAMME (BCDP) PROJECTS IN MALAYSIA



PROJECT RESULTS

	2015	2016	2017
PARTICIPANTS INVOLVED	342	405	2,117
LIVES IMPACTED	1,642	1,944	9,527

*As of November 2017

MOVING FORWARD PLANS AND INITIATIVES

Enhance inclusiveness and improve the household income of the B40

- Leveraging on BioNexus Status companies and/or BTP companies as anchor companies to provide guarantee buyback, training and technical/technology
- Increase participations of farmers, cooperatives and/or associations in BCDP through collaborations with relevant stakeholders
- Focus on strategic sub-sectors

INNOVATION ENABLEMENT BIONEXUS PARTNERS (BNP)



Introduction

The BNP has been established to provide technical support to the bio-based companies by helping to source out for their R&D&C needs through our network of laboratories and expertise.

FOCUS AREAS

BNP provide laboratory services, contract research, rent of lab space, consultancy and technical training in these focus areas:

- Seed and Crop Biotechnology
- Herbal, BioCosmeceuticals and Wellness
- Food Technology
- Genomics and Bioinformatics
- Halal BioProduct
- Medical Device and Biopharmaceuticals
- Bioprocess Engineering
- BioAnalytical Services
- Ecotoxicology and Green Technology

KEY ACHIEVEMENTS

2017

BNP Excellence Award

Outcome

The award is to honour high performing BNP labs which are highly collaborative with the biotechnology and bio-based industry, has high revenue generation and impacted the industry through its significant achievements.

The awards were given during the opening ceremony event at BioMalaysia 2017.

The winners of the BNP Excellence Award 2017 in four categories are:

- AgBiotech: Kedah BioResources Corporation Sdn Bhd
- Healthcare Bio: Biosafety and Biocompatibility Laboratory, SIRIM Berhad
- BioIndustrial: Bioprocess Engineering Laboratory, UTM
- BioAnalytical Services: Analytical Biochemistry Research Centre, USM

2016

Collaborations with the Industry

Outcome

A total of 965 collaborations with the industry has been established and the 12 of the BioNexus Status companies collaborations are as listed below:

- GranuLab (M) Sdn Bhd
- Tenaga Jati Bumi Sdn Bhd
- Biofact Life Sdn Bhd
- Orchid Life Sdn Bhd
- Malaysian Genomics Resources
- Jitu Biotech Industries Sdn Bhd
- IOI Palm Biotech Sdn Bhd
- BioTrack Technologies Sdn Bhd
- One Biotech Sdn Bhd
- Entogenex Industries Sdn Bhd
- Holista Biotech Sdn Bhd
- All Cosmos Industries Sdn Bhd

HIGHLIGHTS FOR YEAR 2017 AND 2016

2017

Marketing and Promotion of BNP Services to the bio-based industry

Events

- **Bioeconomy Day 2017**
14 March 2017, Intercontinental Hotel KL
- **BioBorneo 2017**
11 May 2017, Imperial Hotel, Kuching
- **GREAT 2017**
6-7 May 2017, Imperial Hotel, Kuching
- **BioMalaysia 2017**
11-13 September 2017, KL Convention Centre, KL
- **NICE Wellness Cluster 2017**
12-17 October 2017, Technology Park Malaysia, KL

2016

Marketing and Promotion of BNP Services to the bio-based industry

Events

- **BioNexus Workshop 2016 (Central)**
5 December 2016, Bioeconomy Corporation
- **BioNexus Workshop 2016 (Eastern)**
7 November 2016, Primula Beach Hotel, Kuala Terengganu
- **BioMalaysia 2016**
31 May-2 June 2016, KL Convention Centre, KLCC
- **BioBorneo 2016**
21-22 November 2016, Imperial Hotel, Kuching

Business Matching between Industry Players with BioNexus Partners

Events

- **Mini BioPartnering 2016 (Central)**
17 November 2016, Level 16, Menara Atlan
- **BioPartnering 2016 (Northern Series)**
31 May 2016, NCIA Office, Penang

Establish an online platform for BioLaboratory Services (BioLabS) as a one stop platform for bio-based services and expertise

Events

- Industry interested to source out for bio-based services and expertise can search and send enquiries via Bioeconomy Corp's website
www.bioeconomycorporation.my/services

MOVING FORWARD - PLANS AND INITIATIVES

PLANS

- Make the BioLaboratory Services (BioLabS) more accessible to relevant industry players to support them in their R&D and commercialisation activities
- Continually expand the potential of BNP services, expertise and facilities to be industry and market-driven to the local and global market in the various focus areas
- Develop human capital expertise in technical areas to nurture knowledge-based business in the bio-based industry

INITIATIVES

- Digital and physical marketing of the services to the industry players
- Encourage market/industry-driven collaboration for R&D&C of bio-based products/services
- Provide relevant training for industry players in specific focus areas to increase competitiveness of our local players

INNOVATION ENABLEMENT ACADEMIA INDUSTRY SUPPORT (AIS)



Introduction

Academia Industry Support, formerly known as University - Industry Partnership was formed to assist Institute of Higher Learnings and Research Institutes to commercialise research outputs.

FOCUS AREAS

Academia Industry Support focuses on three specific areas such as:

- Industry - Academia Collaboration
- R&D commercialisation
- Facilitation of bio-based start-up or spin-off

KEY ACHIEVEMENTS

2017 saw the development of six start-ups as per below:

Semarak 16 Sdn Bhd

Funding Received - RM373,000.00
Commercialisation of Recombinant Bromelain Enzyme through spin-off product-Halal Cheese

UMT Akuatrop Sdn Bhd

Funding Received - RM400,000.00
Commercialisation of Black Tiger Shrimp by using Rapid Biofloc Technology

UMP Ecopest Sdn Bhd

Share Capital - RM100,002.00
Commercialisation of Rotenone Extract R&D through spin-off product - Bio-based Pesticide

She Empire Sdn Bhd

Funding Received - RM660,000.00
Commercialisation of roselle extract for cosmetics and wellness products

UMP Keraglow Sdn Bhd

Share Capital - RM5,000.00
Commercialisation of Keratin Extract from Chicken Feathers to support Waste to Wealth Initiative

Coral Waves Sdn Bhd

Commercialisation of sea cucumber extracts

HIGHLIGHTS FOR YEAR 2017

ACTIVITY	OUTCOME
Meeting with Innovation and Technology Manager Association (ITMA) and Technology Transfer Officers (TTO) 2017 26 April 2017	Discussion with university TTOs and introduction to networking platform
Industry - Academia Forum: University's Industry Innovation Solutions Forum 2017 8 June 2017	A gathering between universities, industries, and entrepreneurs to find out the industry current demand which also served as business matching between university and industry. It was attended by 12 companies, 13 universities and 2 research institutes. The event concluded with: <ul style="list-style-type: none"> • Better understanding on the needs and limitation of academia and industry • Insight into customer-driven R&D to be focused on by universities • Potential business matchings created. <ol style="list-style-type: none"> a. UMP Keraglow Sdn Bhd and Furley Bioextracts Sdn Bhd b. UMP Keraglow Sdn Bhd and Coral Waves Sdn Bhd
Biopitching 2017 13 September 2017	A platform provided for bio-based start-ups and researchers to pitch R&D products/technologies to relevant stakeholders in bio-based commercialisation ecosystem. Six R&D products attracted attention from MTDC for funding facilitation: <ul style="list-style-type: none"> • Taylor's University - Seaweed-based Meat Analogues, Prochoco Muesli Bites & Reddy Red Rice Biscuits • University Malaya - Ecobio: Novel biodegradable mulch film for agriculture • IIUM - Rennet Free Cream Cheese & Ricotta Cheese • UMT - Rapid Biofloc: Green technology for health management in shrimp and aquaculture industry

HIGHLIGHTS FOR YEAR 2017

ACTIVITY	OUTCOME
Business Matching Between UMT Apiculture and Meliponine Centre of Excellence with Coral Waves for Kelulut Honey Based Project 4-5 July 2017	<ul style="list-style-type: none"> • Commercialisation of Kelulut Honey-based product helped to commercialise know-how technology of kelulut honey, entrepreneurship among graduates and surrounding community • Coral Waves Sdn Bhd has presented to UMT's Vice Chancellor a mock up kelulut honey based products • The kelulut honey will be supplied by UMT Apiculture & Meliponine Centre of Excellence
Business Matching Between UMP Keraglow Sdn Bhd and Furley Bioextracts Sdn Bhd 12 July 2017	Commercialisation of Keratin Extract for personal care & wound healing products. After the business matching, UMP Keraglow Sdn Bhd will be working together with Furley Bioextracts to develop wound healing products based on Keratin Extracts
MBAN - Bioeconomy Corp Pitching Session 14 August 2017	A platform for bio-based startup to pitch their business to Angel Investors. Two (2) start-ups were selected to undergo first stage of MBAN Pitching to raise fund/obtain investment. The start-ups are: <ul style="list-style-type: none"> • She Empire Sdn Bhd • UMP Keraglow Sdn Bhd After the session, both start-ups are required to improve their business plan and will be invited again to pitch within six months in 2018
Bioentrepreneurship Workshop 2017 - Collaboration between Bioeconomy Corp and International Medical University 16 August 2017	<ul style="list-style-type: none"> • A workshop to encourage private university to commercialise bio-based R&D to market • 33 researchers, graduates and government agency participated in the programme • Participants learnt three important components that can help them to commercialise R&D in a better way such as Business Model Canvas, Building Pitching Deck & Pitching Technique
IP Clinic 2017 11 September 2017	A platform to provide awareness to university and research institutes on Intellectual Property and Strategy. It was participated by UMT, NAHRIM and SIRIM
Bioeconomy Innovation Awards 2017 11-12 September 2017	A platform to recognise and promote commercially ready R&Ds by universities. Conducted in conjunction with BioMalaysia 2017
Collaboration with universities and entrepreneurs to develop bio-based start-ups 12 September 2017	Four start-ups were promoted and recognised during BioMalaysia 2017 in University Start Up Recognition session and additional two start-ups joined the list after the programme. <ul style="list-style-type: none"> • The start-ups are : <ul style="list-style-type: none"> IIUM - Semarak 16 Sdn Bhd (Bromelain based halal cheese) UMP - UMP Ecopest Sdn Bhd (Organic pesticide) UMP - UMP Keraglow Sdn Bhd (Keratin Extract from chicken feathers for personal care and wound healing) UMT - Akuatrop Sdn Bhd (Aquaculture product - Black Tiger Shrimp) • She Empire Sdn Bhd (Cosmetics and wellness products from roselle extracts) • Coral Waves Sdn Bhd (Cosmetic and personal care products from sea cucumber)

MOVING FORWARD - PLANS AND INITIATIVES

PLANS	INITIATIVES
<ul style="list-style-type: none"> • AIS will continue to nurture start-ups and academic researchers to commercialise R&D products by way of bridging their needs to the stakeholders in the bio-based commercialisation ecosystem 	<ul style="list-style-type: none"> • Regular Biopitching Session • Business Trade event to promote commercially-worthy R&D to uptakers from Industry • Regular meeting with Technology Transfer Personnel with Industry to obtain feedback and current business trends

INNOVATION ENABLEMENT TECHNOLOGY MANAGEMENT AND INNOVATION (TMI)



Introduction

Under the 9th Malaysia plan's Biotechnology Acquisition Programme (BAP), Bioeconomy Corp initiated the acquisition of four bio-based technology platforms in 2007 to facilitate the development of core biotechnology areas, as well as to establish an advanced biotechnology industry in Malaysia.

FOCUS AREAS

In managing, developing and commercialising the acquired technology platforms, TMI division focuses on the following areas:

- DNA Marker development and molecular breeding under the Marker Assisted Selection (MAS) technology platform
- High purity plant extraction utilising supercritical carbon dioxide under the Supercritical Fluid Extraction (SFE) technology platform
- Nano particles and conjugation of nano-particles for drug delivery under the Nanotechnology (Nanotech) platform
- Early disease detection under the DotScan Antibody Microarray (DotScan) technology platform

KEY ACHIEVEMENTS

2017	2016
<p>Marketing and Promotion of technology platform services to the bio-based industry</p> <p>Events</p> <ul style="list-style-type: none"> • Bioeconomy Day 2017 14 March 2017, Intercontinental Hotel KL • BioBorneo 2017 11 May 2017, Imperial Hotel, Kuching • GREAT 2017 6-7 May 2017, Imperial Hotel, Kuching • Technology & Services Showcase during BioMalaysia 2017 11-13 September 2017, KL Convention Centre, KL • NICE Wellness Cluster 2017 12-17 October 2017, Technology Park Malaysia, KL <p>Trainings on Technology Platforms</p> <p>MAS</p> <ul style="list-style-type: none"> • Polyploid Data Analysis by Dr Françoise of CIRAD, France 28 February-2 March 2017, MARDI 	<p>Marketing and Promotion of technology platform services to the bio-based industry</p> <p>Events</p> <ul style="list-style-type: none"> • BioMalaysia 2016 31 May-2 June 2016, KL Convention Centre, KLCC • BioBorneo 2016 21-22 November 2016, Imperial Hotel, Kuching <p>Trainings on Technology Platforms</p> <p>MAS</p> <ul style="list-style-type: none"> • Workshop on Genome Wide Association Study and Marker Assisted Breeding Proposal Writing 12-14 October 2016, MARDI • Plant Genome Annotation Workshop 24-28 October 2016, MARDI • Hybrid Assembly Workshop by Novocraft Sdn Bhd 14-16 November 2016, MARDI <p>SFE</p> <ul style="list-style-type: none"> • Halal Cosmetics Compliance Workshop 3-4 February 2016, Bioeconomy Corp • Natural Cosmetics Workshop 2.0 29-30 August 2016, Bioeconomy Corp <p>DotScan</p> <ul style="list-style-type: none"> • Disease Biomarker Discovery Using Dotscan Technology Seminar 20 October 2016, HUKM

MOVING FORWARD - PLANS AND INITIATIVES

PLANS	INITIATIVES
<ul style="list-style-type: none"> • Intensification of further collaboration and strategic alliances via public-private research and development partnerships, international commercial collaborations and smart strategic alliances • Commercialisation of technology platforms for application of high-end technology 	<ul style="list-style-type: none"> • Intensify engagement and increase adoption and utilisation of the technology platform by industry and RUs/RIs • Creation of regional clusters/regional centre for technology development and technology provider

BUSINESS ADVISORY AND DEVELOPMENT BIOACADEMY



Introduction

BioAcademy aims to enrich graduates at any level to pursue careers in biotechnology through skill enhancement as well as life-long learning. With the initiative from BioAcademy department, Bioeconomy Corp has been appointed as an Industry Lead Body (ILB) for biotechnology industry in 2011 by Department of Skills Development of MOHR. Among its responsibilities are implementing industry job analysis and developing National Occupational Skill Standards (NOSS). To date, Bioeconomy Corp together with Department of Skills Development and the industry players have developed 11 NOSS for biotechnology industry. As for the continuity of the life-long learning edge, the role of Library 1310 (Library BIO) is to embrace the knowledge economy through life-long learning and knowledge network. Library BIO is the only specialised library in Malaysia that provides information network and knowledge-sharing in the field of bioeconomy and bio-based industry.

