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10 YEAR MILESTONE 2006



BIOTECHCORP RESOURCE CENTRE

BiotechCorp Resource Centre was established and located at Level 21, Menara Atlan, Jalan Ampang. It functions as the information network for the biotechnology industry in Malaysia

BIOINDUSTRIAL

Green & Smart Sdn Bhd, builds technology to obtain biogas and convert into renewable energy, received BioNexus status under BioIndustrial focus area

AWARDED WITH ISO9001:2008

With the certification scope Management of BioNexus Status Application, BioNexus Monitoring Processes, Commercialisation Grants Applications & Disbursement Processes and Technology Acquisition Process



2009

BIOINDUSTRIAL

Pure Circle Sdn Bhd, world leading provider of Stevia food and beverage sweetener, received BioNexus status under BioIndustrial focus area

2007

INDUSTRY TALENT DEVELOPMENT & EDUCATIONAL SERVICES (ITDES)

Biotechnology Executive Special Training (BeST) Programme was introduced to inspire graduates to pursue the promising careers in biotechnology industry



BIONEXUS PARTNERS (BNP)

Launch of BNP Centres of Excellence for Natural Product Development in FRIM by Y.B. Datuk Seri Panglima Maximus Ongkili, former Minister of MOSTI

2010



2011

BIOMEDICAL

KLSMC Stem Cells Sdn Bhd was established as a stem cells research and development centre, received BioNexus status under the BioMedical focus area

BIONEXUS PARTNERS (BNP)

Launch of the BNP Centre of Excellence for Pharmacogenomics Research in UiTM by Y.Bhg.Tan Sri Dato' Muhyiddin Yassin, former Deputy Prime Minister of Malaysia

BIONEXUS DEVELOPMENT

Regulatory Advisory & Facilitation

BiotechCorp published a regulatory guidebook entitled EU and US Pharmaceutical Regulations: A Guide for Malaysian Companies

INDUSTRY TALENT DEVELOPMENT & EDUCATIONAL SERVICES (ITDES)

Introduced Intellectual Property (IP) Module at AIMST University

VERDEZYNE SDN BHD

Sime Darby invests RM96 million in Verdezyne and the signing ceremony witnessed by Prime Minister Y.A.B. Datuk Seri Najib Tun Razak and US President Barack Obama. An initiative to build and operate the world's 1st bio-based Daodecanedioic Acid plant in Malaysia

LAUNCH OF BIOECONOMY TRANSFORMATION PROGRAMME

1st country in ASEAN & 2nd in Asia after China

2012

BIOMEDICAL

AJ Biologics Sdn Bhd is an establishment of first vaccine manufacturing facility in Malaysia, received BioNexus status under the BioMedical focus area

BIONEXUS DEVELOPMENT

BioShoppe

BioShoppe made its first appearance during BioMalaysia & Bioeconomy Asia Pacific 2013 held at Persada Johor International Convention Centre, Johor

BIONEXUS

PARTNERS (BNP)

BNP Centre of Excellence Award for BioProduct Development awarded to Universiti Teknologi Malaysia by Y.B. Datuk Dr Abu Bakar Mohamad Diah

BIONEXUS

DEVELOPMENT

Regulatory Advisory & Facilitation

Acceptance of Malaysia as Non - OECD Member Adhering to the Mutual Acceptance of Data for Good Laboratory Practice (GLP)

GENTING-ELEVANCE

Genting and Elevance enter into a new biorefinery collaboration to build a 240,000 MT plant to produce high performance olefins and specialty chemicals from palm oil

2014

2013

LAUNCH OF BIOTECHCORP INTERNATIONAL IN SAN FRANCISCO

AWARDED WORLD BIO MARKETS (WBM) BUSINESS AWARDS: WBM INDUSTRY CHAMPION

BiotechCorp joins past winner Coca Cola in receiving this prestigious award

2015

CJ-ARKEMA

Launch of world's 1st integrated Bio-methionine & Thiochemicals plant in Kertih Biopolymer Park by HRH Sultan of Terengganu

BIOECONOMY COMMUNITY DEVELOPMENT PROGRAMME (BCDP)

BCDP was included as one of the National Blue Ocean Strategy (NBOS) initiatives

INDUSTRY TALENT DEVELOPMENT & EDUCATIONAL SERVICES (ITDES)

Launched and featured Studio 1310 (BIO) during BioCareer 2015. ITDES also launched the BioKerjaya Portal for job seekers in the industry



FACTS AND FIGURES

BIONEXUS

BIONEXUS STATUS COMPANIES

Industry Sector	YEAR										Total (RM)
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Number of Companies Approved	5	33	45	49	35	24	13	17	20	33	274
Agriculture	3	18	20	25	20	14	9	14	13	22	158
Healthcare	1	14	16	15	7	3	2	3	4	8	73
Industrial	1	1	9	9	8	7	2	0	3	3	43
Approved Investment (RM)	376.2M	556.2 M	339.5 M	102.1 M	424.5 M	214.0 M	851.5 M	697.7 M	1,286.2 M	1,870.7 M	6,718.6 M
Number of Jobs Planned	184	905	1,189	862	1,999	631	504	1,742	991	1,971	10,978
Number of Knowledge Workers Planned	98	886	743	402	371	140	133	281	206	544	3,804

REALISED INVESTMENT BY INDUSTRY

Industry Sector	Total 2006 (RM' Million)	Total 2007 (RM' Million)	Total 2008 (RM' Million)	Total 2009 (RM' Million)	Total 2010 (RM' Million)	Total 2011 (RM' Million)	Total 2012 (RM' Million)	Total 2013 (RM' Million)	Total 2014 (RM' Million)	Total 2015 (RM' Million)	Total (RM' Million)
AgBiotech	-	116.9	121.6	303.4	172.7	175.4	138.9	84.5	233.3	120.6	1,467.3
BioMedical	-	200.6	78.5	8.0	91.9	68.3	77.1	41.6	94.9	32.4	693.3
BioIndustrial	-	131.3	46.9	302.2	129.7	234.2	92.2	14.1	68.5	53.5	1,072.6
Total	-	448.8	247.0	613.6	394.3	477.9	308.2	140.2	396.7	206.5	3,233.2

REVENUE BY INDUSTRY

Industry Sector	Total 2006 (RM' Million)	Total 2007 (RM' Million)	Total 2008 (RM' Million)	Total 2009 (RM' Million)	Total 2010 (RM' Million)	Total 2011 (RM' Million)	Total 2012 (RM' Million)	Total 2013 (RM' Million)	Total 2014 (RM' Million)	Total 2015 (RM' Million)
AgBiotech	-	7.8	160.2	160.6	217.9	280.6	324.4	342.2	352.0	360.6
BioMedical	-	36.4	89.6	119.0	133.7	176.7	218.9	275.4	267.3	266.8
BioIndustrial	-	35.5	133.0	257.0	99.0	263.8	476.0	551.7	668.3	903.9
Total	-	79.7	382.8	536.6	450.6	721.1	1,019.3	1,169.3	1,287.6	1,531.3

R&D EXPENSES BY INDUSTRY

Industry Sector	Total 2006 (RM' Million)	Total 2007 (RM' Million)	Total 2008 (RM' Million)	Total 2009 (RM' Million)	Total 2010 (RM' Million)	Total 2011 (RM' Million)	Total 2012 (RM' Million)	Total 2013 (RM' Million)	Total 2014 (RM' Million)	Total 2015 (RM' Million)
AgBiotech	-	1.5	5.5	17.8	31.5	24.5	35.9	46.2	47.3	36.2
BioMedical	-	2.6	9.4	19.6	27.9	42.8	54.1	45.7	48.1	42.1
BioIndustrial	-	0.7	5.5	6.1	4.7	11.6	7.0	7.6	10.4	12.6
Total	-	4.8	20.4	43.5	64.1	78.9	97.0	99.5	105.8	90.9

TOTAL EMPLOYEE BY INDUSTRY

Industry Sector	Total 2006 (Employees)	Total 2007 (Employees)	Total 2008 (Employees)	Total 2009 (Employees)	Total 2010 (Employees)	Total 2011 (Employees)	Total 2012 (Employees)	Total 2013 (Employees)	Total 2014 (Employees)	Total 2015 (Employees)
AgBiotech	-	404	677	893	1,177	1,292	1,416	1,485	1,471	1,561
BioMedical	-	335	598	805	825	903	898	868	888	929
BioIndustrial	-	217	360	534	539	629	643	653	668	700
Total	-	956	1,635	2,232	2,541	2,824	2,957	3,006	3,027	3,190

KNOWLEDGE WORKERS BY INDUSTRY

Industry Sector	Total 2006 (Employees)	Total 2007 (Employees)	Total 2008 (Employees)	Total 2009 (Employees)	Total 2010 (Employees)	Total 2011 (Employees)	Total 2012 (Employees)	Total 2013 (Employees)	Total 2014 (Employees)	Total 2015 (Employees)
AgBiotech	-	138	299	350	502	531	577	619	528	667
BioMedical	-	184	359	475	482	903	898	868	533	642
BioIndustrial	-	62	107	159	181	216	245	275	284	305
Total	-	384	765	984	1,165	1,258	1,370	1,434	1,345	1,614

NON BIONEXUS

TOTAL APPROVED INVESTMENTS FOR NON BIONEXUS COMPANIES FROM 2010 - 2015

Industry Sector	Total 2010 (RM' Million)	Total 2011 (RM' Million)	Total 2012 (RM' Million)	Total 2013 (RM' Million)	Total 2014 (RM' Million)	Total 2015 (RM' Million)
AgBiotech	N/A	N/A	N/A	N/A	N/A	203.
BioMedical	347.6	2,276.5	463.9	849.7	1,572.1	414.6
BioIndustrial	31.8	0.0	0.0	613.7	2,382.0	1,806.6
Total	379.4	2,276.5	463.9	1,463.4	3,954.1	2,424.9

TOTAL APPROVED INVESTMENTS FOR HIGH IMPACT PROJECTS FROM 2010 - 2013

Industry Sector	Total 2010 (RM' Million)	Total 2011 (RM' Million)	Total 2012 (RM' Million)	Total 2013 (RM' Million)
BioMedical	1,030.0	N/A	N/A	N/A
BioIndustrial	N/A	1,984.0	1,960.0	877.0
Total	1,030.0	1,984.0	1,960.0	877.0

TOTAL REALISED INVESTMENTS FOR NON BIONEXUS COMPANIES FROM 2009 - 2015

Industry Sector	Total 2009 (RM' Million)	Total 2010 (RM' Million)	Total 2011 (RM' Million)	Total 2012 (RM' Million)	Total 2013 (RM' Million)	Total 2014 (RM' Million)	Total 2015 (RM' Million)
AgBiotech	N/A	16.2	18.7	5.4	5.3	N/A	N/A
BioMedical	0.1	323.4	289.4	87.6	572.0	70.0	238.9
BioIndustrial	N/A	619.0	N/A	61.0	34.4	216.0	N/A
Total	0.1	958.6	308.1	154.0	611.7	286.0	238.9

TOTAL REALISED INVESTMENTS FOR HIGH IMPACT PROJECTS FROM 2011 - 2015

Industry Sector	Total 2011 (RM' Million)	Total 2012 (RM' Million)	Total 2013 (RM' Million)	Total 2014 (RM' Million)	Total 2015 (RM' Million)
BioMedical	59.0	410.4	N/A	193.6	240.6
BioIndustrial	270.0	514.0	277.8	491.7	439.2
Total	329.0	924.4	277.8	685.3	679.8

TOTAL REVENUE FOR NON BIONEXUS COMPANIES FROM 2009 - 2015

Industry Sector	Total 2009 (RM' Million)	Total 2010 (RM' Million)	Total 2011 (RM' Million)	Total 2012 (RM' Million)	Total 2013 (RM' Million)	Total 2014 (RM' Million)	Total 2015 (RM' Million)
AgBiotech	N/A	1.3	1.4	14.9	0.9	N/A	128.2
BioMedical	0.5	200.8	306.5	267.1	342.8	223.7	145.2
BioIndustrial	N/A	38.1	42.1	59.5	11.6	N/A	N/A
Total	0.5	240.2	350.0	341.5	355.3	223.7	273.4

TOTAL REVENUE FOR HIGH IMPACT PROJECTS

Industry Sector	2015 (RM' Million)
BioIndustrial	975.6
Total	975.6

01

CHARTING PATHWAYS FOR **GLOBAL GROWTH**

"Growth is never by mere chance; it is the result of forces working together."
- James Cash Penney, Founder of JCPenney



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FOREWORD BY
CHAIRMAN

"There is a need to refine and adapt our strategies to overcome global economic challenges in the next few years."



Y.Bhg. Professor Tan Sri Zakri Abdul Hamid
Chairman

2015 marked the 10th year anniversary for Malaysian Biotechnology Corporation (BiotechCorp), in which we have facilitated the growth of BioNexus Status companies, attracted multi-million investments from global biotechnology giants and spearheaded the implementation of bioeconomy initiatives. BiotechCorp is proud of its achievements and the contributions it has made to the rapid growth of the bio-based industry in Malaysia.

These efforts have accelerated the achievement of targets under the National Biotechnology Policy (NBP). During the 'Science to Business' of Phase 2 under the NBP, we have achieved over RM11 billion of realised investments, created over 72,000 jobs and generated more than RM37 billion in revenues.

2015 showcased a series of accelerated commercialisation in biotechnology as this was the goal of NBP's Phase 2, Science to Business. With 2015 as the final year of Phase 2, I am pleased to note that many biotechnology related organisations have reinforced their efforts in commercialising research, hence materialising into usable products and services. The revenues generated have been significant in stimulating the country's economic growth, as proven by the BioNexus companies with a revenue increment of 50% from 2012 to 2015 (RM1.02 billion in 2012 compared to RM1.53 billion in 2015).

Unlocking bio-based global business requires commercialisation and market penetration. As such, I applaud the success shown by the Government and BiotechCorp in establishing strong links with several international bioeconomy players in 2015. Collaborations with Dechema Gesellschaft für Chemische Technik und Biotechnologie e.V. from Germany, Association for the Development of Biotechnology (Assobiotech) from Italy, and Ghent Bio-Economy Valley (GBEV) from Belgium helped to advance the development of bio-based technologies and innovations, promote knowledge sharing, as well as support companies and research institutes in the development of commercial bio-based applications. These international cooperations will cement Malaysia's role in the global bioeconomy scene, while enhancing our competitiveness in the bio-based industry.

These accomplishments contribute towards greater economic growth for Malaysia while simultaneously promoting social inclusiveness for the rakyat. As such, the rakyat greatly benefits from the high impact projects under Bioeconomy Transformation Programme (BTP) and Bioeconomy Community Development Programme (BCDP).

The BTP and BCDP are aligned with the overall goals of the Malaysian Government's Economic Transformation Programme, which seeks to lift Malaysia out of the middle income status into high income by the year 2020.

As of December 2015, the number of BTP Trigger Projects has almost doubled to 48 from 25 the previous year. Through its inclusion in the National Blue Ocean Strategy (NBOS) initiative on 27 April 2015, 23 BCDP projects are currently at various stages of implementation in Johor, Melaka, Terengganu and Penang, involving more than 300 farmers. This reflects the growing interest in Malaysia's

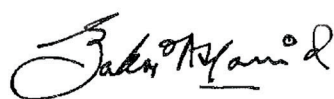
bioeconomy. Besides attracting substantial investments, the adoption of new technologies in these projects create job opportunities that elevate the skill sets of all workers involved.

It is my hope to see the prosperity of the BTP as well as BCDP and their positive effects on the overall societal well-being of the rakyat. In line with one of the 11th Malaysia Plan focus areas and Malaysia's Commercialisation Year 2016, BiotechCorp desires to push commercialisation of homegrown bio-based R&D and innovations to improve the B40 households and communities, ultimately propelling the country's bioeconomy.

With the NBP's next phase of Global Business commencing in 2016, there is a need to refine and adapt our strategies to overcome the global economic challenges in the next few years. Moreover, BioNexus companies need to stay competitive at a global level to ensure global market penetration, while Malaysia must continue to provide global players with a dynamic and conducive environment to do bio-based businesses.

This is crucial if we want to realise our vision of transforming Malaysia into a global bioeconomy capital that is influential in promoting a knowledge-based economy through the establishment of a sustainable bio-based ecosystem. We also need to focus our efforts in realising the bio-based investments which had been secured throughout the years, to ensure that the industry continues to prosper. All stakeholders within the industry in Malaysia must continue to be committed towards refining and strengthening the industry, as we take it through the next phase of development.