FOCUS AREAS

There are three focus areas which are **skills, talent** and **education**:

Skills

BioTechies: The Biotechies Programme is a short term intensive training, designed for continuous personal skill development among biotechnology and bio-based related graduate and talent. It addresses the following scopes:

- Specific technical training programme that is not widely offered by independent training providers
- Technical training programmes that gives fully hands-on experience
- Upskilling and re-skilling approach of technical programmes

Malaysian Board of Technologies: Bioeconomy Corp was appointed by Malaysia Board of Technologists (MBOT) to be the Industry Lead Body for the field of Biotechnology to coordinate the formation of Technology Expert Panel (TEP) according to the sub-fields outlined in the NBP. Bioeconomy Corp is also responsible to facilitate the talents within the biotechnology field to be registered as a Professional Technologist. MBOT is a statutory body, established by an Act of Parliament namely Technologists and Technicians Act 205 (Act 768), that is responsible for:

- The registration of graduate technologists and qualified technician as well as the recognition of professional technologists and certified technicians
- The accreditation of programs in Institute of Higher Learning with involvement of Technology Expert Panel (TEP) Members
- Talent matching/Industrial Chambering for graduates and professionals
- Industrial collaborations with the respective technology fields under the formation of Technology Expert Panel (TEP)

Talent

Studio 1310 (BIO): Studio 1310 (BIO) is a concept studio to suit up and make up the students to unleash their personal branding. Studio 1310 (BIO) also acted as a platform to initiate the awareness of current biotechnology industry in Malaysia.

BioKerjaya Portal: The new online job portal is targeted specifically for bio-based companies and job seekers. Find out more at www.biokerjaya.my

Mini BioCareer Fair: The Mini BioCareer Fair acted as a platform for the industry and future talent to explore employment opportunities and establish network.

Education and Knowledge Network

MBA elective in Bioeconomy: Bioeconomy Corp, through the BioAcademy and UMP via its subsidiary, UMP Advanced Education Sdn Bhd (UAE) worked together to design a customised module and syllabus to develop MBA with Specialisation Elective Course in Bioeconomy. The programme integrates theory, real-world practice and personal experience to develop leaders who address complex problem, both systematically and creatively to improve business and management practice.

Library BIO: Library BIO has been assigned to develop the learning and industry knowledge and intelligence hub for the industry. Bioeconomy Academy will be the catalyst to a competitive nation by providing the access to knowledge and education. Library BIO will focus on providing industry updates to the stakeholders and in addition will start to explore the e-learning platform for education and knowledge dissemination.

HIGHLIGHTS FOR YEAR 2017 AND 2016

ACTIVITY	OUTCOME
<p>Development, completion and promotion of MBA electives in Bioeconomy</p>	<ul style="list-style-type: none"> • BioAcademy and UMP via its subsidiary, UMP Advanced Education Sdn Bhd (UAE) worked together to design a customised module and syllabus • Promotions such as MBA previews and exhibitions was done for the 1st intake in February 2016

HIGHLIGHTS FOR YEAR 2017 AND 2016

ACTIVITY	OUTCOME
Mini BioCareer Fair 2016 at Level 16, Bioeconomy Corp Office, Kuala Lumpur	<ul style="list-style-type: none"> The Mini BioCareer Fair 2016 was a platform for the industry and future talent to explore employment opportunities and establish network. The components of the event: <ol style="list-style-type: none"> On-site interview (By invitation and complimentary for companies) BioKerjaya Specialised and Personalised Advisory (SPA) BioKerjaya portal The event was targeted to biotechnology and life sciences graduates. Companies had the opportunity to assess and scout for potential talents by advertising job vacancies and also internship opportunities Total number of visitors for both days was 897
Biokerjaya Portal @ Career Event	<ul style="list-style-type: none"> BioAcademy represented Bioeconomy Corp in career event organised by other agencies/organisation. This initiative was created for the purpose of providing a platform for employers looking for top talents, and students seeking employment and internship opportunities
Mega Startup Weekend Kuala Lumpur (SWKL)	<ul style="list-style-type: none"> BioAcademy had partnered with MyPerintis for the Mega Startup Weekend Kuala Lumpur (SWKL) from 11-13 November 2016 in a collaboration with TechStars. Bioscience was one of the four verticals apart from EduTech, FashionTech and SocialEntrepreneurs. Bioeconomy Academy sponsored 50 tickets for students from Universiti Islam Sains Malaysia (USIM), Tunku Abdul Rahman University College (TAR UC) and to biotechnology/bio-based graduates interested in exploring Bioscience business
Bio for Youth	<ul style="list-style-type: none"> Invest Selangor Berhad alongside BioAcademy had successfully organised the Bio for Youth on 22 October 2016 at the MINES International Exhibition and Convention Centre (MIECC). The event was held in conjunction with The Selangor International Expo 2016. Bio for Youth was a platform for the industry and future talent to explore employment opportunities and establish network. Bio for Youth featured interactive and informative career talk plus experience sharing from Dr Mahaletchumy Arujanan and Datuk Rosyam Nor
STUDIO 1310 (Throughout the year)	<ul style="list-style-type: none"> BioAcademy promoted Studio 1310 (BIO) as a finishing school programme with the aim to groom the students to be prepared in the working environment. BioAcademy have conducted Studio 1310 (BIO) at KKTU Lenggong, UNIMAS, UMS, USIM, UPM, UniKL, Monash University, UTM, AIMST, QIUP, UKM, UMP and TAR College
Japan-East Asia Network of Exchange for Students and Youths (JENESYS)	<ul style="list-style-type: none"> Japan-East Asia Network of Exchange for Students and Youths (JENESYS) in Japan from 11-20 December, 2016. Themed, Economics (Energy Group), the programme aimed to convey information on Japan to the general public of AMS, Timor-Leste and India through the participants and to promote a global understanding on Japan's economics, society, politics and foreign policy. Among the 20 Malaysian delegates were five biotech professionals - Ahmad Zikri bin Mohamad Khidhir from Bioeconomy Corp, Sharren Abdul Sanny from Malaysian Technology Development Corporation, Farahana binti Nadzri from Malaysian Biotechnology Information Centre, Nahrul Hayawin binti Zainal from Malaysia Palm Oil Board, and Lee Goon Wai from Mostdi Innovations

MOVING FORWARD - PLANS AND INITIATIVES

PLANS	INITIATIVES
<ul style="list-style-type: none"> Develop more educational products that is relevant to the industry and inline with STEM education mandates To continuously partner with other universities to reach out to the talents via Studio1310, educational and Biotechies Constantly develop the industry-driven NOSS in collaboration with DSD through MOHR 	<ul style="list-style-type: none"> To promote opportunities for graduates and biotechnology talents via Biokerjaya Portal and International recognition via MBOT To be the main point of information to the stakeholders via BioIndustry Infobank in order to ensure the stakeholders have access to the up-to-date information and data in bioeconomy and bio-based industry Online Learning Environment - Using Library BIO portal as a gateway for members, MBA students and also other training participants conducted by Bioeconomy Academy

BUSINESS ADVISORY AND DEVELOPMENT
LIBRARY BIO (1310)

Introduction

LIBRARY BIO (1310) is the only specialised library in Malaysia that provides information network and knowledge-sharing in the field of bioeconomy and bio-based industry. LIBRARY BIO has developed core collections and houses over 5,000 hardcopies and online resources in life sciences which include biotechnology, food and agricultural biotechnology, healthcare and pharmaceutical biotechnology, industrial and environmental biotechnology, and intellectual property and law. Library BIO is first library in Malaysia that can be accessed virtually via Google View.

HIGHLIGHTS FOR YEAR 2017 AND 2016

ACTIVITY	ABOUT THE PROJECT	OUTCOME
2017		
BioIndustry Infobank	Compilation of data and information of bioeconomy and bio-based industry	To be the main point of information sources to the stakeholders via BioIndustry Infobank to ensure the stakeholders has the most up-to-date information and data in bioeconomy and bio-based industry
2016		
Librarian Brown Bag Session	Sharing session for librarian in Malaysia on marketing and branding of library with the Branding Expert	To identify and develop strategic marketing initiatives in library and information centre and enable the librarian to build branding and promotional strategy of their library
Library BIO and BioNews website	Enhancement of Library BIO and BioNews website	To fulfil the educational, intellectual, informational and social aspirations of users, through cooperative provision, superior quality library resources and services made available to the users

MOVING FORWARD - PLANS AND INITIATIVES

PLANS	INITIATIVES
<p>BioIndustry Infobank To be the main point of information sources to the stakeholders via BioIndustry Infobank to ensure the stakeholders have the most up-to-date information and data in bioeconomy and bio-based industry</p> <p>Online Learning Environment Using Library BIO portal as a gateway for students and members to access reference materials for their examination and education modules for MBA and other training products produced by BioAcademy</p>	<p>Library Collaboration - Smart Partnership</p> <p>Acknowledging the importance of close collaborations and information sharing, Library BIO has initiated library alliance with other corporate and academic libraries and knowledge centres. The collaboration primarily aims to fulfil the educational, intellectual, informational and social aspirations of users through cooperative provision, superior quality library resources and services made available to the users. Among libraries that have collaboration initiative with Library BIO are Bursa Knowledge Centre, Petronas Resource Centre and UMP Library</p>

BUSINESS ADVISORY AND DEVELOPMENT REGULATORY ADVISORY



Introduction

Regulatory Advisory continues its engagement initiatives with the relevant regulatory authorities for a progressive regulatory framework for the biotechnology sector in accordance with Thrust 7 of the National Biotechnology Policy (NBP) which emphasises for the creation of a solid, balanced and supportive regulatory framework for the development of biotechnology in Malaysia.

FOCUS AREAS

Regulatory Advisory provides regulatory advisory and facilitation in the following focus areas:

- Biosafety
- Access and Benefit Sharing
- Intellectual Property
- Pharmaceutical Regulations
- International Accreditation
- Expatriate Services

HIGHLIGHTS FOR YEAR 2017 AND 2016

Biosafety

The Biosafety Act 2007 regulates and ensures that potential adverse impact of modern biotechnology is minimised and managed

2017

Regulatory Advisory continues to work closely with the Department of Biosafety, Ministry of Natural Resources and Environment (MONRE) in the operationalisation of the Biosafety Act 2007 and its Regulations, by providing advisory and facilitating submissions for biosafety notification and approval from BioNexus Status companies and potential investors. The Department of Biosafety organised the National Seminar on Biosafety 2017: A Decade of Biosafety in Malaysia in May 2017 to commemorate 10 years of the Biosafety Act

2016

Regulatory Advisory remains committed towards supporting the biosafety regulatory framework by providing advisory services to the industry as and when required. The Department of Biosafety organised the National Seminar on Capacity-Building to Promote Integrated Implementation of the Cartagena Protocol on Biosafety (CPB) and the Convention on Biological Diversity (CBD) at the National Level

Access and Benefit Sharing

A comprehensive national regulatory framework on access and benefit sharing ensures that Malaysia will be able to combat biopiracy while providing an effective means for Malaysia to leverage on its rich and diverse genetic resources

2017

The Access to Biological Resources and Benefit Sharing Act 2017 was passed by Parliament on 1 August 2017. The Act aims to regulate access to biological resources and traditional knowledge associated with biological resources and the sharing of benefits arising from their utilisation

2016

Regulatory Advisory resumes regulatory engagements with the Ministry of Natural Resources and Environment in the consultation process for the ABS laws and will continue to provide input on behalf of the industry

Intellectual Property

Access to IP financing will also help SMEs to develop their IPs to improve their competitive edge and generate revenue

2017

Regulatory Advisory continues to support MyIPO in their initiatives to promote IP Financing through providing awareness to BioNexus Status companies on IP financing and to encourage the companies to actively access and utilise the online IPR marketplace which was launched by MyIPO

2016

Free the Seed Sdn Bhd, a BioNexus Status company was selected as one of the case studies for an IP Valuation exercise by the Department of Assessments and Services Malaysia (Jabatan Penilaian dan Perkhidmatan Harta Malaysia) conducted in collaboration with expert IP Valuers from the United Kingdom. Regulatory Advisory also organised the following IP events - IP Workshop: How Biotechnologists Can Take Advantage of the Patent System on 10 May 2016; and The Entrepreneurial Scientist on 24 August 2016

Pharmaceutical and Medical Device Regulations

Pharmaceutical Regulations

The Control of Drugs and Cosmetics Regulations (CDCR) 1984 is promulgated under the Sale of Drugs Act 1952. The Authority, known as the Drug Control Authority or DCA, established under these Regulations, is tasked with ensuring the quality, safety, and efficacy of medicinal products through registration, including quality control, inspection & licensing, and post-registration activities. The National Pharmaceutical Regulatory Authority (NPRA) acts as the secretariat to the DCA which empowers the implementation of product registration. Bioeconomy Corp engages with the following relevant regulators and ministries to provide continuous regulatory advisory and facilitation services to our stakeholders:

- NPRA on products registration/notifications
- Pharmaceutical Services Division, Ministry of Health (MoH), on poison license applications
- Private Medical Practice Control Section (CKAPS), MoH, on medical practices and facility setup
- Malaysian Research Ethics Committee (MREC), MoH, on clinical trial applications
- National Stem Cell Research and Ethics Subcommittee (NSCERT), MoH, on clinical trial applications related to stem cells
- Food Safety Quality (FSQ), MoH, on food regulation compliance and facility accreditation
- Medical Device Authority (MDA), MoH, on establishment licensing and products registration for Medical Device and In-vitro Diagnostics (IVD)

2017

Regulatory Advisory organised regulatory talks and dialogue sessions with NPRA for industry engagement during the Bioeconomy Day and BioMalaysia events

Regulatory Advisory participated in the following ASEAN Technical Working Group (TWG) to provide industry feedback to the Malaysian delegation during the discussion and deliberation process:

1. 27th ACCSQ TMHS PWG in Da Nang, Vietnam, on 15-19 May 2017: Updates on the status of the ATSC, GMP Taskforce, Head of Delegation and the Taskforce of Regulatory Framework meetings
2. 28th ACCSQ TMHS PWG in Bandar Seri Begawan, Brunei, on 23-27 October 2017: Updates on the status of the ATSC, GMP Taskforce, Head of Delegation and the Taskforce of Regulatory Framework meetings

2016

Regulatory Advisory organised regulatory talks and seminars with NPRA for BNP's industry engagement activities

Regulatory Advisory also participated in the following workshop/meeting to provide industry input to the Malaysian delegation during the discussion and deliberation process:

1. 3rd Meeting of OIC Vaccine Manufacturers Group (OIC-VMG) & Training Workshop on Vaccine Management in Bio Farma, Bandung, Indonesia, on 14-18 November 2016
2. 26th ACCSQ TMHS PWG in Bangkok, Thailand, on 28 Nov-2 Dec 2016: Updates on the status of the ATSC, GMP Taskforce, Head of Delegation and the Taskforce of Regulatory Framework meetings

Harmonisation of Standards and Technical Requirements in ASEAN

Regulatory Advisory also participates in the ASEAN meetings to support the Malaysian delegation in the development of the harmonisation of regulatory framework for medical device, cosmetics, pharmaceutical, traditional medicine and health supplements

International Accreditation

Regulatory Advisory works closely with the relevant regulators and ministries:

- National Pharmaceutical Regulatory Agency (NPRA), MoH, and Department of Standards Malaysia (JSM) on OECD GLP. Both authorities are the Compliance Monitoring Authorities (CMA)
- NPRA, MoH, for GMP, GDP, GTP and other related GxPs
- Clinical Research Management (CRM) on Good Clinical Practices (GCP)
- Department of Standard Malaysia (JSM), on BNP laboratories and other BioNexus Status companies' facilities accreditation

2016

Regulatory Advisory organised a few seminars with NPRA for industry engagement on GLP, which are as follows:

1. GLP OECD Workshop: Preparation for GLP Inspection and CMA Expectation on CAPA on 28-29 September 2016 at Bioeconomy Corp, Kuala Lumpur
2. BE Inspection Workshop: Insight to Inspections on the Bioanalytical Aspect on 23-25 November 2016 at The Royale Bintang, The Curve, Petaling Jaya

Expatriate Services

The Immigration Department of Malaysia (IDM) launched a new system at the Expatriate Services Division (ESD) for Employment Pass applications. Hence, all companies are required to create an account and registered with the ESD portal. Bioeconomy Corp is designated as a Monitoring Agency (Regulatory Body) for the applications of Employment Pass for the bio-based industry

2017 AND 2016

The Immigration and Facilitation unit processed the following categories of applications:

1. Employment Pass Application
 - Documentation review and due diligence
 - Provided recommendation to support expatriate applications
2. Residence Pass - Talent Application
 - Documentation review and due diligence
 - Provided recommendation to support application
 - Submission of documents to IDM, Putrajaya/e-Xpat, Cyberjaya.
 - a) Applicant
 - b) Dependent
3. Advisory on Residence Pass - Talent Application
 - Provided consultancy and advisory
 - Documentation review and due diligence



BUSINESS ADVISORY AND DEVELOPMENT REGULATORY ADVISORY

MOVING FORWARD - PLANS AND INITIATIVES

PLANS

Biosafety	<ul style="list-style-type: none"> To continue engagements with the Biosafety Department, in its efforts to advocate the development of a set of balanced and industry-centric regulations to ensure compliance and facilitate the growth of the biotechnology sector
Access and Benefit Sharing	<ul style="list-style-type: none"> To enhance engagements and collaborate with the Biodiversity Section of MONRE to bring awareness to BioNexus Status companies and the industry on the Access to Biological Resources and Benefit Sharing Act 2017
Intellectual Property	<ul style="list-style-type: none"> To leverage on the IP valuation training and enhancement programmes organised by MyIPO to further equip our experts to assist financiers in valuing biotechnology IPs which would be put up as collateral for the purposes of obtaining loans from financial institutions To continue providing advisory services on IP-related matters to the stakeholders
Pharmaceutical and Medical Device Regulations	<ul style="list-style-type: none"> To provide continuous advisory and facilitation services to the stakeholders Active participation and the provision of input in regulatory-related committees and meetings
International Accreditation	<ul style="list-style-type: none"> Provision of input and participation in international forums organised by international governing bodies To strengthen relationship with the stakeholders through holistic partnership
Expatriate Services	<ul style="list-style-type: none"> To enhance engagements and collaborate with TalentCorp, Immigration Malaysia, and other relevant agencies/ministries to enhance the expatriate services in Malaysia

INITIATIVES

Biosafety	<ul style="list-style-type: none"> Regulatory Advisory will enhance its collaboration with the Biosafety Department by organising more talks and events to gain more understanding on the operationalisation of the Biosafety Act and its Regulations
Access and Benefit Sharing	<ul style="list-style-type: none"> Regulatory Advisory will work on its first collaboration with the Biodiversity Unit, MONRE to organise a Workshop on ABS for the BioNexus Status companies
Intellectual Property	<ul style="list-style-type: none"> Regulatory Advisory looks forward to working closely with MyIPO to support the continuation of the MyIPO IP Financing initiatives further and to work with other partners such as MDV
Pharmaceutical and Medical Device Regulations	<ul style="list-style-type: none"> Regulatory Advisory will continue to participate and contribute in the development of pharmaceutical and medical device regulations including harmonisation of regulatory framework for ASEAN region. Moreover with our strong relationship with the regulatory stakeholders, we will provide continuous and constructive inputs from the industry perspective to drive the healthcare biotechnology development The involvement and participation in most of the Technical Working Groups (TWGs) within the Ministry of Health and NPRA has positioned Bioeconomy Corp as a definitive agency in promoting the healthcare sector
International Accreditation	<ul style="list-style-type: none"> Regulatory Advisory shall continuously support all initiatives in encouraging test facilities from BioNexus Status companies and BNP laboratories to be OECD certified for easy access to the international market without going through duplicative testing thus saving cost, time, and resources as well as reducing trade barriers Regulatory Advisory will continue to engage and provide advisory to BioNexus Status companies and BNP laboratories to comply with relevant GxP requirements Continuous engagement and provide support to the relevant stakeholders on the accreditation programmes and initiatives
Expatriate Services	<ul style="list-style-type: none"> Regulatory Advisory will resume its expatriate application services and looks forward to providing added services for expatriate services in the future

BUSINESS ADVISORY AND DEVELOPMENT FUNDING ADVISORY

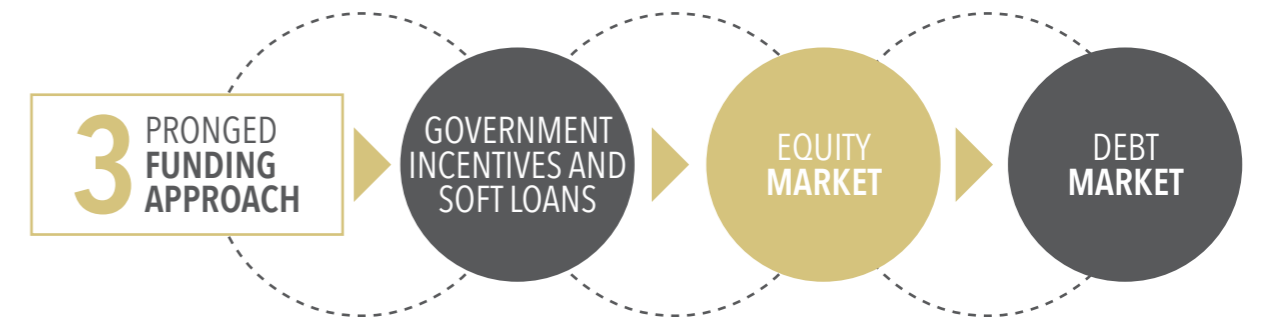
Introduction

The Funding Advisory Department undertakes facilitation of capital raising by bio-based companies and projects. Its key objectives are as follows:

- Promotion and facilitation of investments/capital raising for bio-based industry
- Collaboration with stakeholders in developing the funding ecosystem to support the bio-based industry
- Investor Relations activities to bridge the gap between the investing community and bio-based industry players

FOCUS AREAS

Bioeconomy Corp adopts a three-pronged approach in securing funding for the industry, including continuous engagement with financial institutions, venture capitalists, corporate investors, crowdfunders, angel investors as well as government ministries and agencies in securing funding for bio-based companies/projects over and above conventional public funding that are still available to encourage and support the advancement of knowledge in bio-based for suitable applications, e.g. grants from MOSTI, Cradle and MTDC.



Recent initiatives by capital market players and regulators, among others licencing of crowdfunding operators in 2016, creation of LEAP SME feeder market on Bursa Malaysia and licencing of peer-to-peer lending and equity crowdfunding platforms have created new avenues for tech-based project to raise capital. The team will continue to collaborate with regulators and platform owners alike to enable bio-based companies to tap into these new avenues.

HIGHLIGHTS FOR YEAR 2017 AND 2016

2017

- Facilitated five successful grant applications under Matrade's e-Trade programme for local companies to adopt e-commerce internationally
- Facilitated one successful application under Teraju's SUPERB programme
- Facilitated successful securing of a debt facility for a biomass plant project

2016

- Successful facilitation for capital raising via equity crowdfunding platforms for two bio-based companies, with both companies exceeding targets
- Successful facilitation of grant application for MOSTI's Dana Fasilitasi

BUSINESS ADVISORY AND DEVELOPMENT FUNDING ADVISORY

HIGHLIGHTS FOR YEAR 2017 AND 2016

ACTIVITY	ABOUT THE PROJECT	OUTCOME
2017		
Sharing session with Malaysian Debt Ventures (MDV)	Held jointly with MDV at Menara Atlan, the session provided useful information regarding various financing products and solutions that are provided by MDV for Malaysian companies	N/A
Funding session at BioMalaysia 2017 - Catch the Fund! by MOSTI, Malaysian Technology Development Corporation (MTDC) and Bioeconomy Corp	Held in collaboration with MOSTI and MTDC. This session was open to the public. The session provided information on process, requirements and costs related to grants that are currently provided by MOSTI - SMART Challenge Fund, InnoFund and Facilitation Fund; two financing products by MTDC - Commercialisation of Research and Development Fund (CRDF) and Technology Acquisition Fund (TAF); and our own Biotechnology Commercialisation Fund 2.0 (BCF2.0)	21 unique companies participated in the consultation session: <ul style="list-style-type: none"> • Nine sought further information on MOSTI grants and so far three had made submissions with two more possible submissions to come • Seven sought further information on MTDC funds • Five sought further information on BCF2.0
Workshop on Digital Free Trade Zone with Matrade and SME Corporation	Informative session to promote funds and programmes under Matrade or SME Corporation that allow bio-based companies to capitalise on the growth of the internet economy	To date, seven companies had applied for Matrade's eTrade programme and thus far two have been approved
Second collaboration with Sinopac Securities of Taiwan to promote listing opportunities on the Taiwan Stock Exchange (TWSE)/Taipei Exchange (TPX)	Briefing on opportunities for listing on TWSE for Malaysian companies	Sinopac is currently actively looking into a company for pre-IPO investment and TWSE/TPX IPO
2016		
Introduction to Equity Crowdfunding (ECF)	Briefing sessions were held with two ECF operators namely Alix Global and Crowdplus. These sessions were attended by BioNexus Status, BTP companies and other companies under Bioeconomy Corp's facilitation. The sessions provided information on process, requirements and costs related to fund raising via ECF	So far two companies under Bioeconomy Corp's facilitation has successfully completed their capital raising via ECF platforms
Session with online Islamic debt platform - Investment Account Platform (IAP)	Interactive briefing session to explain fund raising opportunities on the new Islamic debt platform which involves six Islamic banks in Malaysia	To date, there has yet to be any company under Bioeconomy Corp's facilitation suitable for the IAP
Collaboration with Sinopac Securities of Taiwan to promote listing opportunities on the Taiwan Stock Exchange (TWSE)/Taipei Exchange (TPX)	Briefing on opportunities for listing on TWSE for Malaysian companies. This was followed by two investor rounds to BioNexus Status/BTP companies identified as suitable for pre-IPO investment for Taiwanese institutional funds and listing on the TWSE/TPX	Sinopac is currently actively looking into four companies for pre-IPO investment and TWSE/TPX IPO
Workshop on pitching to investors at BioMalaysia 2016	Held jointly with ECF operator Ata Plus, the session gave useful guide and tips for companies pitching for funds from investors	N/A

BUSINESS ADVISORY AND DEVELOPMENT BIOSHOPPE



Introduction

BioShoppe is a platform created by Bioeconomy Corp which is to be utilised to expand market access for BioNexus Status companies' products by providing visibility and exposure to retail environment. BioShoppe promotes a wide range of high quality natural-based wellness products which includes health supplements, cosmetics and personal care, functional food, and aromatherapy products.