We have had 10 great years in shaping the Malaysian biotechnology and bio-based industries. I must express my sincere gratitude to the Malaysian Government, my fellow board of directors at BiotechCorp for the efforts contributed to catalyse the advancements in this industry, and to the management and team, for your hard work in ensuring the NBP and BTP remain on track and is headed towards enriching everyone who benefits from this industry. Finally, I would like to express my heartfelt appreciation to all industry players for their unwavering support as we take the Malaysian bio-based industry to the next level of advancement.



Y.Bhg. Professor Tan Sri Zakri Abdul Hamid
Chairman

FOREWORD BY
CEO



Y.Bhg. Dato' Dr. Mohd Nazlee Kamal
Chief Executive Officer

“2015 displayed admirable accomplishments that promote rapid development and deliver values to various stakeholders.”

2005 was the year of National Biotechnology Policy (NBP) and since then we have outgrown all challenges present our way. As the country's bio-based economic developer, BiotechCorp has forged vital connections with strategic partners and industry networks to build the country's solid yet renewable bioecosystem.

As BiotechCorp entered its tenth year in 2015, the Malaysian bio-based industry continued to thrive in terms of investment and momentum of projects. With the NBP officially moving into its third and final phase of 'Global Business' next year, BiotechCorp's operations in 2015 were in place to transform Malaysia into a global player in the bio-based industry. We intensified our efforts in championing the bio-based SMEs to greater heights with various programmes held to facilitate SMEs in accelerating commercialisation of their technologies and innovations to achieve global market success.

BiotechCorp recognises the importance of global networking to develop a successful framework for bioeconomy growth. With this as a priority, we continued to engage in several key local and international initiatives to enhance the bio-based sector's value propositions and attract various investments.

Highlights of 2015

2015 displayed admirable accomplishments that promote rapid development and deliver values to various stakeholders. Agriculture, healthcare and industrial biotechnology continue to be the key focus areas in advancing the industry and shaping a robust Malaysian bioeconomy through developmental initiatives and acquiring investments.



“As the Global Business phase of the NBP draws closer, Malaysia is poised to become a world class bio-based hub through identified key strategies that would address the challenges and opportunities.”

International Accolades

On March 2 2015, BiotechCorp received the World Bio Markets (WBM) Business Award for the Industry Champion category during the 10th annual World Bio Markets conference ceremony in Amsterdam. The award recognised a company that demonstrated significant excellence in bio-based chemical industries.

The same month saw BiotechCorp receiving the “Excellence in Biotechnology Sector” award during the fifth Global Leadership Awards on 5 March 2015. Championing the corporate business and community development as well as for the continued efforts and contributions towards steering the bio-based sector to greater heights has garnered BiotechCorp such prestigious decree.

These awards acknowledge BiotechCorp’s important role in leading the Bioeconomy Malaysia initiative and further energises the organisation into propelling Malaysia’s bio-based industry to the next level.

World’s First Integrated Bio-based Plant in Terengganu

BiotechCorp along with East Coast Economic Region Development Council (ECERDC) jointly promoted the official opening of the world’s first integrated bio-methionine and thiochemicals facility owned by Korea’s CJ CheilJedang (CJ) and France’s Arkema in Kertih Biopolymer Park (KBP), Terengganu. For the first time, the global feed additives industry will see the production of bio-methionine through application of biotechnology and applied chemistry. The new RM2.1 billion integrated manufacturing facility in KBP is one of the largest

investments in Malaysia’s biotechnology sector and over a decade, it has a potential total investment of RM3 billion.

Global Partnering & Visibility

During the Expo Milano 2015, the inaugural Malaysia Bioeconomy Partnering Day was held on 9 June 2015, in which BiotechCorp and the Italian Association for the Development of Biotechnology (AssoBiotec) exchanged a collaboration proposal to foster greater cooperation between Malaysia and Italy in the areas of bio-based investments and human capital development. BiotechCorp also launched 16 new herbal-based products under BioShoppe to enhance market access and international visibility for local bio-based products. Besides elevating the status of BioNexus companies, the launch generated interest from retailers, distributors and businesses from the European market.

BiotechCorp’s Global Office in San Francisco – BiotechCorp International Inc. (BII)

BiotechCorp’s first global office based in the San Francisco bay area was officially launched on 12 June 2015. Focused on building partnerships and drawing in investments from major international biotechnology players, the office serves as a channel for international engagements and plays an instrumental role in achieving the Global Business targets of the NBP such as supporting and building market access opportunities for Malaysian biotechnology players. As San Francisco is known for its biotechnological and innovative advances, BiotechCorp and the Malaysian biotechnology industry can further establish alliance with their U.S counterparts.

ASEAN Bioeconomy

With Malaysia as Chair of ASEAN Summit 2015, BiotechCorp and the Ministry of Science, Technology & Innovation (MOSTI) played host to BioMalaysia & ASEAN Bioeconomy Conference & Exhibition 2015. With 600 million-strong ASEAN community and richly diversified resources, ASEAN is bound to need a bioeconomy initiative of its own in order to propel the ASEAN nation to greater heights. The conference fostered regional bioeconomy network and developmental challenges were addressed by leveraging on the strengths of each ASEAN member. The ASEAN bioeconomy platform managed to boost interest in regional stakeholders for a shared bioeconomy vision.

Boosting BioNexus Companies

In 2015, 267 companies were awarded the BioNexus status and generated revenues amounting to RM1.5 billion, a 19% increase from RM1.2 billion in 2014 as well as approved investments worth over RM6 billion, a 35% improvement compared to 2014 (RM4.8 billion). By 2020, we wish to create 20 global BioNexus SME companies by implementing the BioNext Programme, a collaborative effort by BiotechCorp and SME Corporation Malaysia. We hope that through strategic programmes focusing on financing, market access and human capital development, bio-based SMEs are able to escalate through the value chain. The 20 selected BioNexus companies were given the proper guidance, exposure and assistance to widen their market reach into other countries and regions.

Looking Ahead

As the Global Business phase of the NBP draws closer, Malaysia is poised to become a world class bio-based hub through identified key strategies that would address the challenges and opportunities.

One such strategy is the need to create global market access for BioNexus companies. Entrepreneurship programmes such as BioNext, BioNexus Go Global and BioShoppe as well as BiotechCorp's San Francisco office will be able to fulfill this goal. Another crucial strategy is to bolster the bioeconomy value chain by increasing gross national income, creating employment opportunities and drawing investments. This is enabled through the BTP Trigger Projects and Bioeconomy Community Development Programme while engaging with organisations such as the National Science Council, National Bioeconomy Council and creating awareness through events such as GSIAC, Bio-IAP, BioMalaysia, ASEAN Bioeconomy and Bioeconomy Day.

The bio-based industry is in need of professionals and companies hence, another definitive strategy is through education and bio-based start-ups. Such strategy will be realised through enhancing the role of Bioeconomy Academy, MBA Bioeconomy and BioCareer for hiring knowledge workers and complement BioNext and QB3 BioEntrepreneurship programme to boost bio-based start-ups.

To this, I would like to congratulate BiotechCorp as we have advanced in leaps and bounds since our beginning in 2005. Presently, the organisation is intensifying and fine-tuning its efforts into achieving the goals set forth by the NBP for the coming years. Nevertheless, even the tiniest of employee contribution in BiotechCorp makes every single accomplishment all the more meaningful as it eventually leads to the success of the Malaysian bioeconomy. For that, I owe them my sincerest gratitude for their excellent work that has brought us thus far.

I am also genuinely appreciative for the leadership and supervision shown by BiotechCorp's distinguished Board of Directors, led by Chairman Y.Bhg. Professor Tan Sri Dr Zakri Abdul Hamid in ensuring we remain on track and carry out our mandate in the best manner. I would also like to take this opportunity to thank all our stakeholders including the Ministries, Government agencies as well as private sector industry players for making the biotechnology industry the success story that it is today. I look forward to more collaborations and engagement with all our stakeholders in the coming years so we can reach our objectives rapidly and effectively.

Finally, I would like to record my heartfelt appreciation to the rakyat for the continuous support towards the development of the nation's bio-based industry. Together, I believe that we can continue to build a successful and sustainable Malaysian bioeconomy that can enrich the nation and secure the future.



Y.Bhg. Dato' Dr. Mohd Nazlee Kamal
Chief Executive Officer

02

THE ESSENCE OF THE **ORGANISATION**

*"Coming together is a beginning. Keeping together is progress.
Working together is success."*
- Henry Ford



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Malaysian Biotechnology Corporation Sdn Bhd (BiotechCorp) Company No. 691431-D

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.

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.

BiotechCorp is an agency of the Ministry of Science, Technology and Innovation (MOSTI) and owned by the Ministry of Finance Incorporated and Federal Lands Commissioner.

It is governed by the Bioeconomy Implementation Council (BIC) (formerly known as Biotechnology Implementation Council) and counselled by the Biotechnology International Advisory Panel (IAP) (both chaired by the honourable Prime Minister of 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



Teamwork

In a relationship based on mutual respect and understanding, we work together with our colleagues, clients and partners to achieve common goals.



Integrity

We conduct our business with uncompromising integrity.



Excellence

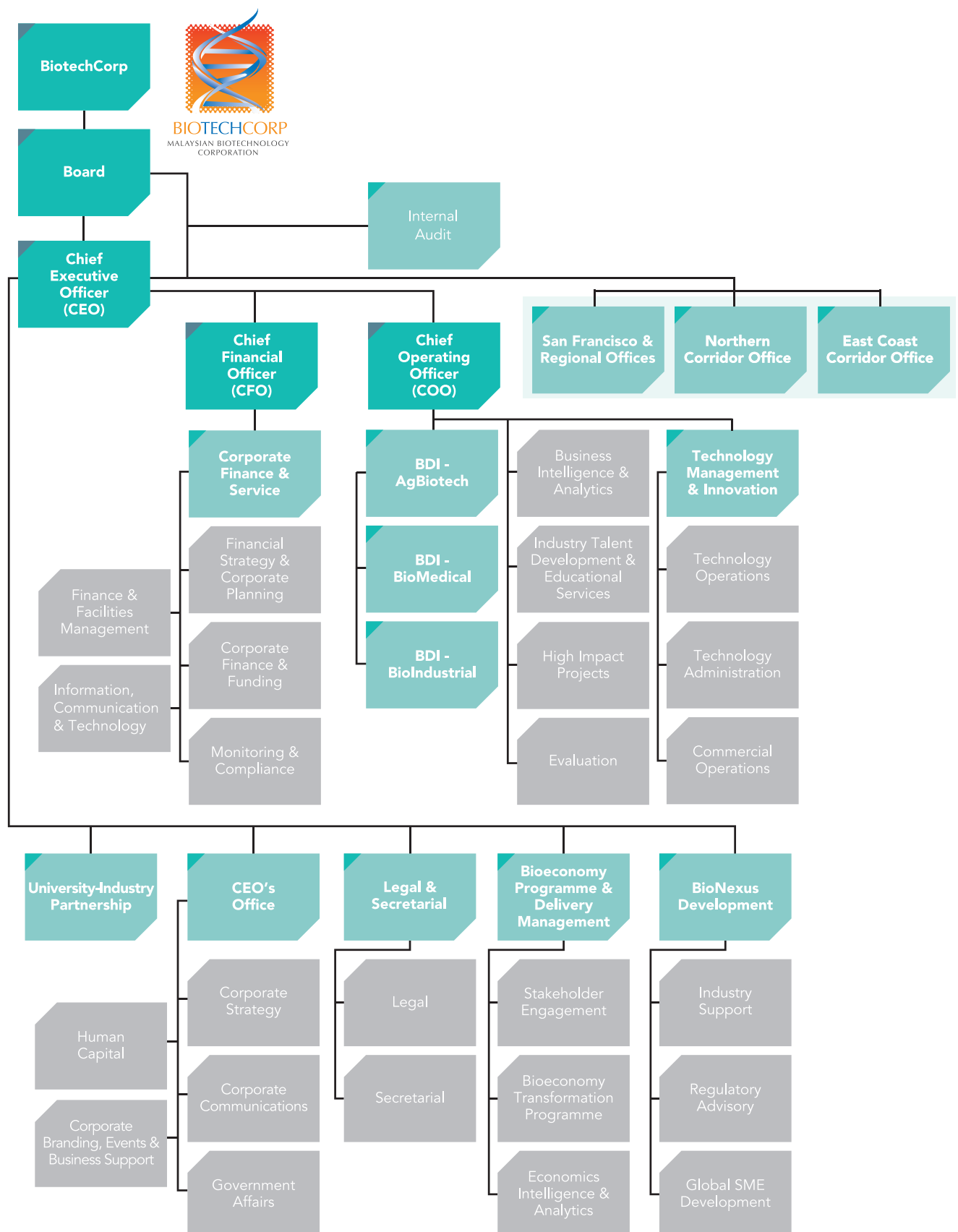
We strive to achieve excellence in all that we do.



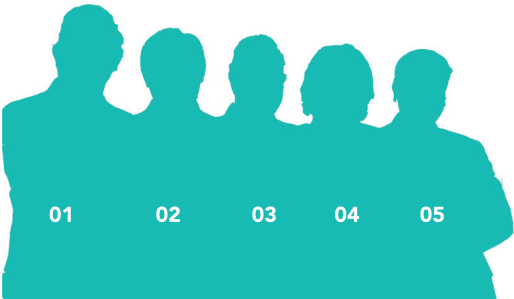
Accountability

We drive the delivery of results for the organisation and the nation.

ORGANISATIONAL STRUCTURE



BOARD OF **DIRECTORS**



01

**Y.Bhg. Professor
Tan Sri Zakri
Abdul Hamid**
Chairman

02

**Y.Bhg. Dato' Dr.
Mohd Nazlee
Kamal**
Director

03

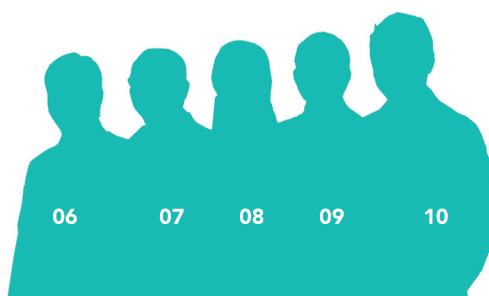
**Y.Bhg. Tan
Sri Dato' Dr.
Jegathesan a/l
N.M. Vasagam @
Manikavasagam**
Director

04

**Y.Bhg. Tan Sri
Dr. Noorul Ainur
Mohd. Nor**
Director

05

**Y.Bhg. Datuk
Wan Ahmad
Shihab Ismail W
Ismail**
Director



06

**Y.Bhg. Datuk
Dr. Noor Hisham
Abdullah**
Director

07

**Y.Bhg. Datuk
Dr. Abd Hapiz
Abdullah**
Director

08

**Pn. Norsimah
Ab. Wahab**
Director

09

**Dr. Radzuan
A. Rahman**
Director

10

**En. Amirul
Fares Wan Zahir**
Director

SENIOR MANAGEMENT



Y.Bhg. Dato' Dr. Mohd Nazlee Kamal

Chief Executive Officer

Y.Bhg. Dato' Dr. Mohd Nazlee Kamal was appointed to the Board of the Malaysian Biotechnology Corporation Sdn Bhd (BiotechCorp) on 18 July 2011.

An academician, scientist and innovator with business and entrepreneurship acumen, he brings a wealth of marketing and technical expertise to BiotechCorp. He is well recognised for his wide industrial leadership and has played a pivotal role in the formulation of the National Biotechnology Policy.

As an academician at UTM, one of his key achievements was the invention of the "External Spinfilter", which is now marketed by Sartorius BBI Systems (Patent No. PI9701436MY- 131798-A). In 1997, he joined B. Braun Malaysia, followed by serving Amersham Biosciences as the ASEAN Business Area Manager (Separation). In 2001, he was the Business Development Manager in Sartorius (M) Sdn Bhd. Dato' Dr. Mohd Nazlee was instrumental in the establishment of Inno Biologics Sdn Bhd, the first contract manufacturing organisation for biopharmaceuticals in Malaysia, and became the CEO and Group MD for Inno Biologics Sdn Bhd and Inno Bio Ventures Sdn Bhd respectively.



Tuan Syed Agil Syed Hashim

Chief Financial Officer

Tuan Syed Agil Syed Hashim, joined BiotechCorp since 2006 and was appointed as the Chief Financial Officer on 17 August 2010.