FOCUS AREAS

- Increase market access and commercialisation of bio-based products in Malaysia
- Enhance accessibility of BioNexus Status products to the public
- Promote and create awareness of bio-based products
- Develop BioNexus Status companies to be successful and competitive entrepreneurs
- Attract and develop new bio-based entrepreneurs

ACHIEVEMENTS FOR YEAR 2017 AND 2016

2017

- 1. Collaboration with Tropical Bioessences Sdn Bhd, launched 2 BioShoppe corners in:**
 - August 2017, SutraShoppe, Subang - B-20-G, Komersial Arena Bintang, Seksyen U5, Jalan Zuhul U5/178, 40150 Shah Alam, Selangor
 - January 2017, SutraShoppe, Shah Alam - 78, Jalan Renang 13/26, Tadisma Business Park, 40100 Shah Alam, Selangor
- 2. Collaboration with Majlis Reka Bentuk Malaysia from 7-8 March 2017**
 - Successfully organised two days training session to enhance entrepreneurship skills of BioNexus Status companies on branding, advertising and developing strategic direction for BioShoppe
- 3. Participated in Sabah Construction Fair 2017 from 24-26 February 2017**
 - Successfully promote and showcased wellness bio-based products to consumers that interact with Government authorities, consultants, contactors, subcontractors, specialised contractors, manufacturers, suppliers, traders and transportation
- 4. Participated in Bioeconomy Day on 14 March 2017**
 - Heightened the awareness on the benefits of wellness bio-based products to the consumers and industry players
- 5. Participated in BioBorneo 2017 on 9 May 2017**
 - Introduced BioShoppe products to the bio-based industry for Sarawak and other regional areas
- 6. Participation in National Innovation and Creativity Economy (NICE) Expo 2017**
 - Introduced and created awareness on the benefits of bio-based products to visitors during the event

2016

- 1. Collaboration with Prumera Sdn Bhd, Association of Northern Bumiputra Cosmetic Entrepreneurs under Kedah State government on 30 July 2016**
 - Successfully launched BioShoppe at Kedah. The event was officiated by Yang Amat Berbahagia Datin Seri Hizam binti Awang Ahmad, wife of YAB Menteri Besar Kedah. BioShoppe at Kedah started operation in May 2016 to enhance the market access of BioNexus Status products in the northern region market
- 2. Participated in BioMalaysia and Asia Pacific Bioeconomy 2016 from 31 May-2 June 2016**
 - Established BioShoppe presence in line of creating awareness to promote local bio-based products
- 3. Participated in Malaysia Agriculture, Horticulture and Agrotourism Show (MAHA 2016) from 1-11 December 2016**
 - Introduced and created awareness on the benefits of bio-based product to four million visitors during the event
- 4. Collaboration with Tropical Bioessences Sdn Bhd on May 2016**
 - Successfully launched a corner of BioShoppe to promote over 150 types of bio-based products that produced by BioNexus Status companies at SutraShoppe - No. 65G, Jalan S2 B21, Seremban 2, 70300 Seremban, Negeri Sembilan
- 5. Collaboration with Puserawi Pharmacy and Health-pro Sdn Bhd on December 2016**
 - Successfully created a BioShoppe corner to promote bio-based products at the leading Asia's aviation hub - Kuala Lumpur International Airport

BUSINESS DEVELOPMENT AND INVESTMENT

AGBIOTECH



Introduction

Agricultural biotechnology, also known as AgBiotech, is a collection of scientific tools and techniques used to improve plants, animals and microorganisms using multiple approaches including genetic engineering, molecular markers, molecular diagnostics, vaccines, and tissue culture. Agriculture today is not only about farming-it's a business, but today the world's agriculture industry has changed quickly to become a commercialised entity with multiple levels of input from precision farming right up to sustainable waste management. This inevitable phenomenon is due to a number of factors such as the rapid growth of the world economy, market liberalisation, rapid urbanisation, technology availability, and naturally the rapid demand for food. In today's global economy, business competitiveness is not only dependent on production efficiency, but also product quality, safety, pricing as well as modern technologies, where biotechnology will play a key role.

FOCUS AREAS

Natural Products

Natural products are products which contain biologically active ingredients derived from natural resources such as herbs, agricultural resources, flora, fauna, marine resources like seaweeds, as well as the microbial biodiversity of a country. Following the trend of previous years, the global demand for the natural product sector is expected to continue growing at CAGR of 9.6% in 2016 (Transparency Market Research). This growth is mainly fuelled by consumers growing awareness about health, making Asian consumers more concerned about what they consume and put on their skins. According to Nielsen global survey, 69% of Southeast Asian consumers prefer fresh natural and/or organic ingredients. Besides that, the survey also found out that seven in ten consumers in Southeast Asia consider health and wellness a key priority which influence their purchase decision. In addition to the natural/organic theme, there has also been an increasing demand for halal herbal based products whereby Malaysia has a distinct advantage due to its strong 'halal' branding/regulation combined with its diverse natural herbal resources. The Natural Products sector comprises of the following subsectors where natural based active ingredients are extracted and formulated to meet the needs of the various industries.



BOTANICAL DRUGS
Botanical drugs are those drugs which are derived from medicinal plants.



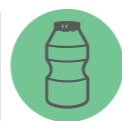
COSMECEUTICAL
Cosmetics produced from natural substances which contain medicinal or therapeutic properties



NUTRACEUTICAL
Products derived from food-source which have additional health benefits, in addition to the basic nutritional value present.



FRAGRANCE AND PERFUMERY
These are complex composition of naturally occurring aromatic compounds that produce pleasant smell. Examples are agarwood (gaharu) and patchouli.



FUNCTIONAL FOOD
Food products that are enriched with particular nutrients that have a potentially positive effect on health and could minimise the risk of certain diseases and other health conditions.

Aquaculture

Aquaculture is among the key sectors under the National Agro-Food Policy (2010-2020) which focuses on increasing the efficiency of the aqua-culture industry across the industry value chain to become more productive, competitive and knowledge-intensive. The aqua-culture sector refers to the breeding, rearing and harvesting of all types of marine life such as fish farms, seaweed farming and cultivation of ornamental fish. In line with this policy and in tandem with the global trend in aquaculture, the number of aquaculture companies applying and receiving BioNexus Status has increased significantly. This pattern is expected to continue for the next 5 years where this sector is among the main contributors to increase fish production both to meet the needs of the nation and for export where, by 2020 aquaculture production is estimated to grow by nearly 8.6% per annum (DoF, 2015).

Traditionally, the growth of this sector very much depended on the availability of land (for land based culture) and sea-space (for open cage farming). However, with advances in technology both in terms of farming practices and nutrition, companies are now moving into more advanced culturing methods such as the Recirculation Aquaculture Systems (RAS) where fish/shrimp can be produced indoor and with minimal water exchanges. This has resulted in the successful initiation and implementation of several Entry Point Projects (EPPs) namely EPP-4 (Integrated Cage Farming of fish) and EPP-6 (Integrated Zone for Aquaculture (IZAQs) for Premium Shrimp production), where anchor companies will train, set standard operating procedure and guidelines for the industry. Thus, helping to create an integrated approach for large-scale commercial production, from hatchery to production and processing. These EPPs has witnessed the involvement of several BioNexus Status companies which are Sunlight Inno Fisheries, Jefi-BioDesaru Sdn Bhd and Darvel Hybrid Aquaculture where technological innovations from hatchery to grow-out culture are implemented successfully, on a commercial scale.

Moving forward, the industry has also diversified in the species being cultured, where previously, the focuses were on shrimps and fishes, there are currently companies venturing into the oyster, sea cucumber, abalone and scallops farming. Technological advancements in the sustainable production of quality seeds has enabled this diversification, where previously seeds and juveniles were procured from the wild. These advancements have also enabled the potential creation of community projects where the practicality and ease of farming species such as sea cucumbers and abalone will be more palatable to the community farming model compared to shrimps and fish where higher cost and commitment from both sides (farming community and anchor company) are needed.

FOCUS AREAS

The Aquaculture sector currently comprises of the following subsectors where sustainability and the development of broodstock (seed stock) is supported.

1. **Finfish Aquaculture:** Both for marine and freshwater fish species
2. **Crustaceans:** Bivalves (Oysters, Scallops, Abalone etc), Shrimps and Mud Crabs breeding and cultivation
3. **Other marine species** such as the breeding of sea cucumber both for food and medicinal applications.
4. **Feed ingredients** and additives such as probiotics and ingredients produced from biotechnology processes (eg. Fermentation, Insect meal for fishmeal replacement).
5. **Waste Remediation** (Microbial based treatment solutions that could be used in Recirculation Aquaculture Systems)

Livestock

The government has formulated various policies and strategies to improve the livestock industry through policies such as the National Agricultural Policy (1984-2010) and the National Agro Food Policy (2011-2020). These policies are designed specifically to ensure the industry remains significant as one of the important sectors in its National economic growth. The livestock industry in Malaysia is expected to continue to grow as the demand for meat especially poultry and beef are expected to increase by more than 58.8% and 53.3%, respectively in 10 years (2010-2020). The demand for mutton, eggs and milk are expected to register more than 30% increase while pork will register the lowest increase of around 10%. Poultry and pig farming represent by far the major proportion of the livestock industry in terms of output value. The poultry and pig industries are operated largely in a commercially oriented model and are increasingly managed as private or public limited companies. In comparison the ruminant sector lags far behind with the majority of cattle, goat and sheep are still owned by individual farmers. The total ex-farm output value for the ruminant sector (meat and milk) was only RM1.5 billion in 2015 compared to poultry and pig which were RM7.6 billion and RM2.1 billion respectively.

The biotechnology tools applications for livestock improvement include:

1. **Animal reproductive technology, genetics and breeding** - artificial insemination, embryo transfer, embryo sexing and cloning, hormone use.
2. **Animal health** - disease diagnosis, vaccine, physiology of lactation and growth.
3. **Animal nutrition** - increasing digestibility of low quality forages, improving nutritive value of cereals, removing anti-nutritive factors from feeds, improving nutritive value of conserved feed, improving rumen function.

Crops

The use of crop biotechnologies has significantly contributed towards improving the yield of crops, meeting the challenges in food production, which includes shrinking land banks, limited water resources, environmental concerns and increasing input costs. In the last decade, food production patterns have recorded lower growth indicating that the current agricultural practices have almost reached its maximum capacity. Therefore, moving forward, it is imperative for countries such as Malaysia to adopt more sustainable agriculture practices and include the use of technology (mechanical or biotechnology) to further improve productivity. The Crop Biotechnology sector currently comprises of the following subsectors.

PLANT NUTRITION

Any substances derived from organic biomass, e.g. plant extraction (plant growth regulators), microbial fermented organic matter (compost from agricultural waste), living beneficial microorganism (bacteria and fungus) and its metabolites that can improve plant growth and development, and rejuvenate soil organic matter, including its microflora. In 2014, global biofertilisers market size was estimated at USD535.8 million and is expected to reach USD1.88 billion by 2020 at a CAGR of 14% from 2015 to 2020. In the past few years, favourable regulatory scenario, especially in North America and Europe has been a key driving factor in spear heading the development/growth of this industry. Besides that, the high cost of developing new chemical compound, coupled with increasing incidents of insect and weed resistance to chemical treatments, and the growing regulatory pressures to limit chemicals on food and environment has also spurred the growth of the biofertiliser industry. Leading players in the biofertiliser market include Gujarat State Fertilisers and Chemicals Ltd (India), Camson Bio Technologies Ltd. (India), Novozymes (Denmark), Rhizobacter Argentina S.A. (Argentina) and Lallemand Inc. (Canada). In Malaysia, we imported approximately 4.4 million tons of chemical fertiliser. Out of that, only 18,000 tons were organic fertiliser. The biofertiliser market is relatively small since the agriculture and plantation sector still rely heavily on the use of chemical fertiliser which provides immediate results towards the growth of plants, such as oil palm.

PLANTING MATERIAL

Micropropagation via tissue culture technique, marker assisted selection breeding and/or any methods that provide elite planting material (high yield, disease resistance, and desirable traits), including mutation breeding, genetic engineering, etc. The seed industry is a multibillion dollar business, where according to International Seed Federation estimates, the global seed market value increased from USD12 billion in 1975 to USD53.8 billion in 2014. The growth is expected to continue at 9.4% CAGR from 2015 to 2020 to reach USD92 billion by 2020. In Malaysia, molecular breeding is relatively new as the use of this technology is limited to agricultural research institutions and large plantation companies. No doubt, we are far ahead in oil palm breeding and agronomy practices, supported by long historical field trials data, funded by both government and private companies. Different elite planting materials had been developed based on Malaysia geographical and climate studies. Marker assisted selection and micropropagation methods were used to multiply the desired planting material. However, this is not the same for other crops, where we import more than 90% of the seeds for vegetables, corn and melon. Our local inbred varieties are unable to compete with the superior imported hybrid varieties, and this is one of the main reason causing low production of locally developed seeds.

PLANT PROTECTION

Any substances derived from organic biomass, e.g. plant extracts, living beneficial microorganism and its metabolites that can act antagonism or inhibit the growth of weed, insect, fungus and virus. Use of agrochemical in crop production has become a global concern, where consumers have started to realise the adverse effect of continuous application of those chemicals. This has resulted in an increasing number of people opting for organic food. The global organic food market is expected to witness a sharp growth in the coming years, as household income increases, changing of lifestyle and rising health concerns among consumers. Organic food products with a total value of almost USD64 billion were sold in 2012, compared to USD15.2 billion in 1999. Global organic food market is expected to grow at a CAGR of over 16% through 2020. As similar to biofertiliser, the market is still dominant by chemical pesticides due to the efficacy and efficiency. In 2014, we imported approximately 18,000 tons of agrochemicals; however, there are no data available on the import of biopesticides.

BUSINESS DEVELOPMENT AND INVESTMENT

AGBIOTECH

KEY SUCCESS FOR YEAR 2017 AND 2016

BIONEXUS STATUS COMPANIES

2017

EntoFood Sdn Bhd

Investment

First commercial production facility of the insect-based protein meal for the poultry and aquaculture industry in Malaysia will be expected to begin construction by end of 2017

Benefits to the Rakyat

Organic waste can be sustainably processed through insect-based bioconversion and production of biofertiliser/composts as by-products for agriculture industry with a total of 253 new employment opportunities in 2017

2016

12 agriculture companies were awarded with BioNexus Status in 2016

Investment

Integrated shrimp aquaculture project in Pitas, Sabah by Sunlight InnoFood had invested at least RM275 million

Benefits to the Rakyat

Creation of contract shrimp aquaculture farmers, seafood processing and shrimp hatchery activities with a total of 742 new employment opportunities

KEY SUCCESS FOR YEAR 2016

NON-BIONEXUS COMPANY

2016

Asia Plantation Capital Berhad

Investment

To date, APC's investment was RM5.4 million which includes commercialisation of the agarwood steam distillation plant and the new gaharu plantation in Johor

Benefits to the Rakyat

Potential contract farming opportunities for the rural community and 398 new employment opportunities created in 2016

HIGHLIGHTS FOR YEAR 2017 AND 2016

COMPANY	ORIGIN (FDI/DDI)	ACTIVITY	OUTCOME
BIONEXUS STATUS COMPANIES			
I-GREEN (M) SDN BHD	DDI	Commercialisation of aloe vera standardised extract based products and to undertake its research and development activities	The company has successfully commercialised its products
GK AQUA SDN BHD	DDI	Breeding and cultivation of all male 'Udang Galah'	The company has commenced its production and first commercial harvest showed very positive result i.e faster growth and uniformity with 100% all male harvest
Q PLANT TECH SDN BHD	DDI	Commercialisation of high quality planting material	The company has commenced production which are sold to their related plantation entities in Kelantan
QUANGROW SDN BHD	DDI	Commercialisation of high quality planting material mainly timber species utilising tissue culture	The company has commenced production and in the midst of fulfilling orders from East Malaysia
MALAYSIAN VACCINES AND PHARMACEUTICALS SDN BHD	DDI	Research, development and commercialisation of animal vaccine	The company has commenced to penetrate international markets
J&J AQUATECH SDN BHD	DDI	Breeding and cultivation of marine fish and shrimp	The company has commenced production of its juvenile hybrid groupers for sale to grow-out farmers
AQUA 77 SDN BHD	DDI	Breeding and cultivation of marine shrimp and fishes	The company has commenced production of its shrimp
YENHER BIOTECH SDN BHD	DDI	The production of microbial based animal feed ingredients and additives, mainly for the swine and poultry industry	The company has completed its R&D on its feed additives and is ready to start production

HIGHLIGHTS FOR YEAR 2017 AND 2016

COMPANY	ORIGIN (FDI/DDI)	ACTIVITY	OUTCOME
BIONEXUS STATUS COMPANIES			
2016			
ENZA ZADEN ASIA R&D SDN BHD	FDI	Contract research services for fruit and vegetable seed breeding	The company has commenced commercialisation
BIO-ANGLE VACS SDN BHD	DDI	Commercialisation of animal vaccines	Project is in the midst of setting up its facility. Pilot production was at UPM
PROVIERA SCD BIOTECH SDN BHD	DDI	Microbial based applications for crop cultivation	The company has commenced commercialisation
STEVIA SUGAR PLANTATIONS	DDI	Commercialisation of stevia-based products	
HILEX AQUATIC SDN BHD	DDI	Breeding and cultivation of marine shrimps	Hatchery production has commenced successfully
7 STARS AGRICULTURAL SDN BHD	DDI	Research, development and commercialisation of mushroom seed culture and the production of premium mushroom varieties	The company has successfully commenced production for which they have received the relevant MeSTi and MyGAP accreditation.
NATURAL GREEN COMMERCE SDN BHD	DDI	Breeding and cultivation of high value freshwater fish species in Recirculation Aquaculture Systems (RAS).	The company has successfully begun commercialisation at their Pangkor facility
CMP ASIA GEN SDN BHD	DDI	Shrimp brood-stock development and hatchery production (post larvae) for the grow-out industry	The company based at Segari, Perak has already commenced production of its post-larvae to be supplied to its own farms and other farms
JEFI AQUATECH (DESARU) SDN BHD	DDI	Production of shrimp post larvae and marine shrimp culture	The company has commenced production of its shrimps while hatchery is in progress
TRIZON LIFE SCIENCES SDN BHD	DDI	Commercialisation of microbial based animal feed ingredients and additives	The company has commenced production and marketing their products to the swine and poultry industry
ABMANAN BIOMEDICAL SDN BHD	DDI	Skin care products based on standardised haruan extracts	The company has commenced commercialisation and is in the midst of market expansion and penetration activities
NUTRATIX BIOTECH SDN BHD	DDI	Commercialisation of herbal based (Moringa oleifera) nutraceuticals	The company has successfully launched its products which are being marketed through its distributors and its own online platform
NON-BIONEXUS COMPANY			
2016			
ASIA PLANTATION CAPITAL BERHAD (APC)	DDI	Strategically commercialises a diverse range of stand-alone businesses, among which are; the use of oud oil from agarwood trees to produce fine perfumes for the international fragrance industry; manufacturing products for the pharmaceutical sector; construction of sustainable homes; plantation and agricultural specialist management, and tree nurseries for local communities to access	<ul style="list-style-type: none"> • APC has been awarded the Bioeconomy Transformation Programme (BTP) "trigger projects" in 2016 • APC estates have full CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) approval and certification • Asia Plantation Capital Berhad is also the first company in Malaysia (and indeed the Asian market) to receive regulatory approval for its agarwood plantation investment programme

MOVING FORWARD - PLANS AND INITIATIVES

PLANS

- Encourage investments into the AgBiotech sector
- Revenue generation through our engagement within the AgBiotech sector
- Technology uptake towards commercialisation through public private partnerships

INITIATIVES

- Continuous nurturing of companies towards BioNexus Status to encourage investment
- Expansion of the AgBiotech sector through contract farming initiatives
- Engaging stakeholders and participating at targeted events/conferences to identify quality companies or projects to commercialise
- Overseas market expansion programmes

BUSINESS DEVELOPMENT AND INVESTMENT HEALTHCARE BIO



Introduction

The Healthcare Bio division leads the development of the Healthcare Bio Cluster in Malaysia by securing strategic investments and creating a conducive environment in target sectors. In 2016, the initiatives were focused on seeking out and securing foreign investments; nurturing and growing local Healthcare Bio companies; and creating new jobs. Efforts were also taken to ensure a conducive business environment for Healthcare Bio companies by addressing regulatory hurdles, facilitating access to market as well as assisting with business matching activities. The Healthcare Bio cluster consists of several focus areas including BioPharmaceuticals, BioMedical Technology, Bio Services, and Emerging BioSciences.

FOCUS AREAS

- BioPharmaceuticals** - Several sub-sectors feature in this focus area including small and large molecule biopharmaceutical product. The small molecule pharmaceutical products are divided into New Chemical Entities (NCEs) and Generics whereas the large molecule pharmaceutical products are categorised into Innovator Biologics, Biosimilars and Vaccines. NCEs and Innovator Biologics are now also termed as New Molecular Entities (NMEs)
- BioMedical Technology** - This vertical currently contributes the highest revenue to Malaysia's Healthcare Bio Cluster and includes the following sub-sectors: Medical Devices, In-Vitro Diagnostics and Biosensors
- Bio Services** - This vertical consists of Bio Services such as Contract Research Organisations (CROs), Contract Manufacturing Organisations (CMOs) and Bioinformatics
- Emerging BioSciences** - Sub-sectors under Emerging BioSciences includes Cellular Medicine and Cell and Gene Therapy Products (CGTP) and Bocosmeceuticals, Wellness & Pharmanutrition and others

KEY SUCCESS FOR YEAR 2016

COMPANY	INVESTMENT	BENEFITS TO THE RAKYAT	ACHIEVEMENTS
2016 BIONEXUS STATUS COMPANY			
BIO-COLLAGEN TECHNOLOGIES SDN BHD	Awarded BioNexus Status in 2009 and through R&D work, the company now manufactures collagen-based medical devices. Pharmaniaga Berhad has recently acquired BioCollagen to expand their commercialisation activities into collagen-based medical devices for wound care management	The acquisition activity has boosted the operational activities of Bio-Collagen and at the same time provided expansion for Pharmaniaga's portfolio in the wound care management for the local, ASEAN, OIC and China markets	To date, the company has a total investment of RM12.5 million
2016 NON-BIONEXUS COMPANIES			
BIOCON SDN BHD	Biocon Malaysia expanded its state-of-the-art facility with an additional RM100 million for insulin pen manufacturing. The company was also awarded with a RM300 million contract to supply rh-insulin cartridges and reusable insulin pens under the Malaysian Government's Off Take Agreement Initiative	With the expansion of Biocon's facility and the OTA initiative in place, diabetes patients in Malaysia will have access to high quality local manufactured insulin and a significant reduction in healthcare cost for diabetes management	Biocon has created more than 500 high end knowledge jobs with more than 85% Malaysians taken up the employment role at the facility. Biocon added another investment of RM215 million towards its expansion activities
MEHOW MEDICAL (M) SDN BHD	Mehow Innovation Ltd is a China medical device company focus on research and development on providing medical device solution with advance technology in manufacturing liquid silicon rubber and tooling and moulding of medical device components	MeHow Innovation will be investing RM94 million to set up its first facility outside of China in Penang, Malaysia to focus on the company's international market	The company envisions a potential job creation as many as 1,068 and approved investment of RM94 million
NOVUGEN PHARMA SDN BHD	Headquartered in Dubai UAE, the collaboration between Dubai and Malaysia is to establish a facility in Malaysia to engage in R&D and manufacturing of generic medicines for regulated and semi-regulated markets	The company will be setting up a US FDA approved formulation and manufacturing facility to develop generic pharmaceutical products to provide affordable, high-quality medicines to the vast pool of patients	The company envisions a potential job creation as many as 200 and approved investment of RM195.6 million
BIOCARE SDN BHD	BioCare is a leading local pharmaceutical company and a manufacturer of ophthalmic, nasal spray, inhaler and pre-filled syringe	Reducing reliability of imports products of MDI and DDI thus reducing healthcare cost	Biocare's facility will be ASEAN's first Asthma prevalent Metered Dose Inhaler (MDI) and Digital Dose Inhaler (DDI) manufacturing plant, located in Bandar Seri Iskandar, Perak

KEY SUCCESS FOR YEAR 2016

COMPANY	INVESTMENT	BENEFITS TO THE RAKYAT	ACHIEVEMENTS
2016 NON-BIONEXUS COMPANY			
ONCOGEN PHARMA SDN BHD	Oncogen Pharma Sdn Bhd is pharmaceutical manufacturing company engaged in research, development and manufacturing of generic medicines. The R&D establishment in Glenmarie facility will be followed by the construction of two fully integrated US FDA approved manufacturing and formulation plant to manufacture active pharmaceutical ingredient (API) for oncology products at Bandar Enstek, Negeri Sembilan	The facilities will act as a catalyst in making Malaysia a hub for oncology products, providing access to affordable oncology medicines. The establishment will also potentially create up to 176 high knowledge jobs	Oncogen established ASEAN's first API laboratory in Glenmarie, Selangor for the development of oncology API and formulation of highly potent oncology drugs for regulated and semi-regulated markets