Prior to his appointment to BiotechCorp, he was with Multimedia Development Corporation (MDEC). He had the opportunity to also contribute towards the development of the Multimedia Super Corridor (MSC), another government initiative in the ICT sector.

He is a registered Chartered Accountant and holds a degree in Accountancy and Master's degree in Business Administration specialising in Finance.



**En. Razwin Sulairee
Hasnan Termizi**

Chief Operating Officer

En. Razwin Sulairee Hasnan Termizi is the Chief Operating Officer of BiotechCorp, responsible for leading and overseeing the implementation of the biotechnology sector as one of the key economic drivers of the nation.

He brings to BiotechCorp 20 years of experience and expertise in investment, business development and strategic planning.

Prior to that, he was the Vice- President of the Industry Development and Investment Division, Senior Vice President at the Business Development and Investment-Industrial Division (BDI-I) and Senior Executive Vice President.

En. Razwin Sulairee holds a Masters in Business Administration from Universiti Teknologi MARA (UiTM), a degree in Industrial Chemistry from University Putra Malaysia and a diploma in Plastic & Rubber from the Plastic and Rubber Institute of Malaysia (PRIM). He has also attended the Senior Executive Programme at Ross School of Business.



**Dr. Abdul Manaf
Mohammad Radzi**

*Senior Vice President,
University-Industry Partnership*

Dr. Abdul Manaf Mohammad Radzi joined the Company as Senior Vice-President, Agriculture in January 2010 and is now responsible for University-Industry Partnership department under the CEO's Office.

Prior to this, he was a General Manager in charge of export sales and then as the Chief Scientific Officer of a leading local pharmaceutical company.

He has been in various industries, namely academia, construction, IT, oil and gas, chemicals, fertilisers and pharmaceuticals holding various positions from researcher to, marketing and sales. He has worked with ICI, PETRONAS, GLC's and other public-listed companies as well as private ones.

He holds a PhD from the University of Tennessee, Knoxville majoring in Physical Chemistry and minoring in Inorganic Chemistry. He also holds an MBA degree from Ohio University.



**Cik Sharifah Hanifah
Syed Abdul Aziz**

*Senior Vice President,
Legal & Secretarial*

Cik Sharifah Hanifah Syed Abdul Aziz joined Malaysian Biotechnology Corporation Sdn Bhd in 2008 as Company Secretary and Vice President, Legal & Secretarial; she was promoted to the position of Senior Vice President Legal & Secretarial in 2011.

Cik Sharifah Hanifah Syed Abdul Aziz was called to the Malaysian Bar in 1989 and practised law for 5 years prior to joining Perusahaan Otomobil Kedua Sdn Bhd (Perodua). During her 13 years in Perodua, Cik Sharifah Hanifah Syed Abdul Aziz managed several functions besides heading the legal and secretarial team including human resources, administration, security, welfare and public affairs.

Cik Sharifah Hanifah Syed Abdul Aziz holds an LLB (Hons) from the University of Wolverhampton and Certificate in Legal Practice. She was empanelled as an Adjudicator with the Kuala Lumpur Regional Centre for Arbitration in 2014.

SENIOR MANAGEMENT



En. Jay Padasian

Senior Vice President, Business Development and Investment Division - BioMedical

En. Jay Padasian is a registered pharmacist, originally trained in the United Kingdom before returning to Malaysia to take up various National and Regional (Asia Pacific) roles in the Medical Device and Pharmaceutical Industry including US and German Multinational companies such as Johnson & Johnson; B.Braun and Covidien. Prior to joining Malaysian Biotechnology Corporation Sdn Bhd, Jay was Country Manager - Malaysia/Brunei at Covidien (now part of Medtronic).

En. Jay Padasian is a member of the National Key Economic Area (NKEA) Healthcare Steering Committee and as well as the Bioeconomy Transformation Programme Steering Committee.

En. Jay is also a Malaysian Government Cleared Advisor for the TPPA; a member of the Board of Studies for Universiti Sains Malaysia's M.Sc BioMedicine course and a member of Universiti Malaya's Commercialisation Evaluators Committee.

En. Jay Padasian joined BiotechCorp in 2009 and has been a member of BiotechCorp's Senior Management since April 2012.



En. Zainal Azman Hj Abu Kasim

Senior Vice President, Business Development and Investment Division - BioIndustrial

Holding a Degree in Communication and Media Studies (Public Relations) from MARA University of Technology (UiTM), Shah Alam, he is an expert in analytical and strategic marketing approach and has served the country well by elevating Malaysia to become among the top ten trading partners to the United States and an active exporter in the Central and West Asia market.

He began his career as an Assistant Director of Procurement and General Services at Malaysia Tourism Board. He was then sought by MATRADE where he held various positions from procurement to trade commissioner for the Western Region of North America. He ultimately became the Senior Manager for Central and West Asia division.

He joined the company as Vice President (Industrial) in 2010 and in 2012 he was promoted to Senior Vice President in the Business Development and Investment (Bio-Industrial) division. Under his leadership, the bioindustrial initiatives in Malaysia was honoured with the World Bio Market (WBM) Industry Champion award for 2015 which recognises a company that has demonstrated significant excellence in growth of the biofuel or bio-based chemical industries.



Dr. Kodi Isparan Kandasamy

Senior Vice President, Business Development and Investment Division - AgBiotech

Dr Kodi is a plant biotechnologist with over 30 years of experience in the field of plant science. Currently, he is the Senior Vice President (for Agriculture Biotechnology) at the Business Development & Investment Division. Prior to that he was the Vice President under the same division since 2010.

Dr Kodi had served at FRIM as a Senior Scientist and the head of the Tissue Culture Laboratory for over 8 years. He was previously the R&D Manager for TropBio Research Sdn Bhd (a private biotechnology company in Malaysia).

Dr Kodi has vast experience in transforming R&D into commercial business ventures, particularly related to Agriculture Biotechnology and actively involved in funding mechanisms for commercial venture, including Domestic Direct Investment (DDI) and Foreign Direct Investment (FDI).

Dr Kodi is also a member of the Genetic Modification Advisory Committee (GMAC), a national committee which regulates all research, development, commercialisation & trade, which involves LMO (Living Modified Organisms).



Pn. Zurina Che Dir

*Senior Vice President, Bioeconomy
Programme and Delivery Management*

Pn. Zurina Che Dir plays an important role in ensuring the successful implementation of the national bioeconomy initiatives mainly to contribute significantly to Malaysia's Gross National Income (GNI), employment and investment.

Prior to this, Pn. Zurina was the VP of Business Intelligence and VP of Healthcare for the past 5 years, focusing on business strategy & development and deals closing for biotechnology companies to operate in Malaysia. She was also involved in technology licensing deals and transfer for Biotechnology Acquisition Programme.

Previously, Pn. Zurina held a managerial position at Bursa Malaysia Stock Exchange and was also involved in the special project on the strategic alliance with Singapore Exchange (SGX) in establishing Bursa Malaysia-SGX Trading Linkage and conceptual work for Disclosure Based Regulation Model. A former Senior Associate at Securities Commission she was involved in analysing and processing the suitability of an issuer to be listed on Bursa Malaysia.

Pn. Zurina graduated from University of Leeds, United Kingdom holding a BA (Hons) in Accounting and Finance.



Dr. Harcharan Singh

*Senior Vice President, Technology
Management and Innovation*

Holding a doctoral degree majoring in Supercritical Technology for the extraction of natural product from the University of New South Wales, Australia, he began his career as a lecturer with the Department of Chemical Engineering, University of Malaya for 9 years.

Dr Harcharan Singh then served as the Vice President and Head of the Innovation and Knowledge Management Centre at Mewah Group, a Singaporean palm oil refining conglomerate.

In 2009, Dr Harcharan Singh joined the Company as the Vice President for the Business Development and Investment Division. Dr Harcharan Singh now heads the Technology Management and Innovation Division which is involved in the management and commercialisation of 4 core bio-based platform technologies acquired by BiotechCorp.

The platform technologies are Marker Assisted Selection, Supercritical Technology, Nanotechnology and Antibody Microarray technology.



En. Adnan Baharum

*Senior Vice President,
CEO's Office*

En. Adnan Baharum has 20 years of working experience in MNC and GLCs in various industries including commodities, FMCG, oil & gas, healthcare and consulting.

He specialises in business development, market research, business intelligence and strategic management, corporate communication and branding & sales and marketing.

En. Adnan Baharum obtained his Bachelor degree in Marketing from University Teknologi MARA (UiTM) in 1996.

He has been with the company since June 2014 and currently is the Senior Vice President in CEO's office and responsible for company's corporate communication and events, government liaison and human capital development.

Prior to this, he was the Director, Business Development of Frost & Sullivan Malaysia Sdn Bhd.

03

A GLIMPSE AT **2015 EVENTS**

"A great accomplishment shouldn't be the end of the road, just the starting point for the next leap forward."

- Harvey Mackay



Calendar of Events • 26

CALENDAR OF EVENTS

Exchange of Collaboration Between BiotechCorp & Ghent Bio-Economy Valley (GBEV)

2 March 2015, Level 16, BiotechCorp, Menara Atlan,
Kuala Lumpur, Malaysia

BiotechCorp joined forces with Belgium's Ghent Bio-Economy Valley (GBEV) to strengthen and support the bioeconomy business and research communities in both Belgium and Malaysia through an exchange of a Collaboration Proposal.

The exchange of Collaboration Proposal marks the first collaboration between Malaysia and Belgium in the area of bioeconomy, which seeks to significantly contribute to the bioeconomy by providing opportunities that can benefit private bio-based companies in Malaysia and Belgium.



Malaysia Bioeconomy Partnering Day in Conjunction with Expo Milano 2015

9 April 2015, Starhotels Rosa Grand, Milan, Italy
at Expo Milano 2015

BiotechCorp successfully partnered with Italy's AssoBiotec to foster greater collaborative ties between Malaysian and Italian bio-based businesses. The exchange of Collaboration Proposal was held during the Malaysia Bioeconomy Partnering Day in conjunction with Expo Milano 2015.

Alongside the exchange of Collaboration Proposal, BioShoppes was also featured in the exhibition halls, having successfully launched 16 new products at Expo Milano 2015.



BioBorneo 2015

20 – 21 April 2015, The Magellan Sutura, Sutura Harbour
Resort, Kota Kinabalu, Sabah, Malaysia

BioBorneo 2015 provided the best avenue to explore bioeconomy opportunities in Borneo, as well as a platform for like-minded individuals and organisations to share information and also a platform for networking.

BioBorneo 2015 was officiated by Y.B. Datuk Seri Panglima Haji Yahya Hussin, Deputy Chief Minister of Sabah cum Minister of Agriculture and Food Industry Sabah.

The theme for BioBorneo 2015 was "Bio-Based Technologies for Wealth Creation Through Bioeconomy".



2015 Malaysia BioCamp

5 - 6 May 2015, Level 16, BiotechCorp, Menara Atlan,
Kuala Lumpur, Malaysia

Malaysia's top graduate and post-graduate students in the life sciences field convened with renowned biotech and healthcare experts at the Malaysia BioCamp 2015, organised by BiotechCorp, the first ever to be held in the country.

The event identified Nurul Aqilah Aqiludeen from Universiti Malaysia Sarawak and Kwong Soke Chee from Universiti Malaya as the 2 winners who represented Malaysia in Switzerland at the prestigious International BioCamp.



Opening of BiotechCorp San Francisco Office

11 – 12 June 2015, San Francisco, California, USA

BiotechCorp enhanced its ties with the United States of America (USA) with the opening of its overseas office, BiotechCorp International Inc. (BII) in San Francisco.

The establishment of BiotechCorp's US-based overseas office will be the contact point for bio-based and biotechnology sectors in the country, as the USA is a hub for biotechnology venture capitalists and funders, and one of the leading biotechnology markets in the world. This US-based office will provide Malaysian and US bio-based companies with the necessary support for business development activities in bringing in FDIs as well as market access.



BIO Philadelphia 2015

15 – 18 June 2015, Pennsylvania Convention Centre, Philadelphia, USA

BiotechCorp joined the BIO International Convention for the 11th time in 2015 with a strong presence of 80 Malaysian delegates from the federal ministries, state governments and government agencies, funding institutions and industry players.

As the Chair of ASEAN in 2015, Malaysia also had a strong position to showcase the country's unique value propositions as the gateway to ASEAN for investments and businesses at the premier convention.



BioMalaysia & ASEAN Bioeconomy 2015

17 – 19 August 2015, Putra World Trade Centre, Kuala Lumpur, Malaysia

BiotechCorp together with the Ministry of Science, Technology and Innovation held the 13th annual BioMalaysia themed "ASEAN Bioeconomy: Biodiversity to Wellness".

The event became a very important landmark as Malaysia was the chair for ASEAN in 2015 and the integration of ASEAN Economic Community in the region.

BioMalaysia & ASEAN Bioeconomy 2015 was officiated by the Minister of Science, Technology and Innovation, Y.B. Datuk Seri Panglima Madius Tangau and attracted a total of 8,223 visitors.



Bioeconomy Day

11 November 2015, Le Meridien Hotel, Kota Kinabalu, Sabah, Malaysia

The Bioeconomy Day in Kota Kinabalu, Sabah was organised by BiotechCorp to highlight the achievements of the Bioeconomy Transformation Programme (BTP) and Bioeconomy Community Development Programme (BCDP) while providing awareness about these programmes and their opportunities for Sabah's communities and private sectors in the bio-based industries.



04

ADVANCING BIOTECHNOLOGY PROGRESS

"Progress is the activity of today and the assurance of tomorrow."
- Ralph Waldo Emerson



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AGBIOTECH – BUSINESS DEVELOPMENT & INVESTMENT DIVISION

*“Evolving local
cooperatives into
Agropreneurs.”*



Introduction

Global population is expected to increase to 9.1 billion by 2050, hence food production will need to increase by 70% (The Food and Agriculture Organisation). This phenomenon puts tremendous challenges in every aspect of agriculture not only to maximise yield of limited space, but also to optimise value-added downstream food and feed processing. Therefore, the application of agricultural biotechnology, also known as AgBiotech, is essential to improve plants, animals and microorganisms using multiple approaches including genetic engineering, molecular markers, molecular diagnostics, vaccines, and tissue culture.

10 YEAR ACHIEVEMENTS

BioNexus Status Companies

01

Sunlight Inno Seafood Sdn Bhd
(BioNexus Status awarded - 2015)



• Investment

An integrated shrimp aquaculture project based in Pitas, Sabah covering 4000 acres. This project is also an entry point project (EPP6) lead by the Department of Fisheries (DOF).



• Benefits to the Rakyat

Enabler for community farming, established to uplift the surrounding rural community in Pitas.

02

Green World Genetics Sdn Bhd
(BioNexus Status awarded - 2015)



• Investment

A leader in breeding high quality tropical hybrid seeds with continuous R&D and the collection of native germplasm for the improvement of agricultural produce and food security. To date, the company has successfully commercialised 105 types of seeds for leafy, fruit and field crop.



• Benefits to the Rakyat

The company has hired knowledge workers since 2008.

FOCUS AREA

Natural Product Biotechnology

Natural products are products which contain biologically active ingredients derived from natural resources such as herbs, agricultural resources, flora, fauna 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 fueled by consumer growing awareness about health making Asian consumers more wary about what they consume and put on their skins. According to Nielsen global survey, 69 percent 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 influences their purchase decision. Besides 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 growth of Malaysia's halal herbal industry is expected to continue at 15% per annum, where it was projected to have an estimated RM15 billion market value by 2015.

Sector is driven by industries focusing on development and commercialisation of:



NUTRACEUTICAL

Nutraceuticals are products derived from food-source which have additional health benefits, in addition to the basic nutritional value present. One of the examples is collagen-based drinks.



COSMECEUTICAL

Refers to cosmetics produced from natural substances which contain medicinal or therapeutic properties. For example, mangosteen extract can be used to create natural cosmeceuticals that have anti-inflammatory properties which are contributed by naturally occurring active ingredients such as garcinol and mangostin.



FRAGRANCE AND PERFUMERY

Fragrance and Perfumery are complex composition of naturally occurring aromatic compounds that produce pleasant smell. Examples are agarwood (gaharu) and patchouli.



BOTANICAL DRUGS

Botanical drugs are those drugs which are derived from medicinal plants. Examples of botanical drugs are standardised extract of ginseng, *Tongkat Ali* (longjack) and *Misai Kucing* (*Orthosiphon stamineus*).



FUNCTIONAL FOOD

Functional Food products are food products that are enriched with particular nutrients or substances that have a potentially positive effect on health beyond basic nutrition. Prebiotics and probiotics are examples of functional foods.