HIGHLIGHTS FOR YEAR 2017 AND 2016

COMPANY	ORIGIN (FDI/DDI)	ACTIVITY	OUTCOME
2017 BIONEXUS STATUS COMPANIES			
VIRAMATIX SDN BHD	DDI	Develop and commercialise peptide based anti-viral therapeutics products. The company also functions as a Contract Research Organisation (CRO)	Viramatix envisions to become Malaysia's first drug inventor. Their lead candidates designed for influenza therapeutics have successfully completed the Pre-Clinical stage and moving forward to Phase I clinical stage. The company will continue to use its novel mechanism to develop other therapeutics candidates including HIV, Zika, Hepatitis C, and Herpes
CELL TISSUE TECHNOLOGY SDN BHD	DDI	Commercialisation of tissue engineered technology including human skin graft for wound care treatment, skin graft for research use and autologous dermal fibroblast cell suspension for skin rejuvenation	The company's tissue engineered human skin provides solution as an alternative to conventional surgical skin substitute methods. It can replace human skin testing, leading to reduce clinical trials cost as well as avoiding unnecessary complications/adverse reaction to human subjects. The engineered skin graft can also replace animal models to conduct safety and toxicity test of compounds in cosmetics or other industries
2016 BIONEXUS STATUS COMPANIES			
BIH GLOBAL SDN BHD	FDI	BIH Global is a subsidiary of a BIH group of companies (Hong Kong and Korean based fetal stem cell business) that focuses on development of stem cell research and therapy	BIH Global is planning to establish clinics and treatments in Malaysia to provide EMCELL technology, the use of biologically active substances derived from amniotic fluid separated mesenchymal stem cells (MSCS) for the Asia region
CERCA INSIGHTS SDN BHD	DDI	Cerca Insights is a CRO specialising in research and drug discovery for behavioural pharmacology	Cerca Insights has a dedicated team of scientists and a laboratory in Penang to provide bioanalytical, drug discovery, preclinical and toxicology services to discover compounds for behavioural pharmacology
BIOCOLLAGEN SDN BHD	DDI	The company designs, develops, manufacture and commercialise collagen-based medical devices for wound care management	Pharmaniaga acquired Biocollagen to expand their commercialisation activities into collagen-based medical device for wound care management
GENENEWS DIAGNOSTICS SDN BHD	FDI	GeneNews is a molecular diagnostics company focused on application of functional genomics to enable early diagnostics of diseases	GeneNews developed a patented technology platform that has the ability to detect and stage any medical condition from a simple blood test enabling early detection of diseases and personalised health management. One of their lead product is ColonSentry, the world's first blood test for colorectal cancer

BUSINESS DEVELOPMENT AND INVESTMENT HEALTHCARE BIO

HIGHLIGHTS FOR YEAR 2017 AND 2016

COMPANY	ORIGIN (FDI/DDI)	ACTIVITY	OUTCOME
2016 NON-BIONEXUS COMPANIES			
B. BRAUN MEDICAL INDUSTRIES SDN BHD	FDI	B. Braun Medical Industries is a subsidiary of B. Braun Germany and is one of the largest medical device companies in the world. The facility in Penang manufactures medical, surgical and pharmaceutical products and is one of the largest in the region	The company is expanding its Sterile Infusion Solution Plant to address the increasing national and regional demand for sterile infusion solutions in bags and plastic containers. With the expansion, it is expected to create 200 job opportunities
SYMBIOTICA SPECIALITY INGREDIENTS SDN BHD	DDI	Symbiotica is a pharmaceutical and biotechnology company that produces intermediates and finished products for pharmaceutical preparations for human and animal health using integrated bio-based and synthetic pharmaceuticals plants	Symbiotica facility is located in Penang and it is one of the few Active Pharmaceutical Ingredients manufacturing company in Malaysia. The facility is GMP certified and received its first US FDA inspection in 2014
ACCOBIOTECH SDN BHD	DDI	Accobiotech is a molecular diagnostic company focus on research, development and manufacturing of Rapid Test In-Vitro Diagnostics Kits for infectious diseases such as influenza, HIV, Hepatitis C and H1N1 and other diagnostics kits for cardiology, oncology, drug abuse and women's health	Accobiotech set up its operations in Johor through a joint collaboration with South Korea technology to develop and manufacture diagnostics kits. The company is establishing to become a leading manufacturer of diagnostic kits license under their own in-house brand name
MEHOW MEDICAL (M) SDN BHD	FDI	MeHow Malaysia's facility is set up with advance technology to manufacture liquid silicone rubber (LSR) for applications in the medical device industry	The company set up its first international facility in Penang, Malaysia to diversify its businesses outside of China. MeHow has launched the first phase of the plant and will be developing the second phase to increase its manufacturing capacity
NOVUGEN PHARMA SDN BHD	FDI	Novugen is a pharmaceutical company engaged in research, development and manufacturing of generic medicines for regulated and semi-regulated markets	Novugen's will be setting up a US FDA approved formulation and manufacturing facility to produce pharmaceutical generic drugs for the treatment of common to emerging diseases
NASHMIR CAPSULE SDN BHD	DDI	Nashmir is a pharmaceutical manufacturing company that produces and commercialises empty hard gelatin capsules vegetable-based raw materials for the pharmaceutical, dietary supplement and traditional Chinese medicines industries	Nashmir's facility is located in Penang. The company's empty hard gelatin capsules is certified Halal by JAKIM thus providing alternatives to porcine gelatine-based and address the need for halal certified gelatin-based capsules
BIOCON SDN BHD	FDI	Malaysia's first biopharmaceutical manufacturer is expanding its capacity as a premier insulin solution provider to include disposable pen assembly line and related machineries	Increasing patient access to insulin through significant reduction in healthcare costs attributed to diabetes

MOVING FORWARD - PLANS AND INITIATIVES

PLANS

- Achieve the objectives of the NBP and BTP towards creating a new engine of growth for Malaysia to achieve a developed nation status
- Position Malaysia as global/regional Healthcare Bio Hub using value chain approach
- Develop a holistic Healthcare Bio ecosystem using value chain approach

INITIATIVES

- Increase the multiplier effects on the economy and positive impact on the income and welfare of the rakyat by developing socio-economy focused programmes
- Actively realise investments through project implementation and conduct communication outreach to increase the visibility of Bioeconomy Corp activities in Healthcare Bio industry
- Develop and implement ecosystem based pipeline building initiatives to build a conducive environment for the Malaysian healthcare sector

BUSINESS DEVELOPMENT AND INVESTMENT BIOINDUSTRIAL



Introduction

The demand from the global chemicals and materials industries for bio-based/green products, sustainability and security of food, feed, fuel/energy and health, as well as environmental challenges are promoters to the growth of Industrial Biotechnology (IB). In line with the NBP and the BTP, BioIndustrial will continuously promote and integrate Malaysia's bio-based resources with IB technology platform (unique combination between chemical and/or biotechnology processes) and engage the industry players to create awareness, interest and structure partnering/collaboration to foster new investment and add value to the existing manufacturing sectors towards reducing greenhouse gas emission, landfill, waste water effluents and manufacturing cost and achieving sustainable business operations.

FOCUS AREAS

FINE AND SPECIALTY CHEMICALS

Commonly produced from crude oil and natural gas. IB can produce the same chemicals from bio-based feedstocks through fermentation, chemical or enzymatic conversion into biochemicals

BIOGAS AND BIOGAS DERIVATIVES

Gases produced from the breakdown of organic matter from waste. IB can convert these gases into renewable energy source through anaerobic digestion or undergo further downstream processes for biochemical production

BIOMATERIALS

Bioplastic, bioadhesive, biofibre and biocomposite are biomaterials that are mostly derived from vegetable oil, sugar, and starch produced from renewable resources. IB can now produce hybrid material combining bio and fossil fuel based materials, providing physical strength yet with renewable content

BIOREMEDIATION

Waste management process that uses microorganisms to remove pollutants from municipal spills, sewerage, and industrial waste. More environmental friendly and safe method

BIOCATALYST

Uses enzymes derived from living organisms to speed up (catalyse) manufacturing processes that is greener, cost effective and sustainable

BIINGREDIENTS

Active components generated by plants, extracted to provide natural flavours, fragrances and colour ingredients to be used for food, beverage, nutraceutical and the cosmetics industry

KEY SUCCESS FOR 2017 AND 2016

2017

Verdezyne Sdn Bhd

Investment

Verdezyne is a synthetic biology company offering bio-based chemicals manufactured via fermentation of its proprietary yeast cells. Sime Darby is one of the investors in Verdezyne Inc.USA, a parent company of Verdezyne Sdn Bhd

Benefits to the Rakyat

The project is in line with global trends of replacing petroleum-derived chemicals with bio-based chemicals

Achievements

Verdezyne had on 30 July 2017 successfully held a groundbreaking ceremony for its VerdePalm plant at BioXCell Biotechnology Park in Iskandar Puteri, Johor. The VerdePalm Plant is Verdezyne's first commercial-scale renewable chemicals manufacturing facility and will be the World's first bio-based plant for DDDA production.

The VerdePalm plant is expected to be completed in 12-18 months. The plant can produce approximately 6,000 metric tons of industrial grade DDDA every year

2016

Green & Smart Sdn Bhd

Investment

Involved in harnessing biomethane gas from palm oil mill effluent (POME), converting it into renewable energy and feeding it to palm oil mills and National Power Grid for Feed-in-Tariff. To date, the company has completed 140 projects worldwide

Benefits to the Rakyat

The company aligns with RMK-11 strategy to promote green growth by reducing GHGs emission and increasing renewable energy source

Achievements

The holding company of the group, Green & Smart Holding PLC was successfully listed on the AIM, London Stock Exchange in May 2016 and successfully raised £4.0 million

Bioplastic Initiatives with SIRIM and Kementerian Wilayah Persekutuan

Bioeconomy Corp is a collaborating partner with SIRIM QAS International Sdn Bhd in supporting Kementerian Wilayah Persekutuan initiatives to implement the usage of biodegradable and compostable materials to replace the conventional plastic bags and polystyrene in the Wilayah Persekutuan. Bioeconomy Corp promotes SIRIM Eco-Labeling Certification Scheme i.e. SIRIM ECO 001:2016 for degradable and compostable plastic packaging materials and SIRIM ECO 009:2016 for biomass-based products for food-contact applications as the standard for the implementation of bioplastic and biodegradable initiatives. Since the introduction of SIRIM ECO 001:2016 and SIRIM ECO 009:2016, a number of conventional plastic companies had successfully adopted bioplastic technologies to get their products certified in order for these companies to sell their products in Wilayah Persekutuan

BUSINESS DEVELOPMENT AND INVESTMENT

BIOINDUSTRIAL

HIGHLIGHTS FOR YEAR 2017 AND 2016

COMPANY	ORIGIN (FDI/DDI)	ACTIVITY	OUTCOME
2017 BIONEXUS STATUS COMPANIES			
ZYMERATICS SDN BHD	DDI	Commercialisation of enzyme and its related services and to undertake its related research and development activities	Set-up of a manufacturing facility to produce enzymes at commercial scale
GREEN & SMART SDN BHD	DDI	Development and commercialisation of anaerobic reactors and biological systems for treatment of various wastes. Applies in-house technology for treatment of palm oil mill effluent to become biogas	Set-up of two biogas plants to be converted into electricity generation for Feed-in-Tariff
2016 BIONEXUS STATUS COMPANIES			
PELANGI ALTERNATIF SDN BHD	DDI	Commercialisation of cotton products via enzymatic process	Set-up of manufacturing facility to produce cotton products using enzymatic process
FAST TRACK RESOURCES SDN BHD	DDI	Wastewater treatment using biotechnology application	Set-up of manufacturing facility to produce microbial-based products for waste water treatment system and soil management applications
UAGB ENGINEERING SDN BHD	DDI	Biological wastewater treatment and biogas extraction with up-flow anaerobic granulation bio-digester (UAGB) and aerobic bio-digester	Set-up of biological wastewater treatment system for commercial usage
FREE THE SEED SDN BHD	DDI	Production of biodegradable packaging products	Expansion of manufacturing lines for biodegradable packaging products
RONSER BIO-TECH BERHAD	DDI	Development and commercialisation of bio-based waste management	Set-up of bio-based waste management facility in Iskandar Malaysia
GREEN & SMART SDN BHD	DDI	Development and commercialisation of anaerobic reactors and biological systems for treatment of various wastes. Applies in-house technology for treatment of palm oil mill effluent to become biogas	Set-up of three biogas plants to be converted into electricity generation with total capacity of 7.5 MW for Feed-In-Tariff
2017 NON-BIONEXUS COMPANIES			
GLOBAL SPECIALTY INGREDIENTS SDN BHD	DDI	Production of anti-clouding agent for palm olein	Set-up of the anti-crystallising agent production plant (food emulsifier plant) at Bandar Bestari, Klang, Selangor
PROFES LIPID SDN BHD	DDI	Production of extra red palm olein and extra red palm stearin	Set-up of extra red palm olein and extra red palm stearin plant at Semenyih, Selangor
ECO PALM PAPER SDN BHD	DDI	Development, production and commercialisation of corrugated medium paper using Empty Fruit Bunch (EFB)	Set-up of a manufacturing facility to produce corrugated medium paper using EFB
INDAH WATER KONSORTIUM SDN BHD	DDI	Bio-based wastewater treatment	Set-up of a bio-based wastewater treatment facilities
2016 NON-BIONEXUS COMPANIES			
SABAH SOFTWOODS BERHAD	DDI	Biogas plant	Set-up of a biogas power plant at Kapilit palm oil mill in Tawau, Sabah
CONCORD GREEN ENERGY SDN BHD	DDI	Biogas plant	Set-up of four biogas power plants at FELDA palm oil mills
GLT ENERGY SDN BHD	DDI	Biogas plant	Set-up of two biogas power plants at two palm oil mills in Pahang
LIPIDCHEM SDN BHD	DDI	Production of steric acid and Medium Chain Triglycerides (MCT)	Expansion of cGMP steric acid and Medium Chain Triglycerides (MCT) Powder Plants
GLT RENEWABLE SDN BHD	DDI	Biogas plant	Set-up of a biogas power generation plant at Rompin palm oil mill in Pahang based on the Feed-in-Tariff model

HIGHLIGHTS FOR YEAR 2017 AND 2016

COMPANY	ORIGIN (FDI/DDI)	ACTIVITY	OUTCOME
2016 NON-BIONEXUS COMPANIES			
OLIVE ENERGY SDN BHD	DDI	Biomass plant	Set-up of 10 MW palm oil biomass power generation plant in Mukah, Sarawak
MAJUNAKA ECO ENERGY SDN BHD	DDI	Biomass plant	Set-up of a 9.95 MW rice husk and woodchip biomass power generation plant in Naka, Kedah
METRO HAVANA SDN BHD	DDI	Biogas plant	Set-up of a biogas power generation plant at Sri Jelutong palm oil mill in Pahang based on the Feed-in-Tariff model
GLT ECO SDN BHD	DDI	Biogas plant	Set-up of a biogas power generation plant at Setia Kawan Kilang Kelapa Sawit in Kedah based on the Feed-in-Tariff model
TELIC PAPER SDN BHD	DDI	Development, production and commercialisation of biodegradable products	Set-up of a manufacturing facility to produce biodegradable products
GAS MALAYSIA IEV SDN BHD	DDI	Production of compressed natural gas (CNG)	Set-up of compressing of natural gas (CNG) facility
DOUBLE CORPORATE SDN BHD	DDI	Production of biofuel (Palm Methyl Ester)	Set-up of biofuel plant (Palm Methyl Ester)
ENCOMPASS INDUSTRY SDN BHD	DDI	Production of NBR latex and NBR examination gloves	Set-up of NBR latex and NBR examination gloves integrated facility

MOVING FORWARD - PLANS AND INITIATIVES

PLANS

- Adopt IB as a technology platform and leverage on Malaysia's natural bio-based resources to develop and commercialise value-added and innovative products and services
- Adopt IB as a strategic solution to provide renewable energy, reduce carbon emission and provide environmental protection as part of a pivotal role in the RMK-11 in pursuing green growth for sustainability and resilience
- Continue nurturing local IB players for global commercialisation to enable them to generate higher revenue, capture larger markets and create international branding

INITIATIVES

Fine, Specialty, and Bulk Chemicals (Biochemicals)

BioIndustrial initiatives is to tap into the availability of bio-based second generation feedstocks from the palm oil industry, agriculture (biomass), domestic and industrial waste and utilise the IB platform to promote manufacturing and commercialisation of value-added products and services. Key players globally are now exploring for cheaper and sustainable feedstocks in Malaysia

Biomaterials or Bioplastic

- Biomaterials or bioplastic is environment sustainable as it is derived from vegetable oil, starch and/or biomass. The potential rise in crude oil and natural gas prices and continuous consumer demands for more environmental sustainable products will promote change in environmental policies and legislative measures
- BioIndustrial initiatives include to facilitate industry players to adopt bioplastic technologies to produce bio-based and biodegradable materials and to support the States Government initiatives to ban fossil-based plastic bags and polystyrene

Bioenergy

Utilise IB platform to reduce up to 40% of greenhouse gasses emission and increase the share of renewable energy in the country through non-fossil based energy (i.e. Biofuels, Biogas and Biomass), Bioremediation of polluted areas, Anaerobic Digestion of waste while converting Advance Biogas into renewable energy in the form of electricity, Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG) and potentially bioplastics

Biocatalyst

Enzymatic reactions or catalyst can offer reduction of manufacturing cost, improve quality, and yield and enhance the sustainability profile of manufacturing processes. Current enzyme market leaders can still fetch good demand for enzyme applications but there is a vast scope for growth with many new types of enzymes offering new possibilities

Bioingredients

The biodiversity of enzymes and microbes are providing the food, pharmaceutical and nutraceutical industry with a wide range of functionalities. BioIndustrial initiative is to promote the use of enzymatic, microbes, supercritical fluid extraction (SFE) and fermentation methods to extract flavours, fragrance, colourant from plant, yeast, and microbe materials

LEGAL AND SECRETARIAL SERVICES



Introduction

In general, the Legal and Secretarial Division (L&S) provides legal work and advisory as well as company secretarial services to Bioeconomy Corp Group of Companies. For ease of reference, Bioeconomy Corp Group of Companies include Malaysian Bioeconomy Development Corporation Sdn Bhd, Malaysian Bio-XCell Sdn Bhd (Bio-XCell) and other subsidiary companies.

FOCUS AREAS

- Business Operations
- Transaction Matters
- Property and Commercialisation
- Corporate Secretarial
- Management of Board of Directors and its Committees
- Management of Other Committees of the Company

HIGHLIGHTS FOR YEAR 2017 AND 2016

EVENT	ACTIVITY
2017 6 October 2017 Half Day Seminar on Companies Act, 2016	Highlighted key changes to Companies Act, 2016 to the staff of Bioeconomy Corp and Bio-XCell
2016 15 November 2015 5 December 2016 8 December 2016 Awareness Session on Whistleblower (in line with Whistleblower Protection Act, 201)	Briefed the staff of Bioeconomy Corp and Bio-XCell on the provisions of the Whistleblower Act, 2010 as well as the Company's policy on Whistleblower Protection in the Workplace
8 December 2016 Awareness Session on Prevention and Eradication of Sexual Harassment in the Workplace	Briefed the staff of Bio-XCell on the company's policy on Prevention and Eradication of Sexual Harassment in the Workplace

BOARD OF DIRECTORS FOR YEAR 2017

YBHG PROFESSOR TAN SRI ZAKRI ABDUL HAMID CHAIRMAN

YBhg Professor Tan Sri Zakri is the Science Advisor to the Prime Minister of Malaysia. He is respectively the Chairman of National Science and Research Council and National Professors Council. He is the Joint-Chairman of Malaysian Industry-Government Group for High Technology (MIGHT) and Aerospace Malaysia Innovation Centre (AMIC). In January 2013, he made history by being elected as the founding Chairman of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). YBhg Professor Tan Sri Zakri is also appointed as a Joint Secretary of the Global Science and Innovation Advisory Council (GSIAC) chaired by the Prime Minister

YBRS DR MOHD SHUHAIZAM MOHD ZAIN DIRECTOR/CHIEF EXECUTIVE OFFICER

YBrs Dr Mohd Shuhaizam Mohd Zain holds the directorships for MiGHT Technology Nurturing Sdn Bhd and Yayasan Hikmat Insan Malaysia. He is also a Consultant for the Ministry of Higher Education where he has assisted AKEPT in approaching and engaging Malaysian students abroad to educate them on job opportunities in Malaysia. YBrs Dr Mohd Shuhaizam Mohd Zain is currently the Chief Executive Officer of Bioeconomy Corp.

YBHG DATUK SERI DR MOHD AZHAR HJ YAHAYA DIRECTOR

YBhg Datuk Seri Dr Mohd Azhar Hj Yahaya is currently the Secretary General of the Ministry of Science, Technology and Innovation (MOSTI). He is also a Member of the Board of SIRIM Berhad.

YBHG DATUK WAN AHMAD SHIHAB ISMAIL W ISMAIL DIRECTOR

YBhg Datuk Wan Ahmad Shihab is currently the Special Officer and Divisional Director to the Honourable Prime Minister of Malaysia. He is also a Commission Member of the Land Public Transport Commission (SPAD). YBhg Datuk Wan Ahmad Shihab sits on the Boards of Multimedia Development Corporation (MDeC), Powertek Energy Sdn Bhd and 1Malaysia Energy (Langat) Sdn Bhd. Additionally, he is a member of the Board of Trustees of Yayasan Rakyat 1Malaysia.

YBHG DATUK DR NOOR HISHAM ABDULLAH DIRECTOR

YBhg Datuk Dr Noor Hisham is currently the Director-General of the Ministry of Health. He is also the head surgeon and senior consultant for breast and endocrine surgery at Putrajaya Hospital.

BOARD OF DIRECTORS FOR YEAR 2017

YBHG DATUK SERI DR ISMAIL HJ BAKAR DIRECTOR

YBhg Datuk Seri Dr Ismail Hj Bakar is currently the Secretary General of the Ministry of Agriculture and Agro-Based Industry. He is also a Member of the Chartered Institute of Purchasing and Supply (CIPS), United Kingdom and an Adjunct Professor with the School of Engineering and Entrepreneurship, Universiti Malaysia Perlis (UNIMAP).

YBHG DATUK DR AMINUDDIN HASSIM DIRECTOR

YBhg Datuk Dr Aminuddin Hassim is currently the Director for the National Strategy Unit, Ministry of Finance. He is also a Member of the Board of Malaysian Global Innovation and Creativity Centre (MaGIC) and Universiti Utara Malaysia.

ENCIK AMIRUL FARES WAN ZAHIR DIRECTOR

Encik Amirul Fares Wan Zahir is the co-founder of Xeraya Capital Sdn Bhd and its current Chief Executive Officer. He is Co-Chairman of the Malaysian Life Sciences Capital Fund (MLSCF) and a Member of the Board of the Malaysian Technology Development Corporation Sdn Bhd as well as Spring Hill Bioventures Sdn Bhd.

YBHG DATUK DR ABD HAPIZ ABDULLAH DIRECTOR

YBhg Datuk Dr Abd Hapiz Abdullah is currently the Chairman of Chemical Industries Council of Malaysia (CICM).

SENIOR MANAGEMENT FOR YEAR 2017

YBRS DR MOHD SHUHAIZAM MOHD ZAIN CHIEF EXECUTIVE OFFICER

Dr Shuhaizam holds a Bachelor of Medicine and Surgery from the Royal College of Surgeons in Ireland, Dublin. He comes from a diverse background and possesses experience in multiple industries to manage and steer businesses to the next level, especially in the fast-changing economic environment. Dr Shuhaizam's vast experience and knowledge in the Government's policies and directions, as well as his in-depth know-how in engineering, system integration and biomedical, have led him to succeed in designing viability studies and business concepts, on top of managing and commercialising lab-based knowledge. Since 2005, he has built 10 companies in an array of industries that include agriculture, healthcare, green technology, biomass, bioenergy, clean technology, ICT, and training.

SYED AGIL SYED HASHIM CHIEF FINANCIAL OFFICER

Syed Agil is a registered Chartered Accountant and holds a degree in Accountancy and Master's degree in Business Administration specialising in Finance. Prior to his appointment to Bioeconomy Corporation, he was the Finance Manager of Multimedia Development Corp. He had the opportunity to contribute towards the development of the Multimedia Super Corridor (MSC), another government initiative in the ICT sector.

ADNAN BAHARUM

SENIOR VICE PRESIDENT, CORPORATE AFFAIRS
Adnan obtained his Bachelor degree in Marketing from University Teknologi MARA (UiTM) in 1996. He specialises in business development, market research, business intelligence and strategic management, corporate communication and branding & sales and marketing.

SHARIFAH HANIFAH SYED ABDUL AZIZ

SENIOR VICE PRESIDENT, LEGAL AND SECRETARIAL
Sharifah Hanifah holds an LLB (Hons) from the University of Wolverhampton and Certificate in Legal Practice. She was called to the Malaysian Bar in 1989 and practised law for 5 years. Sharifah Hanifah was empanelled as an Adjudicator with the Kuala Lumpur Regional Centre for Arbitration in 2014.

ZAINAL AZMAN ABU KASIM

SENIOR VICE PRESIDENT, BUSINESS DEVELOPMENT AND INVESTMENT - BIOINDUSTRIAL
Zainal Azman holds a degree in Communication and Media studies (Public Relations) from MARA University of Technology (UiTM), Shah Alam. Under his leadership, the bioindustrial initiatives in Malaysia were honoured with the World Bio Market (WBM) Industry Champion award in 2015 which recognises a company that has demonstrated significant excellence in growth of the biofuel or bio-based chemical industry.

ZURINA CHE DIR

SENIOR VICE PRESIDENT, PROGRAMMES AND DELIVERY MANAGEMENT
Zurina graduated from University of Leeds, United Kingdom holding a BA (Hons) in Accounting and Finance. Prior to her current position, Zurina was the Vice President of Business Intelligence and Vice President of Healthcare in Bioeconomy Corp, focusing on strategy development, business structuring and deals closing for foreign and local biotechnology/life science companies to operate in Malaysia. She was also one of the pioneers involved in technology licensing deals and transfer for Bioeconomy Corp's Biotechnology Acquisition Programme namely for nanotechnology and protein microarray technology acquisition programmes.

DR KODI ISPARAN KANDASAMY

SENIOR VICE PRESIDENT, BUSINESS DEVELOPMENT AND INVESTMENT - AGBIOTECH
Dr Kodiswaran is a plant biotechnologist with over 30 years of experience in the field of plant science. He is a member of the Genetic Modification Advisory Committee (GMAC), representing Bioeconomy Corp. Dr Kodiswaran is also a member of the executive editorial board for the Journal of Tropical Medicinal Plants, and a referee for several other local and overseas scientific journals, especially in the field of plant cell, tissue, and organ culture.

JAY PADASIAN

SENIOR VICE PRESIDENT, BUSINESS DEVELOPMENT AND INVESTMENT - HEALTHCARE BIO
Jay is a registered pharmacist, originally trained in the United Kingdom before returning to Malaysia. He is a member of the National Key Economic Area (NKEA) Healthcare Steering Committee as well as the Bioeconomy Transformation Programme Steering Committee. Jay is also a Malaysian Government Cleared Advisor for the TPPA and a member of the Board of Studies for Universiti Sains Malaysia's M.Sc BioMedicine course.

DR HARCHARAN SINGH

SENIOR VICE PRESIDENT, INNOVATION ENABLEMENT
Dr Harcharan Singh graduated from the University of New South Wales, Australia with a doctoral degree majoring in Supercritical Fluid Extraction of natural products.

NORA MOHAMED

SENIOR VICE PRESIDENT, BUSINESS ADVISORY AND DEVELOPMENT
Nora graduated from Birmingham City University, United Kingdom in Accountancy. She has played a key role in building the local SMEs in the biotechnology space in Malaysia. She has facilitated the applications and conferment of BioNexus Status to qualified companies and extensively involved in the management of Government's fund under various schemes to develop businesses in the supported area of healthcare, agriculture and bioindustrial.

BRANDING AND COMMUNICATIONS



Introduction

The overall approach of the department is to strongly support the global expansion objectives of Phase III, the BTP and its initiatives as well as the eighth thrust of the NBP which advocates global branding as a strategic development for the bio-based industry.