FLAVOURS & EMULSIFIERS

Both flavours & emulsifiers are food additives. Monosodium glutamate and lecithin are examples of food additives which can be produced via biotechnology and are commonly used in food.

Aquaculture Biotechnology

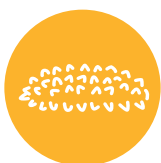
In tandem with the global trend in aquaculture, the number of aquaculture companies applying and receiving BioNexus status has increased significantly. This pattern is expected to continue for the next 5 years. In 2015 alone, the number of aquaculture companies which have applied for the BioNexus status has doubled compared to previous years. The diversity in the species being cultured is also expanding, where previously the focus was on shrimps and fishes, there are currently companies venturing into sea cucumber, abalone, oyster and scallop, as well as stingrays breeding. In addition, research institutes have also been forthcoming in trying to introduce alternate shrimp species for commercial production especially since the common *Penaeus vannamei* and *Penaeus monodon* species have recently been facing disease outbreaks. The aquaculture industry is not only made up of the breeding and growing of live food (shrimps/fish/molluscs etc.) but also the supporting industries such as feed, feed additives and animal health products. Companies involved in the feed additives business tend to tie up with anchor feed producers to support the high market demand for feed. In general, the focus in aquaculture biotechnologies is towards improving current aquaculture practices and increasing productivity by encouraging the development in **6 areas namely:**



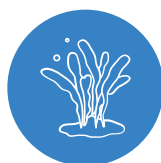
FISH



CRUSTACEANS



SEA CUCUMBER



SEAWEED



ALGAE



FEED ADDITIVES

Livestock Biotechnology

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 2014 ex-farm production value of chicken and duck eggs was estimated to be RM4,063 million and poultry meat output was estimated to be in the region of RM7,603 million, while the pig industry contributed about RM2,110 million during that year. These sub-sectors are operated largely on a commercial oriented manner 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 still owned by individual farmers who rear these animals as part of their overall rural agricultural activities. The total ex-farm output value of beef and milk was estimated to be about RM1,247 million and RM150 million respectively and mutton at about RM149 million in 2014.

The available biotechnology applications for livestock improvement include:

REPRODUCTIVE TECHNOLOGY

Artificial insemination, embryo transfer, embryo sexing and cloning, hormone use.

ANIMAL GENETICS AND BREEDING

Multiple ovulation and open nucleus breeding system, indicator traits, genetic marker and marker assisted selection, transgenic animal, genetic characterisation and conservation of animal genetic resources.

ANIMAL NUTRITION

Development and improvement of nutritive values in animal feed / additives to ensure better digestibility and overall health of the animals.

ANIMAL HEALTH

Disease diagnosis, vaccine, physiology of lactation and growth.

Crops Biotechnology

The use of crop biotechnologies have 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 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. In general, the focus of crop biotechnologies is towards improving current agricultural practices and increasing productivity by encouraging the development in three key areas namely, plant nutrition, planting material and plant protection products:

PLANT NUTRITION

Any substances derived from organic biomass, such as plant growth regulators, microbial fermented organic matter 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. North America and Europe's regulatory requirements has a key driving factor in spear heading the growth of this industry, hence spurring the growth of the biofertiliser industry.

PLANT PROTECTION

Any substances derived from organic biomass, e.g. plant extracts, living beneficial microorganism and its metabolites that can inhibit the growth of weed, insect, fungus and virus. Use of agrochemical in crop production has become a global concern as realisation of the adverse effects of continuous application of those chemicals. This has resulted in global demand for organic food and the market is expected to witness a sharp growth in the coming years, as household income increases, changing lifestyle, and rising health concerns among consumers. Organic food product totaling 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.

PLANTING MATERIAL

Micropropagation technique via tissue culture, marker assisted selection breeding or any methods that provide elite planting material (high yield, disease resistance, & desirable traits), including mutation breeding, genetic engineering, etc. Seed industry is a multibillion dollar business. 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.

2015 HIGHLIGHTS

BioNexus Status Companies

SE Aquatech Sdn Bhd

(BioNexus awarded – 30 March 2015) / DDI
R&D and commercial breeding and cultivation of high value abalone.

Outcome

Malaysia's first sustainable production of abalone through aquaculture which would benefit our local and foreign seafood industry.

Virgin Green X Sdn Bhd

(BioNexus awarded – 30 March 2015) / DDI
R&D and commercial production of soil enhancers using biotech processes.

Outcome

The microbes developed will be used in converting agricultural waste into organic fertiliser through solid stage fermentation process.

Vegefruit Resources Sdn Bhd

(BioNexus awarded – 30 March 2015) / DDI
Production of sweet potato seedlings by using tissue culture technique.

Outcome

Production of high quality sweet potato seedlings via tissue culture techniques.

Orion Biosains Sdn Bhd

(BioNexus awarded – 11 June 2015) / FDI
R&D and commercialisation of oil palm genetic screening kit and provision of laboratory genetic screening services.

Outcome

The company will provide screening services to the oil palm industry which would enable growers to identify high yielding clones and in the long term improve productivity of the industry.

Prathista Far East Sdn Bhd

(BioNexus awarded – 11 June 2015) / FDI
R&D and commercialisation of plant and animal nutritional/ health related products utilising fermentation technology.

Outcome

The company's main technology will be focusing on producing organic acid as chelating agent for plant nutrients and animal feed products.

XLR8 Bio Sdn Bhd

(BioNexus awarded – 30 March 2015) / DDI/FDI
R&D and commercialisation of microbial based soil enhancer products and to undertake its related research and development activities.

Outcome

Produce microbial based soil enhancer products from food waste through fermentation processes.

Gaya Naturals Sdn Bhd

(BioNexus awarded – 3 August 2015) / DDI
Commercialisation of standardised essential oil (immediate commercialisation plan: Patchouli & Vetiver).

Outcome

Gaya has secured its first order by signing a 10-year forward contract with the world top flavour & fragrance company, Givaudan SA ("Givaudan") in year 2012.

Era Flow (M) Sdn Bhd

(BioNexus awarded – 3 August 2015) / DDI
R&D and commercialisation of SPF post larval (PL) immediate commercialisation : P. monodon PL.

Outcome

Commercialisation of black tiger shrimp cultivation where the company is currently constructing an integrated hatchery and broodstock breeding centre in BioDesaru, Johor, Malaysia.

Laskar Fertilizer Sdn Bhd

(BioNexus awarded – 3 August 2015) / DDI
R&D and commercialisation of biofertiliser using chicken manure

Outcome

The production of plant nutrient via solid state microbial fermentation of farm waste. The company is working closely with Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia in term of continuous product improvement.

Sunlight Inno Seafood Sdn Bhd

(BioNexus awarded – 3 August 2015) / DDI
R&D and commercial breeding and production of shrimps with the use of biotechnology elements/processes.

Outcome

The project is a public private partnership which is located at Kg. Puyuh, Pitas (now known as the Pitas Shrimp Park). Upon completion, this project will be the largest aquaculture project in the country covering a total area of 4000 acres.

2015 HIGHLIGHTS

Sialin Bird Nest Essence Sdn Bhd

(BioNexus awarded – 4 December 2015) / DDI

Commercialisation of bird nest essence and its related products and to undertake its related research and development activities.

Outcome

The company has developed an in-house processing method which enables them to extract active components such as sialic acid and amino acids from raw bird nest. These ingredients will then be used to formulate cosmoceutical and nutraceutical products.

Feedimo Sdn Bhd

(BioNexus awarded – 4 December 2015) / DDI

Commercialisation of animal feed ingredients utilising biotechnology.

Outcome

Feedimo, a new startup company will develop high value animal feed ingredients through the fermentation of raw materials such as corn.

Advanced Green Nanotechnologies Sdn Bhd

(BioNexus awarded – 4 December 2015) / DDI

Production and commercialisation of chitosan-based products.

Outcome

Commercial production of biopesticide ingredients via liquid fermentation of organic waste (chitin). The company does team up with nanotechnology expert from University of Cambridge to further improve the product efficiency.

Vaishnavi Life Science Sdn Bhd

(BioNexus awarded – 4 December 2015) / FDI

Commercialisation of feed additives through enzymatic application.

Outcome

Commercialisation production of feed additives through liquid stage microbial fermentation.

Vata VM Synergy (M) Sdn Bhd

(BioNexus awarded – 4 December 2015) / DDI

Commercialisation of microbial-based biofertiliser and soil conditioners.

Outcome

R&D and commercialisation activity in converting palm oil mill waste into organic nutrient through solid stage microbial fermentation.

GST Aquaculture (Batu Kawan) Sdn Bhd

(BioNexus awarded – 4 December 2015) DDI/FDI

Commercialisation of marine fish using biotechnology.

Outcome

The development of more integrated marine fish, breeding, hatchery and nursery facilities will increase the availability of high quality fingerlings to the aquaculture industry.

Non BioNexus Status Companies

Palsgaard Malaysia Sdn Bhd

FDI

Production of food emulsifiers and stabilisers using palm oil.

Outcome

The company has managed to diversify the use of palm oil by producing high quality emulsifiers and stabilisers for the food and beverage industry.

Flora Bee Hive Sdn Bhd

DDI

Commercialisation of Honey Bee Breeding and its downstream activities.

Outcome

The company is involved in the breeding and cultivation honey bee for commercial production of honey and its by-products.

Green Plant Organic Fertilizer Sdn Bhd

DDI

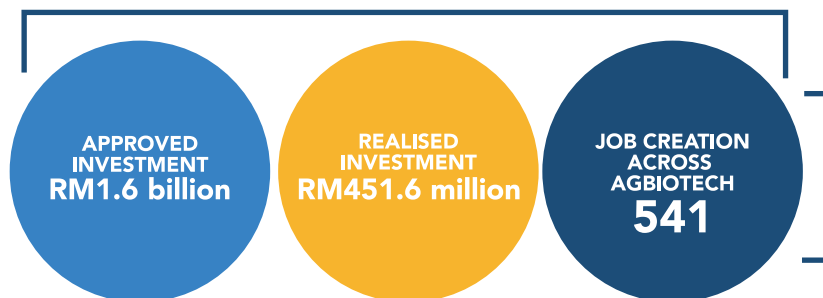
Conversion of oil palm waste into biofertiliser.

Outcome

The company a subsidiary of Harvys Oil Mills Sdn Bhd, has managed to developed an in-house technology (microbes) to convert oil palm waste into biofertilisers.

2015 SUMMARY OF INVESTMENTS

INVESTMENT RELATED INITIATIVES



DETAILS OF OUTCOME

The figures were contributed by 19 companies in 2015, which 16 of them were rewarded with BioNexus Status and 3 of them participated in Bioeconomy Transformation Programme.

MOVING FORWARD – PLANS & INITIATIVES

PLANS



INITIATIVES

NATURAL PRODUCTS

Identifying potential overseas market that will eventually lead the Malaysian Natural Products to penetrate global market.

The need for strategic action plan and approach in commercialising Malaysian Natural Products by attending expo, meet up with other potential international players, initiate collaborations and networking with foreign parties.

Upgrade and establish scientific work toward evidence-based standard and globally acceptable natural products.

Continuously promote natural products abroad.

AQUACULTURE

Actively promoting the development of integrated aquaculture systems which incorporate biosafety and security features into farm management system that is critical in preventing and containing disease outbreak.

Encourage the development of alternative and more sustainable feed source i.e. insect based feed.

Support the development of new broodstock which increase the availability of high quality seed (fry and fingerlings) and in turn support the expansion of the grow-out industry.

CROP

Promote the use of biotechnology in the farming value chain to ensure sustainable and value added farm products.

Encourage the usage of organic fertilisers, bio-fertilisers and bio-pesticides produced by local biotech companies by including these products as part of the government subsidy for the crop industry.

Improve crop yield, combat plant diseases and adapt to a hotter & drier world through gene-genomic revolution while maintaining production cost.

Improve agricultural species through molecular breeding or genetic modification to create exciting new opportunities in the field of diagnostics services and crop improvement initiatives.

LIVESTOCK

New strategies and approaches should be considered by the stakeholders of the industry to address issues of farm output, competitiveness and risk management to ensure sustained growth.

The livestock sub-sector should use resources in a sustainable and optimal manner, meet the market with innovations in products, services and delivery systems that recognises consumer needs and their rights.

Livestock industry can explore various options, innovations and experiences that have accumulated within the region and other developed nations.

The application of scientific knowledge, research and value innovations should be emphasised to increase production, productivity, quality and higher value along the value chain so that together we can initiate changes towards fulfilling the growing demand for food.

Furthermore, there is a huge potential for the silage industry where, local and foreign companies from Taiwan and Korea have already expressed interest in investing in Malaysia, especially in the East Malaysian state of Sabah where land is of abundance to grow various fodder crops required for the silage process.

BIOINDUSTRIAL – BUSINESS DEVELOPMENT & INVESTMENT DIVISION

“Industrial Biotechnology advances renewable resources thus creating sustainability.”



Introduction

The demand from the global chemical and material industry, sustainability of energy and environmental challenges are promoters to the growth of Industrial Biotechnology (IB). IB will have a fundamental impact because biotechnology processes uses renewable resources and offers the most promising innovative approaches towards reducing greenhouse gas emission, landfill, waste water effluents and sustainability of energy resources. In line with the National Biotechnology Policy and the Bioeconomy Transformation Programme, BioIndustrial will continuously promote and integrate Malaysia's bio-based resources with IB technology platform and engage the industry players to create awareness, interest and structure technology partnering to foster new investment and add value to the existing manufacturing industries.

10 YEAR ACHIEVEMENTS

BioNexus Status Companies

01

Pure Circle Sdn Bhd

(BioNexus Status awarded – 2007)



• Investment

World leading provider of natural sweetener derived from the Stevia plant for the global food and beverage industry and has established patented extraction process to extract the best tasting steviol glycosides from the leaf. The group recorded sales of over RM500 million FY 2016.



• Benefits to the Rakyat

Created a huge number of jobs in sales, marketing, distribution, production, supply chain and investment holdings.

02

IOI Lipid Enzymtec Sdn Bhd

(BioNexus Status awarded – 2012)



• Investment

Involved in the research, development, production and commercialisation of specialty fats and palm oil using enzyme modification and purification technology. The company has six modern manufacturing plants located in Pasir Gudang, Johor.



• Benefits to the Rakyat

The company's enzymatic technology provides consumers with healthier edible oils that is trans fat free and lower in saturated fat.

03

Green & Smart Sdn Bhd

(BioNexus Status awarded – 2007)



• Investment

Involved in harnessing biomethane gas from palm oil mill effluent, convert it into renewable energy and feed it to palm oil mills and National Power Grid for Feed-in-Tariff. To date, the company has completed 140 projects worldwide and generated revenues of RM19.4 million.



• Benefits to the Rakyat

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

04

Sime Darby Bhd-Verdezyne Sdn Bhd

(BioNexus Status awarded – 2013)



• Investment

Sime Darby has taken a stake in Verdezyne by investing RM96 million to become the single largest investor in Verdezyne Inc. Verdezyne uses proven and proprietary metabolic pathway engineering tools to develop unique yeast strains for cost-effective production of bio-based chemicals.



• Benefits to the Rakyat

Project is expected to bring in a total investment of RM250 million and create 134 jobs at Bio-XCell Biotechnology Park in Nusajaya, Iskandar, Johor and will become the world's first bio-based DDDA commercial plant in the world.

2015 HIGHLIGHTS

Non BioNexus Status Companies

01

CJ Bio Malaysia Sdn Bhd & Arkema Thiochemicals Sdn Bhd (CJ-Arkema)



• Investment

CJ-Arkema launched the world's first integrated Bio-Methionine and Thiochemicals plant worth RM2.1 billion at Kertih Biopolymer Park, Terengganu. CJ Bio has patented a microbe technology to produce L-methionine for animal feed from industrial sugar using fermentation process.



• Benefits to the Rakyat

The JV company hires high level technical and knowledge workers.

02

Genting Biorefinery Sdn Bhd & Elevance Renewable Sciences



• Investment

Genting-Elevance is building a 240,000 MT metathesis biorefinery plant in POIC Lahad Datu, Sabah to become the world's largest to utilise palm oil as feed stock to produce high performance olefins and specialty chemicals that can be used in multiple end product applications including lubricant, surfactants, additive and personal care.



• Benefits to the Rakyat

The project is expected to turn Sabah into a global biorefinery hub that leverages on the availability of palm oil and palm biomass.

FOCUS AREA



FINE AND SPECIALTY CHEMICALS

Commonly produced from crude oil & 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.



BIOMATERIALS

Bioplastic, bioadhesive, biofibre and biocomposite are biomaterials that are mostly derived from vegetable oil and starch extracted 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 oil spills, sewerage & population waste. Highly potential as it is cheaper and uses less land.



BIOCATALYST

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



BIOINGREDIENTS

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. Achieved through supercritical fluid extractions (SFE), biotransformation, enzymatic and fermentation processes.

2015 HIGHLIGHTS

BioNexus Status Companies

MyBiomass Sdn Bhd

DDI

Yeast commercialisation through biotechnology process.

Outcome

Set up manufacturing plant with a proprietary drying technology and specially designed bioreactors to produce yeast at commercial scale.

Jitu Bio-tech Industries (M) Sdn Bhd

DDI

Commercialisation of natural colourant from fruits and plants via enzymatic fermentation process.

Outcome

The company with Universiti Putra Malaysia successfully identified the natural colourant from dragon fruit, extracted via enzymatic fermentation process, which is certified Halal. Their current production facility is at TPM Biotech, Perlis and plans to expand their manufacturing capacity by 2016.

Green & Smart Sdn Bhd

DDI

Development and commercialisation of anaerobic reactors and biological systems for treatment of various wastes.

Outcome

Green & Smart applies in-house technology for treatment of palm oil mill effluent to become biogas. The company plans to build nine (9) biogas plants in various locations to be converted into electricity generation for Feed-in-Tariff as promoted by SEDA.

Aqueous Biotech Sdn Bhd

DDI

Commercialisation of microbial based waste water treatment system.

Outcome

Developed in-house technology to treat palm oil mill effluent and will further enhance technology in future for other industrial and domestic waste treatment system.

Non BioNexus Status Companies

FGV Biotechnologies Sdn Bhd

DDI

Establish manufacturing plant to produce biodiesel, glycerine and fatty acid distillate in Kuantan, Pahang.

Outcome

FGV Biotechnologies is establishing a 250,000MT manufacturing plant at Kuantan Port using enzymatic process to produce biodiesel, glycerine and fatty acid distillate from palm fatty acid distillate. The project is in line with Malaysia's strategy to promote green technology and renewable energy & will provide 78 job opportunities.

Esterchem (M) Sdn Bhd

DDI

Establishment of ester production plants in Pulau Pinang.

Outcome

Production of Bio-MCT, a formulation used for health benefits in the nutritional supplement industries. The plant will provide 80 job opportunities.

UMP Centre of Excellence for Bio Aromatic

DDI

Evolva (Sweden) collaborate with Universiti Malaysia Pahang (UMP) to set up Centre of Excellence.

Outcome

R&D on Malaysia natural products to develop natural compounds using Evolva's yeast fermentation platform.

Megagreen Energy Sdn Bhd

DDI

Setting up biogas power generation plants at FELCRA mills.

Outcome

Harnessing biogas from palm oil mill effluent to produce electricity and feed to the National Power Grid for FiT.

BioSynthetic Technologies Asia Sdn Bhd

FDI

Establishment of manufacturing plant to produce biosynthetic oil from palm oil.

Outcome

BT Asia will build a 171,000 MT commercial chemical plant at Bio-XCell Biotechnology Park, Johor to produce highly-functional "biosynthetic" oils that can be used in the lubricant, chemical & cosmetics industries. It is expected to create 187 employments and boosts new oleochemical technologies in Malaysia's palm oil industry.

2015 HIGHLIGHTS

Non BioNexus Status Companies

IOI Bio-Energy Sdn Bhd

DDI

Biomass power plant from biomass generated from palm oil mills.

Outcome

IOI Bio-Energy will be involved in implementation of projects to increase value of agriculture biomass such as wood wastes, palm oil empty fruit bunches, paddy waste by conversion to renewable energy for power generation.

LipidChem Sdn Bhd

DDI

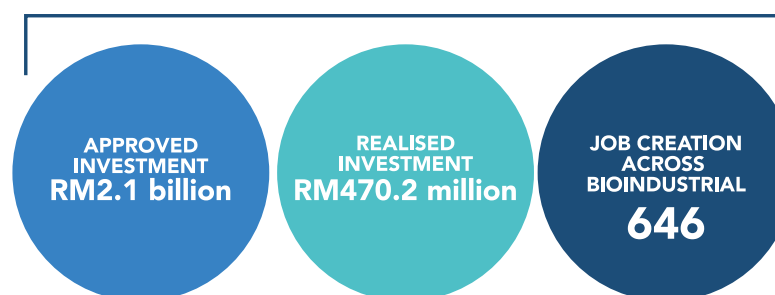
Establishment of manufacturing plant to produce steric acid powder and medium chain triglyceride powder.

Outcome

Produces stearic powder using high pressure spraying and liquid nitrogen for the pharmaceuticals, health supplement, animal feed, food, cosmetics and personal care industries.

2015 SUMMARY OF INVESTMENTS

INVESTMENT RELATED INITIATIVES



DETAILS OF OUTCOME

BioIndustrial's Approved and Realise Investment contributed the most to the Investment division and exceeded the stretched target by 52% and 27% respectively. These figures were contributed by a total of 12 companies of which 5 companies were granted the BioNexus status.

MOVING FORWARD – PLANS & 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 CHEMICALS, BULK CHEMICALS (BIOCHEMICALS)	BIOMATERIALS OR BIOPLASTICS	BIOENERGY	BIOCATALYST	BIOINGREDIENT
BioIndustrial initiatives is to tap into the availability of bio-based 2nd 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 is environment sustainable as it is derived from vegetable oil or starch. The Government of Malaysia has put in initiatives to ban polystyrene and fossil fuel based plastic bags. The potential rise in natural gas prices and consumer demands for more environmental - sustainable products will provide change in environmental policies and legislative measures.	Utilise IB platform to reduce up to 40% of greenhouse gasses emission and increasing the share of renewable energy in the country through Bioremediation of polluted areas, Anaerobic Digestion of waste while converting Advance Biogas into renewable energy in the form of electricity, CNG, LNG and potentially bioplastics.	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.	The biodiversity of enzymes is providing the food industry with a wide range of functionalities. BioIndustrial initiative is to promote the use of enzymatic, supercritical fluid extraction (SFE) and fermentation methods to extract flavours, fragrance, colourant from plant materials.

BIOMEDICAL – BUSINESS DEVELOPMENT & INVESTMENT DIVISION

“Emerging scientific discoveries further encourages the use of biotechnology processes”



Introduction

The BioMedical division leads the development of the Healthcare Bio Cluster in Malaysia by securing strategic investments in target sectors as well as creating a conducive environment for these sectors to thrive. In 2015, 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 area verticals including BioPharmaceuticals; BioMed Tech & Diagnostics and Bio Services & Emerging BioSciences.

10 YEAR ACHIEVEMENTS

BioNexus Status Companies

01

Nova Laboratories Sdn Bhd
(BioNexus Status awarded – 2006)



• Investment

Health and wellness facility providing complete range of research-based products.



• Benefits to the Rakyat

Provides the highest quality of herbal products to fulfill the needs of rakyat in the healthcare industry.

02

AJ Biologics Sdn Bhd -
(BioNexus Status awarded – 2013)



• Investment

Establishment of first vaccine manufacturing facility in Malaysia.



• Benefits to the Rakyat

The rakyat will be enjoying benefits such as improved access to vaccines with the establishment of Malaysia's first vaccine facility. This facility could also serve Malaysia's vaccine security issues.

03

KLSMC Stem Cells Sdn Bhd
(BioNexus Status awarded – 2011)



• Investment

Establishment of stem cells research & development center.



• Benefits to the Rakyat

Creation of skilled technical laboratory jobs, development of best in class clinical practices and enhance R&D activities in Malaysia's stem cell industry.

04

Stemlife Berhad
(BioNexus Status awarded – 2007)



• Investment

Establishment of stem cell therapies and consultancy services.



• Benefits to the Rakyat

As Malaysia's first stem cell services provider, StemLife offers stem cell banking and therapies consultancy to rakyat at an affordable cost.

10 YEAR ACHIEVEMENTS

Non BioNexus Status Companies

01

Abbott Medical Optics (AMO)



- **Investment**

A greenfield facility for the production of intraocular lenses (IOLs).



- **Benefits to the Rakyat**

The AMO facility provides high tech jobs for Malaysians as first state of the art IOL facility in South East Asian.

02

Biocon Sdn Bhd



- **Investment**

Asia's largest integrated insulins manufacturing facility.



- **Benefits to the Rakyat**

Biocon's entry into Bio-XCell has stimulated growth for the sector, providing commercial opportunities for small and medium biotechnology enterprises in Malaysia and promote a more vigorous domestic direct investment. The investment will also be able to cater to the needs of Malaysian diabetic patients for affordable insulin and insulin analogs.

03

Fresenius Medical Care Production Sdn Bhd



- **Investment**

A medical devices manufacturing facility to produce haemodialysis concentrates as well as peritoneal dialysis, hemofiltration and automated dialysis solutions.



- **Benefits to the Rakyat**

The investment in a plant manufacturing dialysis solutions will cater to the South East Asian market making Malaysia a potential South East Asian hub and also result in our country to be self-sufficient in peritoneal dialysis (PD) healthcare. Technology transfer also will benefit the rakyat by being able to access to most advanced PD product in the market.

04

Haemonetics Sdn Bhd



- **Investment**

First manufacturing facility in Asia to produce components of Whole Blood and Apheresis device.



- **Benefits to the Rakyat**

The company will acquire new blood management and medical technologies, huge equipment and localisation investment, as well as investments in capital. It also offers jobs alongside extensive training & development.

FOCUS AREA

BIOPHARMACEUTICALS

Several sub-sectors feature in this vertical including small and large molecule biopharmaceutical products. The small molecule pharmaceutical products are divided into New Chemical Entities (NCEs) and Generics whereas the large molecule pharmaceutical product is categorised into Innovator Biologics, Biosimilars and Vaccines. NCEs and Innovator Biologics are now also termed as New Molecular Entities (NMEs).

BIOMEDTECH AND DIAGNOSTICS

This vertical currently contributes the highest revenue by sub-sector to Malaysia's Healthcare Bio Cluster and includes the following sub-sectors: Medical Devices, Invitro Diagnostics and Biosensors.

BIO SERVICES AND EMERGING BIO SCIENCES

This vertical consists of BioServices such as Contract Research Organisations (CROs), Contract Research and Manufacturing Organisations (CRAMs) & BioInformatics as well as Emerging sub-sectors such as Cellular Medicine & Cell and Gene Therapy Products (CGTP) and Biocosmeceuticals, Wellness & Pharmanutrition and others.

2015 HIGHLIGHTS

BioNexus Status Companies

Quintiles Malaysia Sdn Bhd

FDI (USA)

Provision of clinical research services to biopharma and biomed tech sub-sectors.

Outcome

Quintiles' expansion plan includes developing additional Asian Prime Sites in Malaysia as well as broadening the scope of its services into new therapeutic areas. By providing broader clinical research services, Quintiles will be able to create sustainable infrastructure for local clinical research industry from the development of these prime sites for clinical research services.

MyXMO Sdn Bhd

DDI

Clinical trials and site management services for pharmaceutical, biotechnology and medical device companies.

Outcome

Position Malaysia as the preferred choice of clinical trial site as well as the Clinical Trial Hub in the region especially for biopharmaceuticals and medical devices industries.

Cell Therapies (M) Sdn Bhd

FDI (Australia)

Commercialisation of approved cellular therapy activities, in-licensed products and provision of cellular contract manufacturing services.

Outcome

The company will bring revolutionary therapies in high unmet need disease states to patients in Malaysia first. Consequently, treatment and improved access to quality healthcare products will be enjoyed by the nation.

Indipharm (M) Sdn Bhd

FDI (USA)

Clinical trials management related services in the ASEAN region.

Outcome

Indipharm Malaysia aims to provide clinical trial services that will create employment opportunities for knowledge workers, transfer of technology and ultimately this will spur the development of local economic growth especially in the clinical research industry.

Tenaga Jati Bumi Sdn Bhd

DDI

Commercialisation of herbal extract based products utilising biotechnology process and to undertake its related research and development activities.

Outcome

Tenaga Jati Bumi's initiative to conduct standardisation studies, pre-clinical and clinical trials on their herbal products will uplift the local herbal industry from one of products with low, general claims to one with medium claims and possibly evidence-based botanical drugs with high claims.

MyBiosciencelab Sdn Bhd

FDI (India)

Commercialisation of contract research services for pharmaceutical, cosmeceutical, nutraceutical and medical device industries.

Outcome

MyBioscienceLab is a public-private partnership company that was established to be Malaysia's first full-service OECD-GLP (Organisation for Economic Cooperation and Development – Good Laboratory Practice) certified laboratory providing non clinical and pre-clinical testing for the Healthcare Bio Industry.

Proliv Life Sciences Sdn Bhd

DDI

Commercialisation of standardised herbal extract based products and to undertake its related research and development activities.

Outcome

Proliv Life Sciences is involved in the commercialisation of herbal based products. The company's initiative in conducting standardisation, pre-clinical and clinical studies will create botanical drugs for the healthcare industry and allow the nation to have access to traditional and complementary medicines with more robust health claims.

Non BioNexus Status Companies

Pharmaniaga Sdn Bhd

DDI

Extension and modification of the existing manufacturing facility for manufacturing of high value freeze dried pharmaceutical products.

Outcome

The establishment of a lyophilisation manufacturing suite by Pharmaniaga to manufacture high value freeze dried pharmaceutical products at competitive product pricing to the government and private sectors. This could potentially provide patients better access to these medications. This project will also provide an opportunity for the development of local expertise in lyophilised pharma manufacturing technology.

Star Medik Sdn Bhd

DDI

Manufacturing of medical disposable products for domestic and international markets.

Outcome

Star Medik will produce quality medical disposables utilising both local talent as well as locally obtained raw materials where possible.

Hitech Cryotherm Sdn Bhd

DDI

Manufacturing of hot & cold therapeutics machine and parts.

Outcome

Hitech Cryotherm will be able to cater for the local medical and aesthetics market domains with its manufacturing expertise. The company will also be able to increase employment opportunities for skilled people in this field.

2015 HIGHLIGHTS

Non BioNexus Status Companies

Paramit (M) Sdn Bhd

FDI (USA)

Manufacturing of medical instruments, medical equipment, laboratory equipment and electronic measurement tools.

Outcome

With the expansion of the facility, the Malaysian subsidiary of a US biomed tech player has created employment opportunities, transfer of technology and ultimately, spur the development of local economic growth in the medical device industry.

Owen Mumford Sdn Bhd

FDI (UK)

Manufacturing of capillary blood sampling devices (single and multi-use), auto-injectors and drug delivery devices.

Outcome

The facility for manufacturing medical devices and medical products will create employment opportunities, transfer of technology and the growth of the local healthcare industry. The Owen Mumford facility will also be the commercial and distribution hub for Asia Pacific.

Orchid Life Sdn Bhd

DDI

Commercialisation of Kacip Fatimah as a higher claim herbal product for prevention and management of obesity.

Outcome

Marketed under the brand "Labeesity", pre-clinical and

clinical studies are being done to set the evidence for a higher claim indication for the Kacip Fatimah based product to be used in weight loss management for obese people.

Oncogen Pharma Sdn Bhd

FDI (UAE)

Development and manufacture of oral solid dosage, lyophilised and liquid injectables for oncology products.

Outcome

Oncogen Pharma has built ASEAN's first oncology active pharmaceutical ingredient (API) research and development (R&D) centre. Oncogen Pharma will go on to be one of the first plants in South East Asia to manufacture both oncology APIs and formulated products.

Lucenxia Sdn Bhd

FDI (Switzerland)

Manufacturing of INTELLIS, Intelligent Automated Peritoneal Dialysis (APD) cyclers designed for Chronic Kidney Disease (CKD).

Outcome

The Lucenxia project involves the manufacturing of the Automated Peritoneal Dialysis (APD) cycler, INTELLIS. This would improve the management of patients with Chronic Kidney Disease have access to quality and cost-effective care.

2015 SUMMARY OF INVESTMENTS

INVESTMENT RELATED INITIATIVES



DETAILS OF OUTCOME

The figures were contributed by 15 companies with 8 FDIs and 7 DDIs, involved in 26 projects.

MOVING FORWARD – PLANS & INITIATIVES

PLANS

Achieve the objectives of the National Biotechnology Policy and the Bioeconomy Transformation Programme towards creating a new engine of growth for Malaysia to achieve developed nation status.