FOCUS AREAS

The initiatives taken were based on the following strategies:

- 01**
To enhance the positive image of Bioeconomy Corp as the economic development agency of the bio-based industry in Malaysia through success stories
- 02**
To build a strong brand recognition for Bioeconomy Corp locally and internationally
- 03**
To strengthen internal communications through effective engagement with relevant stakeholders
- 04**
To strengthen external communications through effective engagement with relevant stakeholders
- 05**
To strengthen branding and relationship with stakeholders through digital and social media

HIGHLIGHTS FOR YEAR 2017 AND 2016

ACTIVITY	OUTCOME
Featured CEO of Bioeconomy Corp in two #BioChat sessions	<ul style="list-style-type: none"> • Biotechnology: Fiction and Reality, Bioeconomy Day in Kuching, Sarawak • The Future of Bio Industry: Challenges, Opportunities and Roles of University, Universiti Malaysia Terengganu
Featured CEO of Bioeconomy Corp and MOSTI Minister in monthly Mingguan Malaysia newspaper columns from May to December 2016	A total of seven columns featured, worth a media value of RM471,007.64
Managed meetings and engagement with CEO/ACEO and media via press conferences	A total of 13 press conferences organised, worth a media value of RM8,483,829.36
Executed content development to provide support and assistance to respective divisions' programmes and initiatives via preparation of speeches, press release, press conference talking points	Executed content development for a total of 15 events, worth a media value of RM8,635,050.92
Executed one mini-documentary episode	BIOGraphies Ep. 1: Sowing the Seeds of Success
Employed effective communication way/tools to support core business areas of Bioeconomy Corp	<ul style="list-style-type: none"> • Above-the-Line advertising engagement ie design of marketing kits, promotional materials and media announcements on rebranding. Ensured consistency on the use of logo by internal and external stakeholders • Publication of Bioeconomy Corp's news and projects via the corporate social media platform • Up-to-date information available on corporate website and social media

MEDIA ACHIEVEMENTS FOR YEAR 2016

MEDIA VALUE **RM14.8 million**

MOVING FORWARD - PLANS AND INITIATIVES

PLANS

- Generate positive media value through promotions on targeted media platforms
- Build a strong brand recognition for Bioeconomy Corp by measuring quality of support
- Establish strong engagement with internal stakeholders through execution of Bioeconomy Corp
- Establish strong engagement with external stakeholders through execution of media and communications activities
- Strengthen branding and relationship with stakeholders through digital and social media platforms

INITIATIVES

- Feature Bioeconomy Corp in television programmes through discussions with bio-based industry players, and showcase Bioeconomy Corp's programmes and initiatives
- Highlight Bioeconomy Corp's initiatives and achievements through newspaper articles, columns, and advertorials
- Monthly updates to stakeholders through the Bioeconomy Bulletin via email and social media platforms
- Above-the-line advertising - buntings, electronic billboards, marketing collaterals and marketing kit, and media announcements
- Ensure visibility for Bioeconomy Corp at various exhibitions and conferences through media interviews
- Enhance public relations with media through media engagement to increase Bioeconomy Corp's publicity
- Content Development to provide support and assistance to respective divisions' programmes and initiatives
- Media familiarisation tour and media appreciation activities
- Maintenance of corporate website to increase number of views/hits
- Execution of social media engagements:
 - a. Contests via social media platforms
 - b. Series of mini documentaries to engage with the public i.e. BIOGraphies
 - c. Short discussions to be featured online by engaging with BioNexus Status companies or bio-based industry players i.e. #BioChat

KEY EVENTS AND MILESTONES IN 2016 AND 2017

2016

8 JANUARY 2016

BIOECONOMY DAY
PULLMAN HOTEL, KUCHING, SARAWAK



5 APRIL 2016

MAJLIS PENYERAHAN PROJEK MOSTI SOCIAL INNOVATION (MSI) 15035
MARDI KUALA LINGGI, MELAKA

Officiated by MOSTI Deputy Minister YB Datuk Wira Dr Abu Bakar Mohamad Diah, the ceremony signifies the handing over of bee boxes to the members of Persatuan Penternak Madu Lebah Komersil Kuala Linggi and the completion of the BCDP Bee Farming Project.

11-12 APRIL 2016

3RD PLANT GENOMICS CONGRESS ASIA
RENNAISSANCE HOTEL, KUALA LUMPUR

Organised by Global Engage in partnership with BiotechCorp and MOSTI, the congress was a regional platform for scientists and researchers to network, exchange ideas and address issues pertaining to plant genomics.



31 MAY - 2 JUNE 2016

BIOMALAYSIA AND ASIA PACIFIC BIOECONOMY 2016
KUALA LUMPUR CONVENTION CENTRE



The ceremony marks the first collaboration between the two organisations in bioeconomy, and Bioeconomy Corp's first major participation and foray in the herbal, cosmetics and perfumery sectors.

30 JULY 2016

LAUNCH OF BIOSHOPPE IN KEDAH
UTC KEDAH, ALOR SETAR KEDAH

Officiated by YABhg Datin Seri Hizam binti Awang Ahmad, wife to Chief Minister of Kedah, BioShoppe was launched to expand the market access of BioNexus products and to encourage local bio-based entrepreneurs to participate in the BioNexus Status programme.



The acclaimed event, themed 'Value Adding Our Economy through Bio-based Technologies', showcased latest technologies, innovation and products from major local, regional and international biotechnology companies.

13 JUNE 2016

SIGNING AND EXCHANGE OF COLLABORATION PROPOSAL BETWEEN BIOECONOMY CORPORATION AND COSMETIC VALLEY
BIOECONOMY CORP'S OFFICE, MENARA ATLAN KUALA LUMPUR

The event is to signify the collaboration between Bioeconomy Corp and BIMP EAGA Bioeconomy Development Holdings Sdn Bhd (BIMP EAGA Bioeconomy) to spur the development of the bio-based industry in Sabah through cultivating the state's honey industry under BCDP.

8-9 DECEMBER 2016 MALAYSIA COMMERCIALISATION YEAR SUMMIT (MCY SUMMIT) 2016 & GLOBAL ENTREPRENEURSHIP COMMUNITY (GECOMMUNITY) 2016
KUALA LUMPUR CONVENTION CENTRE



30 NOVEMBER 2016 LAUNCH OF BIOECONOMY COMMUNITY DEVELOPMENT PROGRAM (BCDP) IN SABAH AND SIGNING CEREMONY AND LAUNCH OF HONEY BEE PROJECT IN SABAH
GRAND MILLENNIUM HOTEL, KUALA LUMPUR



MCY 2016 was co-organised by MOF and MOSTI and conducted as part of the government's National Blue Ocean Strategy. As part of GEC 2016, Bioeconomy Corp strengthened and nurtured entrepreneurs for better outcome of new market-driven innovations through a cluster lab.

14 JANUARY 2017

LAUNCH OF BIOTECHNOLOGY COMMERCIALISATION FUND 2.0 AT KARNIVAL KEWANGAN
PUTRA WORLD TRADE CENTRE (PWTC) KUALA LUMPUR

Officiated by MOSTI Minister YB Datuk Seri Panglima Wilfred Madius Tangau during Karnival Kewangan, the event was aimed to assist bio-based companies in expanding their business growth.

14 MARCH 2017

BIOECONOMY DAY
INTERCONTINENTAL KUALA LUMPUR



Officiated by MOSTI Deputy Minister, YB Datuk Wira Dr Abu Bakar Mohamad Diah, this event raised awareness for Bioeconomy Corp's programmes to spur commercialisation of R&D and promote national bioeconomy growth. It was attended by ministry agencies, bioeconomy stakeholders, industry players and researchers.



9 MAY 2017

BIO BORNEO 2017
IMPERIAL HOTEL KUCHING, SARAWAK

The ceremony was officiated by MOSTI Minister YB Datuk Seri Panglima Wilfred Madius Tangau in which the ten members of Persatuan Peniaga Kecil Kampung Sagil, Tangkak, Johor received training and fund to do Kacip Fatimah Farming and vegetative propagation via cutting method.



19 MAY 2017

MAJLIS PENYERAHAN PROJEK MOSTI SOCIAL INNOVATION (MSI) 16032
KG SAGIL PARIT 2, TANGKAK, JOHOR

21 MAY 2017

MAJLIS PENYERAHAN PROJEK MOSTI SOCIAL INNOVATION (MSI) 16031
KG KONDOK, NILAI, NEGERI SEMBILAN

The handing over ceremony was officiated by Secretary General of MOSTI, Datuk Seri Dr Mohd Azhar bin Haji Yahaya, in which the member of Koperasi Waris Jati Kondok Berhad were trained to cultivate oyster mushroom for commercialisation.

25 MAY 2017

MAJLIS PENYERAHAN PROJEK MOSTI SOCIAL INNOVATION (MSI) 16030
PANTAI TANJUNG RHU, LANGKAWI, KEDAH



The handing ceremony of the BCDP project was officiated by Deputy Secretary General of MOSTI, Prof Madya Dr Ramzah Dambul, in which 20 members of the Persatuan Pengusaha Rumpai Laut Langkawi now have the skills to farm, maintain, and increase seaweed production for commercialisation.

10 JUNE - 10 SEPTEMBER 2017

EXPO 2017 ASTANA
ASTANA KAZAKHSTAN

Themed "Green Innovation, Powering your Future", the exhibition focused on sustainability of renewable biological resources and conversion into value added products in the food, bio-chemicals, energy and healthcare wellness industries, via innovative and efficient technologies.

30 NOVEMBER 2016 LAUNCH OF BIOECONOMY COMMUNITY DEVELOPMENT PROGRAM (BCDP) IN SABAH AND SIGNING CEREMONY AND LAUNCH OF HONEY BEE PROJECT IN SABAH
GRAND MILLENNIUM HOTEL, KUALA LUMPUR

The event is to signify the collaboration between Bioeconomy Corp and BIMP EAGA Bioeconomy Development Holdings Sdn Bhd (BIMP EAGA Bioeconomy) to spur the development of the bio-based industry in Sabah through cultivating the state's honey industry under BCDP.

8-9 DECEMBER 2016 MALAYSIA COMMERCIALISATION YEAR SUMMIT (MCY SUMMIT) 2016 & GLOBAL ENTREPRENEURSHIP COMMUNITY (GECOMMUNITY) 2016
KUALA LUMPUR CONVENTION CENTRE



30 JULY 2017

YBM MOSTI BIO-XCELL SITE VISIT
MALAYSIAN BIO-XCELL SDN BHD, ISKANDAR PUTERI, JOHOR



The event showcased the progress of Bio-XCell Malaysia and landscape of the bio-based industry in Johor. In conjunction with the site visit, Verdezyne and Bio-XCell Malaysia organised a groundbreaking ceremony for the VerdePalm plant, Verdezyne's first commercial-scale renewable chemicals manufacturing facility.



12-16 OCTOBER 2017

NATIONAL INNOVATION AND CREATIVE ECONOMY 2017 (NICE '17)
TECHNOLOGY PARK MALAYSIA

Bioeconomy Corp provided holistic solutions to the wellness industry via community outreach by BCDP; public awareness, market access and retail experience via BioShoppe; creation of talents and career opportunities via Bioeconomy Academy; commercialisation via BNP; and growth opportunities in bio-based sectors via Bio-XCell Malaysia.

06

MOVING FORWARD

Challenges are imminent as they hold the key to unlock opportunities that were nothing to begin with. As a fast growing nation, we are faced with challenges from all aspects of life. Technology, in the past, was the supposed saviour. But instant gratification has led to the world economy demanding more in an almost instantaneous manner. This is where we begin to question, what if? What if we boost our current situation with a tinge of science? What if we converge technologies and create visionary outcomes? With abundant and diversified natural resources, Malaysia has laid its plans to becoming one of the nations that implements a holistic biotechnology national policy. This is to ensure that Malaysia is set to effectively contribute to the betterment of the society and economy through its major three sectors: agriculture, industrial and healthcare.

As the business ecosystem has eventually interallied with biotechnology, bio-based industries are gaining momentum. With Bioeconomy Corp leading the way, the organisation is ever ready to nurture, strengthen and develop bio-based companies in Malaysia. This in turn will create abundance spill over opportunities in the country's bioeconomy. At Bioeconomy Corp, we are working to ensure efforts are channelled into securing quality investment especially those that are knowledge and capital intensive and are able to improve the country's socio-economic well-being. With the many possibilities of biotechnology, we aspire to positively impact these sectors:

SOCIO-ECONOMIC IMPACT

Strategic investments are effective instruments to increase capital influx, disseminate new and innovative technologies, transferring technical expertise, skills, as well as creating employment.

GOING GLOBAL

Venturing beyond the local market is an essential step for our local bio-based industry players in order to attain global exposure, accreditation and penetrate the international market; hence, aspiring industry players can rely on Bioeconomy Corp for support and facilitation.

HUMAN CAPITAL DEVELOPMENT

To address the gap between supply and demand, and to match graduate skills with market needs, Bioeconomy Corp has put in place entrepreneurial initiatives as well as higher management proficiency in biotechnology. The goal is to empower our biotech workforce, hence, reducing our dependency on foreign experts.

COMPLETE BIOECOSYSTEM

Through the BNP, and various industry-academia linkages, we are able to link industry to research institutions, and universities for research and development support and collaboration.

COMMUNITY DEVELOPMENT

The BCDP is characterised through its high-impact, low cost, rapid execution and sustainability component and is now part of the NBOS agenda. Initiatives undertaken has enabled the creation of several flagship companies to venture into global market while helping to uplift B40 households.

Charting Beyond - We are nearing the future faster than we can respond to it as the distant future is approaching right around the corner. Soon, we would need to chart the future based on the impossible and with youthful visionaries in bioeconomy, Malaysia will be ready or perhaps lead the way.





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