Position Malaysia as global / regional Healthcare Bio ecosystem 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 people by developing socio-economy focused programmes.

Actively realise investments through project implementation and conduct communication outreach to increase the visibility of BiotechCorp's activities in the BioMedical area.

Develop and implement ecosystem based pipeline building initiatives to build a conducive environment for the Malaysian healthcare sector.

BIOECONOMY DEVELOPMENT

Developing the Bioeconomy

"Impacting the lives of people through national economic progress and societal wealth achievement."



BIOECONOMY TRANSFORMATION PROGRAMME (BTP)

Introduction

Launched by the Honourable Prime Minister of Malaysia during the National Bioeconomy Council Meeting on 30th October 2012, the Bioeconomy Transformation Programme (BTP) provides a platform for the private sector to channel and maximise commercial opportunities in bio-based industries. Through the BTP, the government and leading industry players will work in tandem to set national goals for the application of biotechnology in agriculture production, industrial manufacturing and healthcare, put in place the structural conditions required and develop necessary mechanisms to ensure that policies can flexibly adapt to new opportunities. BTP is designed as a transformation programme based on biotechnology's potential to cut across various different industries and transform Malaysia into a high income, inclusive and sustainable economy.

FOCUS AREAS



AGBIOTECH

Enhance agri-based industry: Producing high-value end products using innovative technology



BIOINDUSTRIAL

Use of renewable resources: Energy, chemical and material productions



BIOMEDICAL

Innovative healthcare products and services: Cheaper and more accessible to medicine

BTP ACHIEVEMENTS & TARGETS

ACHIEVEMENTS

TARGETS

2015 -
11 Entry Point
Projects (EPPs)
and 48 Trigger
Projects

AgBiotech



Bio-based Farm Inputs

3 Trigger Projects

High-Value Bioingredients

7 Trigger Projects

High-Value Food Varieties

10 Trigger Projects

BioMedical



Biopharmaceuticals

3 Trigger Projects

Drug Discovery & Preclinical Services

1 Trigger Project

Molecular Screening

2 Trigger Projects

Stem Cells & Regenerative Medicine

1 Trigger Project

BioIndustrial



Industrial Bio Inputs

8 Trigger Projects

Bio-based Chemicals

7 Trigger Projects

Biomaterials

5 Trigger Projects

Bioremediation

1 Trigger Project

*(As of December 2015)



GNI in 2020
**RM5.97
billion**



Job
Opportunities
by 2020
**25,355
jobs**



Investment
by 2020
**RM18.20
billion**



GNI in 2020
RM48 billion



Job Opportunities
by 2020
170,000 jobs



Investment by 2020
RM50 billion

BTP FUND

Two BTP Trigger Projects have been tabled to the BTP Funding Committee for recommendation to utilise the BTP Fund. The projects are:

- Mass Cultivation of *Haematococcus pluvialis* for the Production of Natural Astaxanthin
- Setting up of 14 Biogas Power Generation Plants at FELDA Palm Oil Mills based on the Feed-in-Tariff Model

2015 HIGHLIGHTS

BTP Trigger Projects

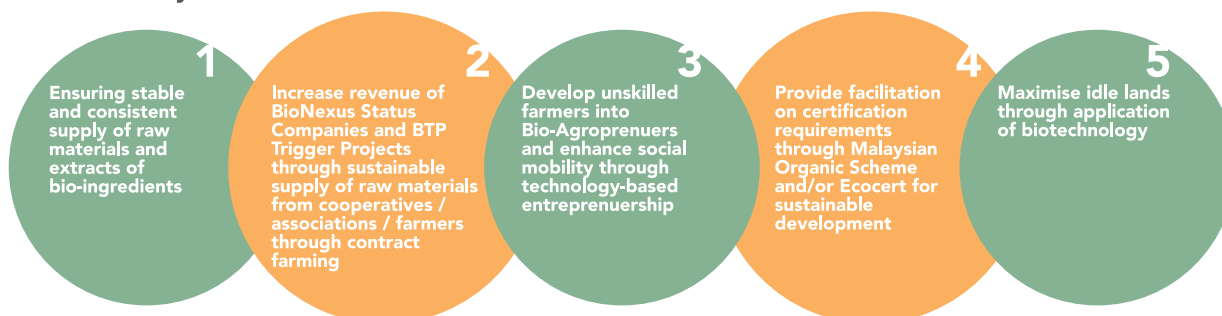
LOCATION	EPP
Langkawi, Kedah Kuala Muda, Kedah Gurun, Kedah Kulim, Kedah Bayan Lepas, Pulau Pinang Butterworth, Pulau Pinang Prai, Pulau Pinang Kamunting, Perak Manjung, Perak Kampung Gajah, Perak Subang Jaya, Selangor Kuala Kubu Bharu, Selangor Telok Gong, Selangor Tanjung Sepat, Selangor Semenyih, Selangor Bukit Jalil, Kuala Lumpur Kuala Lumpur	High-Value Food Varieties – AgBiotech High-Value Bioingredients – AgBiotech Biomaterials from Renewable Resources – BioIndustrial Biopharmaceuticals – BioMedical Biopharmaceuticals – BioMedical High-Value Food Varieties – AgBiotech Biomaterials from Renewable Resources – BioIndustrial High-Value Bioingredients – AgBiotech High-Value Food Varieties – AgBiotech High-Value Food Varieties – AgBiotech Biomaterials from Renewable Resources – BioIndustrial Industrial Bioeconomy Upstream Inputs – BioIndustrial Bio-based Farm Inputs – AgBiotech High-Value Food Varieties – AgBiotech High-Value Bioingredients – AgBiotech High-Value Bioingredients – AgBiotech Drug Discovery & Predlinical Services – BioMedical Scale Up Innovative Molecular Screening & Diagnostics – BioMedical High-Value Bioingredients – AgBiotech Biopharmaceuticals – BioMedical High-Value Food Varieties – AgBiotech High-Value Food Varieties – AgBiotech High-Value Bioingredients – AgBiotech Biochemicals from Renewable Resources – BioIndustrial High-Value Bioingredients – AgBiotech Bioremediation – BioIndustrial Biochemicals from Renewable Resources – BioIndustrial Scale Up Innovative Molecular Screening & Diagnostics – BioMedical Industrial Bioeconomy Upstream Inputs – BioIndustrial Industrial Bioeconomy Upstream Inputs – BioIndustrial Industrial Bioeconomy Upstream Inputs – BioIndustrial High-Value Food Varieties – AgBiotech Biomaterials from Renewable Resources – BioIndustrial Biochemicals from Renewable Resources (3) – BioIndustrial Biomaterials from Renewable Resources – BioIndustrial Industrial Bioeconomy Upstream Inputs (2) – BioIndustrial Industrial Bioeconomy Upstream Inputs – BioIndustrial High-Value Food Varieties – AgBiotech High-Value Food Varieties – AgBiotech Biochemicals from Renewable Resources – BioIndustrial Industrial Bioeconomy Upstream Inputs – BioIndustrial Bio-based Farm Inputs – AgBiotech Biochemicals from Renewable Resources – BioIndustrial Bio-based Farm Inputs – AgBiotech
Bandar Enstek, Negeri Sembilan Nilai, Negeri Sembilan Rembau, Negeri Sembilan Jejenu, Negeri Sembilan Jasin, Melaka Nusajaya, Johor Iskandar Malaysia, Johor Masai, Johor Kahang, Johor Tenggaroh, Maokil & Nitar, Johor Sungai Melikai & Nasaruddin, Johor Rompin, Pahang Gebeng, Pahang Kertih, Terengganu Kapilit, Sabah Kundasang, Sabah Pitas, Sabah Tawau, Sabah Lahad Datu, Sabah Sabah	

BIOECONOMY COMMUNITY DEVELOPMENT PROGRAMME (BCDP)

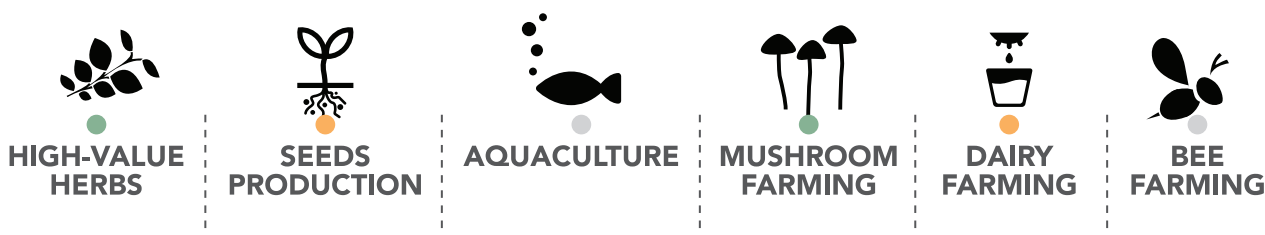
Introduction

Bioeconomy Community Development Programme (BCDP) was announced by Y.A.B. Prime Minister in Malaysia's Budget 2014 to increase revenue of BioNexus Status Companies and BTP Trigger Projects through creation of sustainable supply of raw materials via offtake collaboration with cooperatives/associations/farmers through contract farming. It is intended to develop unskilled farmers into Bio-Agropreneurs and generate additional income for the programme's participants. It also provides a foundation for the upstream and downstream portion of the Bioeconomy industry supply chain. BCDP has been endorsed as part of the National Blue Ocean Strategy (NBOS) initiatives on 27 April 2015.

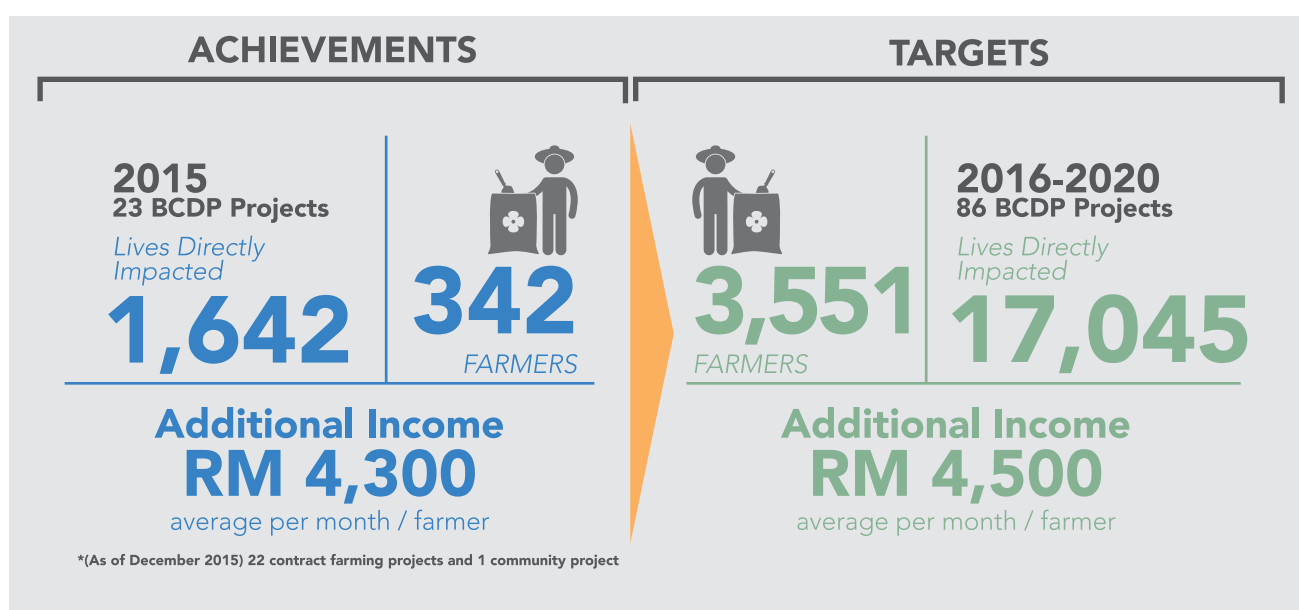
The main objectives of BCDP



FOCUS AREAS

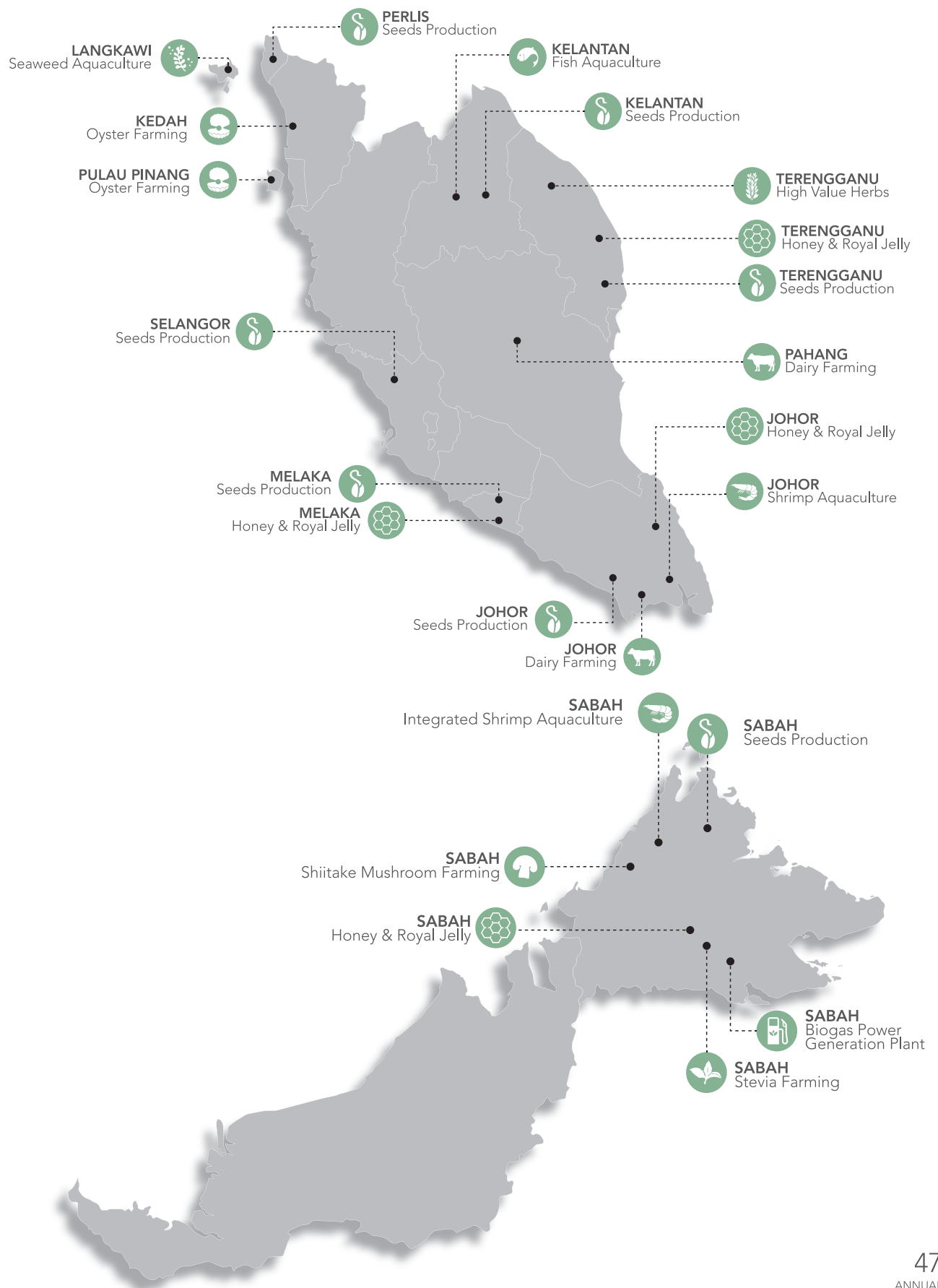


BCDP ACHIEVEMENTS & TARGETS

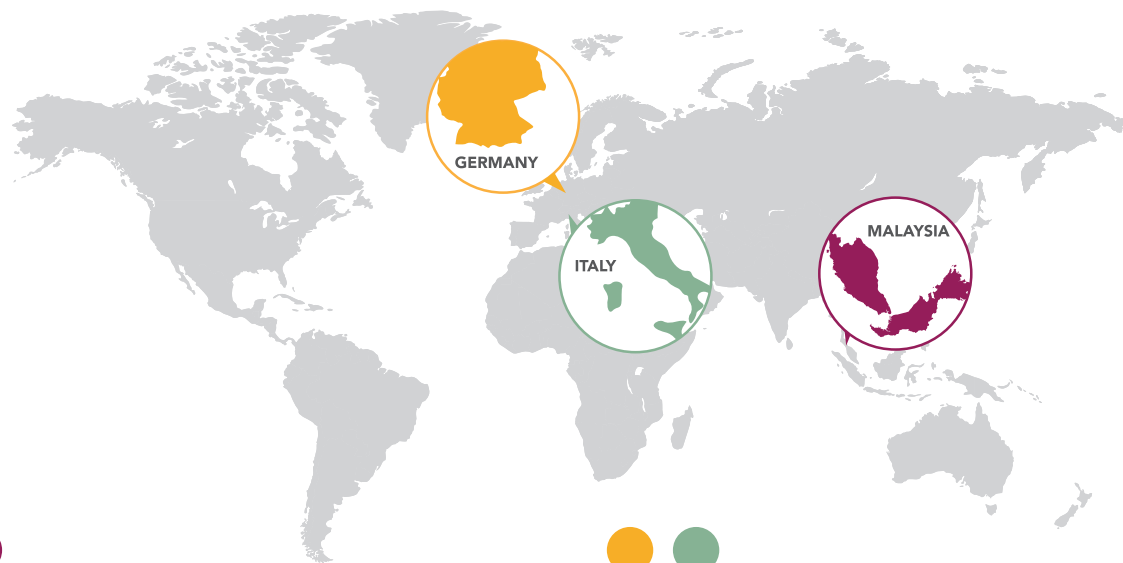


2015 HIGHLIGHTS

BCDP Projects



KEY EVENTS



Local

- **11 February 2015**
Exchange of Collaboration Proposal between BiotechCorp and DECHEMA of Germany in Kuala Lumpur
- **18 February 2015**
Presentation on BCDP proposal for RMK-11 to representatives from 18 stakeholders at BCDP Stakeholder Meeting at BiotechCorp HQ
- **2 March 2015**
Exchange of Collaboration Proposal between Ghent Bio-Economy Valley and BiotechCorp at BiotechCorp HQ
- **19 March 2015**
Steering Committee Meeting to approve 13 new BTP Trigger Projects and 4 BTP Funds at MOSTI, Putrajaya
- **19 – 22 April 2015**
Promoting Bioeconomy initiatives at BioBorneo 2015, Kota Kinabalu, Sabah
- **27 April 2015**
Endorsement of BCDP as part of Malaysia's National Blue Ocean Strategy (NBOS) initiatives in Putrajaya
- **28 April – 2 May 2015**
Promoting Bioeconomy initiatives at Festival Bio-Kelantan & Teknologi Hijau Negeri Kelantan 2015, Kota Bharu, Kelantan
- **27 July 2015**
First Honey Harvest Ceremony for BCDP Bee Farming Project in Kuala Linggi, Melaka
- **17 – 19 August 2015**
Bioeconomy Day, BioMalaysia & ASEAN Bioeconomy 2015 Conference & Exhibition at PWTC, Kuala Lumpur
- **21 September 2015**
BCDP Awareness Workshop in collaboration with The Holstein Milk Co. Sdn. Bhd. at BiotechCorp HQ
- **11 November 2015**
Bioeconomy Day at Le Meridien Hotel, Kota Kinabalu, Sabah
- **18 December 2015**
Bioeconomy Networking Investment Session in Kuala Lumpur

International

- **9 June 2015**
 - Exchange of Collaboration Proposal between BiotechCorp and Italian Association for the Development of Biotechnology (Assobiotec) in Milan, Italy.
 - Product launch by a BCDP anchor company, Flora Bee Hive Enterprise Sdn. Bhd. during EXPO Milano in Milan, Italy
- **31 August 2015**
High Level Roundtable Discussion Meeting with Assobiotec and Italian Bio-based Companies/Universities/Research Institutes in Milan, Italy
- **24 - 26 November 2015**
Participated in the Global Bioeconomy Summit in Berlin, Germany

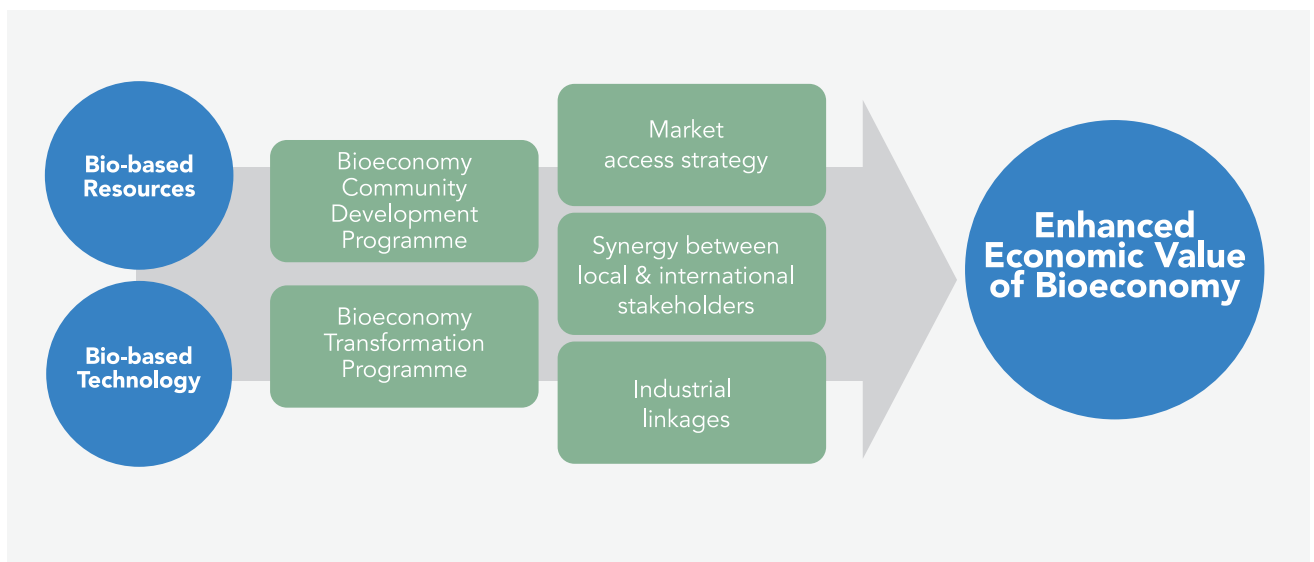
MOVING FORWARD

CHALLENGES AHEAD

In view of the challenges ahead, BiotechCorp foresees the Bioeconomy playing a greater role in providing solutions for managing resources in a responsible, inclusive and efficient way. BiotechCorp believes that the multiple enablers under its initiatives, further guided by the 11MP focusing on capital and people economies, will spur productivity and innovation through an environmentally sustainable approach, thus bringing the bio-based industry to greater heights for the nation. These enablers include:

- Effective implementation of the Bioeconomy Community Development Programme (BCDP);
- Increasing domestic investment through the Bioeconomy Transformation Programme (BTP);
- Amplifying market access strategies;
- Enhanced synergies between local and international stakeholders; and
- Strengthening industrial linkages to support bio-based industry.

KEY ENABLERS TO ENHANCE BIOECONOMY



Advancing The SMEs

"Championing local bio-based entrepreneurs to venture into the global market."



Introduction

The BioNexus Development Division is focused on promoting the BioNexus status and its benefits to bio-based companies and entrepreneurs as well as nurturing current BioNexus companies through business advisory services which also includes regulatory and immigration facilitation. Strategic initiatives undertaken by the Division are through three main platforms namely BioNexus Engagment, the BioNEXT programme and BioShoppe. These platforms enable BioNexus companies to enhance their access to market and accelerate commercialisation activities to achieve the target set under the National Biotechnology policy, which is the creation of 20 global biotech companies by 2020. There are 261 BioNexus status companies at the end of 2015 and most of them are defined as Small and Medium enterprise. These BioNexus status companies have had a constant revenue growth rate 19% since 2008. The main driver for this impressive growth is their ability to embrace innovation, technology adoption and continuous R&D activity which is part of the BioNexus programme.

10 YEAR ACHIEVEMENTS

Public listed BioNexus Companies / Group of Companies.

- ACGT Sdn Bhd
- Attest Research Sdn Bhd
- Aurigene Discovery Technologies (M) Sdn Bhd
- Avenue Biotech Sdn Bhd
- Bioalpha R&D Sdn Bhd
- Bio-Collagen Technologies Sdn Bhd
- Cardia Bioplastics Malaysia Sdn Bhd
- Genting AgTech Sdn Bhd
- GranuLab (M) Sdn Bhd
- Green & Smart Sdn Bhd
- IOI Lipid Enzymtec Sdn Bhd
- IOI Palm Biotech Sdn Bhd
- Kulim TopPlant Sdn Bhd
- Malaysian Genomics Resource Centre Berhad
- Microwell Bio Solutions Sdn Bhd
- PGEO Biotech Sdn Bhd
- PureCircle Sdn Bhd
- QL Agrobio Sdn Bhd
- Quintiles Malaysia Sdn Bhd
- StemLife Berhad
- Sunzen Life Sciences Sdn Bhd
- TMC Biotech Sdn Bhd
- TSH Biotech Sdn Bhd

BioNexus Engagement

Evaluation and assessment pre-applications for BioNexus Status

Outcome

Evaluated and assessed **1222** pre-applications for BioNexus Status.

Accelerating commercialisation activities of BioNexus Status companies

Outcome

18.84% Compound Annual Growth Rate (CAGR) of BioNexus Status companies.

Facilitate the participation BioNexus Status companies participation in 14 international Exhibition/Trade Mission

Outcome

USD 58 million total potential deal value from all the international Exhibition/Trade Mission.

2015 HIGHLIGHTS

BioNexus Engagement is actively involved in local and international events, product launches, funding initiatives and showcases during the year 2015.

Gulf Food, Dubai, UAE

Dubai World Trade Centre

from 8-12 February 2015

Biotree Biotechnology Sdn Bhd and Natural Wellness Biotech Sdn Bhd participated in this exhibition.

Potential Deal Value USD600,000.

Global Forum for Innovation in Agriculture

Abu Dhabi National Exhibition Centre (ADNEC)

from 9-10 March 2015

Tropical Bioessence Sdn Bhd, Green World Genetics Sdn Bhd, Agrovery Sdn Bhd and Cambridge Herbal Sdn Bhd participated and launched **5 aromatherapy products** including Sajdah, an aromatherapy spray for prayer mat, shower gel, shampoo, hand & body lotion and multipurpose spray.

Potential Deal Value USD8.5 million.

Vitafood Asia 2015, Hong Kong

Asia-World Expo, Hong Kong

from 2-3 September 2015

6 BioNexus companies participated in this Expo:

- i. BioFact Life Sdn Bhd
- ii. BioTree Biotechnology Sdn Bhd
- iii. Ligno Biotech Sdn Bhd
- iv. Hopematic Sdn Bhd
- v. Furley Bioextracts Sdn Bhd
- vi. Ricca Peacock Asia Sdn Bhd

Potential Deal Value USD9.8 million.

ASEAN SME Showcase & Conference 2015,

Kuala Lumpur Convention Centre

from 17-19 May 2015

4 BioNexus companies namely Stemlife Berhad, Airstec Sdn Bhd, DNA Laboratories Sdn Bhd and APSN Sdn Bhd participated in the ASEAN SME Conference.

Pre-application processing for BioNexus Status

In 2015, BioNexus Engagement evaluated and assessed 65 new Pre-applications for BioNexus Status.

BioMalaysia & ASEAN Bioeconomy

Putra World Trade Centre

from 17-19 August 2015.

7 BioNexus companies exhibited at the BioNexus Pavilion and 11 products were successfully launched by the Deputy Minister of MOSTI:

- i. Biotree Biotechnology Sdn Bhd - Elixir
- ii. Airstec Innovation Sdn Bhd - Clayzyme and Bioactive Microorganism Enzymatic Surface Cleaner
- iii. Persona Kosmetik Sdn Bhd - SP.I
- iv. Cambridge Herbal Sdn Bhd - Dara Harumi Feminine Wash and Quddis moisturising cream
- v. Algae International Berhad - Josens Spirulina Whey Protein Powder, 3 flavours (vanilla, berry and caramel)
- vi. Tropical Bioessence Sdn Bhd - A'VERA Shampoo, A'VERA Shower Gel, A'VERA Facial Cleanser for Women, and A'VERA Facial Cleanser for Men
- vii. Asma Agro Sdn. Bhd.

SUPERB fund by TERAJU

SUPERB fund by TERAJU is aimed at creating a pipeline of quality and sustainable entrepreneurs that will play a vital role for economic growth and act as a catalyst for job creation.

As at December 2015, there are **7 SUPERB winners** nurtured under BiotechCorp, which are as follows:

- i. APC Nature Farm Sdn Bhd – Ayam Kampung Akar Putra
- ii. Kamuda Bio Agro Sdn Bhd – Manufacturing of Ruminant Feed
- iii. SHE Empire Sdn Bhd – Halal Beauty Products under the brand name Nature Kiss
- iv. Euryvative Sdn Bhd – Eurypot, a supporting device for the Tongkat Ali planting
- v. Maiza Integrated Resources Sdn Bhd – Indoor Hybrid Grouper production
- vi. Addin Aquaculture Sdn Bhd – Soft Shell Crab production
- vii. Louis Eco Farm Sdn Bhd – Self-Sustainable Vertical Farming

Total Disbursed funds:

RM1.49 million

Balance:

RM1.985 million

MOVING FORWARD – PLANS & INITIATIVES

PLANS

Enhance quality and competitiveness of BioNexus companies.	Focus more on 3 mega trend as reported by Frost & Sullivan which is in wellness (health supplements, natural products etc), renewable energy and urbanisation (waste management, composting etc).	Re-energising non-performing BioNexus Status companies.
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INITIATIVES

Work with SME Corp and other agencies / ministries / regulators to further develop BioNext companies.	Work closely with BioNext companies.	Continued engagements with non-performing BioNexus companies.
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BioNEXT PROGRAMME

Introduction

Start-ups and SME development have always been a crucial component in the Bioeconomy agenda. Having recognise this, BiotechCorp and SME Corp collaborated to create BioNEXT Programme, an initiative under the High Impact Programme (HIP) 5; Catalyst Programme under the SME Masterplan. The BioNext Programme is intended to create home grown champions in the biotechnology industry by strengthening the capability and capacity of participating BioNexus-status companies through development programmes, provision of market intelligence and enhancement in market access. This initiative supports the NBP in creating 20 global bio-based companies by 2020.

Creating **HOMEGROWN CHAMPIONS** via a targeted approach and support in financing, market access and human capital development

HIP5

**NBP
20 GLOBAL
COMPANIES**



BioNext PROJECT TIMELINE

In Stage 1 of the BioNext Programme, BioNexus status companies were invited to attend an Outreach Workshop on 26 June 2015 as an introduction to the BioNext Programme, out of which, 20 companies were selected to move on to the next stage of the Programme. Stage 2 of the Programme included a Capacity Building Workshop and an evaluation of the preparedness and capabilities of the companies to successfully grow their business in international markets.

The scores from Stage 2 was used to select the companies to participate in Stages 3 and 4 of the Programme, whereby the BioNexus companies were also required to deliver a 5 minute business pitch to a panel comprising the CEO from Biotech Corp and the CEO of SME Corp in the presence of other stakeholders. These pitches, together with other information from their application forms and business plans was used to select a total of 10 companies eligible to attend the Oxford Accelerator Programme. The participating companies are:

Tier 1 Companies:

Fuciphagus Agritech Sdn Bhd • Algaetech International Sdn Bhd • Furley Bioextracts Sdn Bhd • Tropical Bioessence Sdn Bhd • Natural Wellness Sdn Bhd • Biofact Life Sdn Bhd • Hopematic Sdn Bhd • Cambridge Herbal Sdn Bhd • Ligno Biotech Sdn Bhd • Orchid Life Sdn Bhd

Tier 2 Companies:

BioAlpha R&D Sdn Bhd • ScienceGates Sdn Bhd • GanoFarm R&D Sdn Bhd • BioTree Biotechnology Sdn Bhd • Aning Biotech Corporation Sdn Bhd • Persona Kosmetik • Ricca Peacock Sdn Bhd • Spektra Biotek Sdn Bhd • Algae International (M) Sdn Bhd • Kayu Gaharu (M) Sdn Bhd



Oxford Accelerator Programme Summary

The Oxford Accelerator Programme (OAP) held @ Lady Margaret Hall, University of Oxford in September 2015 is designed to address the unmet needs and knowledge area gaps based on the company profiling analysis exercise undertaken. At the end of the OAP, the 10 companies were able to develop action plans which include international market development, channel development, product certification and demand generation via marketing and communication.

Visit by the Minister of Science, Technology and Innovation (MOSTI)

During the course of the programme at Oxford, The Honourable Minister of Science Technology and Innovation (MOSTI) Malaysia, Y.B. Datuk Seri Panglima Madius Tangau made a short visit to witness first-hand how the BioNext Programme was conducted. His presence brought tremendous impact and prestige to the programme as it brought immense endorsement and value to the programme. The entrepreneurs took the opportunity to meet and interact with the Y.B. Minister.



BioShoppe

Introduction

BioShoppe is a platform created by Biotechcorp which aims to intensify and expand market access for BioNexus status companies' products by providing visibility and exposure to retail environments. BioShoppe promotes a wide range of natural-based wellness products including health supplements, cosmetics and personal care, functional food and aromatherapy products. The main objectives of BioShoppe is to bring together high quality products produced by BioNexus companies and market them under various strategic marketing programmes to enhance their market coverage.

10 YEAR ACHIEVEMENTS

Launched in 2014 with **3 retail presence** at Nova Store (IOI Mall, Puchong), Life Springs Pharmacy (Mont Kiara) and Super Pharmacy (SS14, Petaling Jaya) & Lazada.com for online presence.

Selected by MOSTI to exhibit its products for 6 months at **Expo Milano 2015** under the Malaysian Pavilion.

BioShoppe in Singapore with 6 products from 3 BioNexus companies at Agro Bazaar Singapore.

FOCUS AREAS

Develop BioNexus SMEs to become home-grown champions

Providing the companies with "soft landing" into the retail environment and to improve on their branding & packaging

Introduce the BioShoppe brand to stakeholders and local consumers

Promote and create awareness for bio-based wellness products

2015 HIGHLIGHTS

Activity

Participated in IDEX 2015

Universiti Teknologi MARA (UiTM) Shah Alam
from 28 - 30 April 2015

Outcome

Awareness on the benefits of bio-based products to students and visitors. A total of 2500 visitors came for IDEX 2015.

Participated in Bio Borneo 2015

Magellan Sutera, Sutera Harbour Resort
from 20 - 21 April 2015

Outcome

Introduced BioShoppe products to the bio-based industry for Borneo and other regional areas.

Participated in National Innovation Conference and Exhibition (NICE 2015)

Kuala Lumpur Convention Centre
from 28 -30 April 2015

Outcome

Awareness on the benefits of bio-based products to the industry players, NGO's, public sector, university & schools students.

Participated in ASEAN SME SHOWCASE & CONFERENCE 2015

Kuala Lumpur Convention Centre
from 26 – 28 May 2015

Outcome

Successful promotion of products from BioNexus companies for ASEAN markets and seize global networking opportunities.

Participated in MOSTI Commercialisation Conference & Exhibition 2015

Putra World Trade Centre
from 18 – 19 November 2015

Outcome

Awareness and promotion on the wide range of wellness products by BioNexus SMEs.

Participated in Bio Malaysia & Asean Bioeconomy 2015

Putra World Trade Centre
from 17 – 19 August 2015

Outcome

This is the third appearance of BioShoppe for BioMalaysia Bioeconomy Asia Pacific. Awareness activities were carried out during the event to promote local bio-based products.

Activity

Collaboration with Super Pharmacy Megastore

(known as the largest pharmacy warehouse outlet in Malaysia by the Malaysia Book of Records)

Outcome

Successfully launched a BioShoppe corner to promote over 100 types of BioNexus products from natural health supplements, personal care, cosmetics and aromatherapy products.

Participated in international events to promote Malaysia local bio-based products

Outcome

Promote bio-based products at Expo Milano 2015 under the Malaysian Pavilion. BioShoppe showcased over 20 types of BioNexus products produced from Biotropics (M) Sdn Bhd, Nova Laboratories Sdn Bhd, Cambridge Herbal Sdn Bhd, Tropical Bioessence Sdn Bhd, Hopematic Sdn Bhd, Kayu Gaharu Sdn Bhd, Spektra Biotek Sdn Bhd, Bioalpha R & D Sdn Bhd & Biofact Life Sdn Bhd.

Collaboration with Malaysia External Trade Development Corporation (MATRADE)

Outcome

BioShoppe successfully showcased various BioNexus products at MATRADE Wan Chai, Hong Kong

Collaboration with Federal Agricultural Marketing Authority (FAMA)

Outcome

BioShoppe's products successfully penetrated Singapore through Agro Bazaar.

MOVING FORWARD – PLANS & INITIATIVES

PLANS

Develop BioNexus SMEs to become home-grown champions.

Raise awareness and promote BioNexus products into the retail environment.

Promote bio-based wellness products

Establish BioShoppe as the incubator for branding and marketing for BioNexus companies' products.

INITIATIVES

Continue collaborations with other government agencies, relevant ministries and industry to explore the potential of BioNexus companies' products.

Collaborate with pharmacies and online platforms to showcase and promote the wide range of BioNexus products.

Continue participation in local and international events to promote BioNexus companies products.

Expand BioShoppe wellness store nationwide via a franchise scheme.

Regulatory Advisory & Facilitation

Introduction

BiotechCorp is actively engaged in various initiatives to support the formulation of a progressive regulatory agenda for the biotechnology sector in accordance with Thrust 7 of the National Biotechnology Policy (NBP). The main emphasis of Thrust 7 is the creation of a solid, balanced and supportive regulatory framework for the development of biotechnology in Malaysia. In 2015, BiotechCorp continues its active role in supporting the formulation of a progressive regulatory agenda for the biotechnology sector through regulatory engagements with all relevant regulatory authorities which is pertinent to ensure that the regulatory environment will be further enhanced to support the final phase of the NBP.

10 YEAR ACHIEVEMENTS

The Acceptance of Malaysia as Non-OECD Member

Adhering to the Mutual Acceptance of Data (MAD) in the Assessment of Chemicals on Good Laboratory Practice (GLP)

Outcome

Since 2008, BiotechCorp was actively involved in the programme and worked closely with National Pharmaceutical Control Bureau (NPCB) and Standards Malaysia to provide feedback, support and awareness to ensure that we meet the requirements and targets set by the OECD as this initiative will significantly benefit biotech companies. The acceptance of Malaysia as Non-OECD Member adhering to the MAD system on GLP is a big achievement for the country. With the acceptance, Malaysia benefits in many ways such as:

- International acceptance of non-clinical data developed in Malaysia
- Trade facilitation by reducing marketing time for locally manufactured products marketed internationally
- Exemption of non-clinical research being repeated in OECD countries
- Cost savings in product development
- Overcoming existing technical barriers
- Increasing local and foreign investments in research and development of products involving pharmaceutical, biomedical, biotechnology and biochemicals in Malaysia
- Making Malaysia a development and research hub for non-clinical research

Biosafety Act 2007

Outcome

The BioSafety Act 2007 came into force on 1 December 2009 which complies with the requirements set out by the Cartagena Protocol on Biosafety (CPB). BiotechCorp played a major role in ensuring that adequate and proper consultation took place between the regulators with the biotechnology industry which provided much needed constructive feedback. The Act is meant to regulate the release, importation, exportation and contained use of LMOs and has a significant impact on the industry. The coming into force of the Act provides a sense of certainty to the industry and investors besides ensuring that a process is in place to handle the release, importation, exportation and contained use of LMOs.

Pharmaceutical Regulations

Outcome

BiotechCorp played a significant role in providing feedback in the development of the Guidance Document and Guidelines for the Registration of Biosimilars in Malaysia before it was published. In 2008, BiotechCorp published a regulatory guidebook entitled "EU and US Pharmaceutical Regulations: A Guide for Malaysian Companies" which provides a useful overview on the regulatory pathway to access the EU and US markets. It also provides relevant information to enable Malaysian companies to better plan and implement appropriate regulatory strategies for successful product placement in those markets. BiotechCorp was invited to participate in the Technical Working Group (TWG) for pharmaceutical, traditional medicines & health supplements and medical devices and provided industry input for the harmonisation of regulations in the three sectors in ASEAN.

10 YEAR ACHIEVEMENTS

Strengthening Malaysia's Intellectual Property (IP) Framework

Outcome

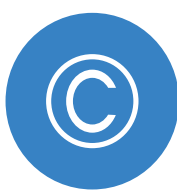
BiotechCorp & MyIPO collaborated to raise awareness on IP and to improve IP protection in the development of the biotechnology sector.

- Collaborated with Malaysian Institute of Management to introduce the Certified Professional IP Manager Programme (CPIPM) whereby the programme saw over 100 graduates from this programme.
- BiotechCorp worked with MyIPO to hold 3 series of Certified Short Course on IP Law from 2008-2010 for the judiciary and enforcement officials on to update and enhance their skills and awareness on IP law.
- Biotech Corp collaborated with Malaysian Debt Ventures (MDV) to bring greater access to funding for BioNexus companies under the Intellectual Property Financing Scheme (IPFS) which recognises IP as a source of collateral for funding.

FOCUS AREAS



Biosafety



Intellectual Property



Pharmaceutical Regulations



Access & Benefit Sharing



International Accreditation



Expatriate Services

2015 HIGHLIGHTS

Biosafety

Outcome

BiotechCorp continues to work closely with the Department of Biosafety, Ministry of Natural Resources & Environment (MONRE) in the operationalisation of the Biosafety Act and its Regulations, by providing advisory and facilitating submissions for biosafety notification and approval from BioNexus Status (BNX) companies and potential investors.

In 2015, the Department of Biosafety held various consultation sessions with federal government departments and agencies including BiotechCorp to source for comments and feedback with regards to a study conducted by the Centre of Excellence for Biodiversity Law (CEBLAW) with regards to regulatory framework for liability and redress for damages caused by Living Modified Organisms (LMOs) that may result from their transboundary movement as stipulated under the Nagoya - Kuala Lumpur Supplementary Protocol Liability and Redress.

Access & Benefit Sharing (ABS)

Outcome

The Conference of the Parties to the Convention on Biological Diversity (CBD) in 2010 saw the finalisation and adoption of the "Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation to the Convention on Biological Diversity".

Consistent with Malaysia's commitment and obligations as a member of the CBD, under the Nagoya Protocol, a comprehensive national regulatory framework on ABS needs to be in place.

BiotechCorp resumes regulatory engagements with MONRE in the consultation process for the ABS laws and will continue to provide input on behalf of the industry. While it was earlier anticipated that the draft ABS law was to be tabled in Parliament before the end of 2015, the draft ABS law will mostly likely be tabled in 2016.

Upon its proclamation, the domestic ABS framework should provide a balanced means to enable Malaysia to combat biopiracy while providing an effective means for Malaysia to leverage on its rich and diverse genetic resources, in line with Malaysia's objective to promote biotechnology development as an engine for growth.

Pharmaceutical and Medical Device Regulations

Outcome

Pharmaceutical Regulations

The Control of Drugs and Cosmetics Regulations (CDCR) 1984 were promulgated under the Sale of Drugs Act 1952. The Authority (known as Drug Control Authority, 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 Control Bureau (NPCB) acts as the secretariat to the Authority which empowers the implementation of product registration in accordance to phases:

Phase 1: Prescription Drugs (Scheduled poisons/NCE/Biotechnology/Biologics)

Phase 2: Over-the-Counter, OTC (Non-scheduled poisons)

Phase 3: Traditional Medicine and Health Supplement

Phase 4: Cosmetics (Registration of cosmetics was replaced by the Notification Procedure with effect from 1 January 2008)

Phase 5: Veterinary Products

Phase 6: Active Pharmaceutical Ingredient (API)

BiotechCorp continues to work closely with NPCB to update and advise the BioNexus companies on any updates to the regulations.

Cell and Gene Therapy Products (CGTPs) Regulations

The regulatory framework for Cell and Gene Therapy Products (CGTPs) attempts to address the unique characteristics of the products through a suitably adjusted set of principles. CGTPs are subject to the same Investigational New Drug (IND) and product approval process as any other biologics.

The development of CGTPs guidance document and guidelines for registration in Malaysia had engaged relevant stakeholders from various government agencies, research and treatment institutions, pharmaceutical industries, manufacturers via the formation of the Technical Working Group (TWG-CGTPs), chaired by National Pharmaceutical Control Bureau (NPCB), Ministry of Health Malaysia.

In 2015, BiotechCorp actively participated in the CGTPs Technical Working Group to provide feedbacks on the guidance documents and development of regulatory framework.

Medical Device Regulations

Medical Device Authority (MDA) was established as Medical Device Bureau (MDB) under the Ministry of Health (MoH), Malaysia, in charge of medical device regulatory matters.

MDA ensures that medical devices are of high quality, effective and safe for the local market through establishment licensing and registration scheme. The registration of Medical Device will become mandatory after 30 June 2016.

Medical Device Centralised Application System (MeDC@St) was launched on 1 July 2013 by the Minister of Health Malaysia, to support the implementation of the Medical Device Act 2012 (Act 737) and its regulation. MeDC@St is a web-based Online Application System for Establishment Licensing and Medical Device Registration.

In 2015, the following directives were issued and revised by the MDA:

- Good Distribution Practice for Medical Devices (GDPMD), First Revision (November 2015)
- Medical Device (Exemption) Order 2015

BiotechCorp continues to work closely with MDA to update and advise the BioNexus companies on any updates to the regulations

Harmonisation of Standards and Technical Requirements in ASEAN

Throughout 2015, Malaysia continued to play an active role in harmonisation efforts through the ASEAN Consultative Committee for Standards and Quality (ACCSQ) for Pharmaceutical Product Working Group (PPWG), the Traditional Medicines and Health Supplement Product Working Group (TMHS PWG) as well as the Medical Devices Committee (AMDC).

In 2015, BiotechCorp participated in the following ASEAN Technical Working Group (TWG):

- **22nd ACCSQ PPWG in Vientiane, Lao PDR, on 9-13 March 2015:** Updates on the status of MRA for GMP, BA/BE Taskforce and developments in ASEAN.
- **23rd ACCSQ TMHS PWG in Kuala Lumpur on 1-5 June 2015:** Updates on the status of the ATSC, GMP Taskforce, Head of Delegation and the Taskforce of Regulatory Framework meetings.
- **24th ACCSQ TMHS PWG in Makati, Philippines, on 12-16 October 2015:** Updates on the status of the ATSC, GMP Taskforce, Head of Delegation and the Taskforce of Regulatory Framework meetings.
- **1st ACCSQ AMDC in Kuala Lumpur on 1-2 December 2015:** Updates on the developments in ASEAN economic integration initiatives and implementation of ASEAN Medical Device Directive.

Through ACCSQ PWG participation, BiotechCorp was able to keep track on the work programme progress and the time frame targeted in harmonising standards and reducing technical barriers towards a single market by 2016.

2015 HIGHLIGHTS

International Accreditation

Outcome

OECD Good Laboratory Practice (GLP)

Malaysia is officially a non-member with full adherence to the Organisation for Economic Cooperation and Development (OECD) related to Mutual Acceptance of Data (MAD) in the Assessment of Chemicals on Good Laboratory Practice (GLP) since April 2013. 8 test facilities are compliant to OECD GLP Programme in 2015 (6 facilities by Standards Malaysia and 2 facilities by NPCB).

BiotechCorp through various initiatives promotes and encourages BioNexus companies and BioNexus Partnering Programme (BNP) laboratories to obtain the OECD accreditation for their test facilities to open up an avenue for laboratory testing in the event of product registration in the OECD countries.

Good Distribution Practice (GDP)

Pharmaceutical

The GDP under pharmaceutical requires that materials and products or cosmetics classified as dangerous drugs, scheduled poisons and psychotropic substances, under the Dangerous Drugs Act 1952 (Revised 1980), Poison Act 1952 (Revised 1989), Poisons (Psychotropic Substances) Regulations 1989 and the Control of Drugs and Cosmetics Regulations 1984 (Revised 2009), are stored and distributed in accordance with the requirements of the respective Acts and Regulations.

Medical Device

The Good Distribution Practice for Medical Devices (GDPMD) is developed to specify the requirements for a quality management system to be established, implemented and maintained by an establishment in carrying out activities in medical device supply-chain to comply with Malaysian medical device regulatory requirements as stipulated in Medical Device Act 2012 (Act 737).

BiotechCorp provide constant support to BioNexus companies to comply with the relevant GDP and GDPMD requirements as well as creating a holistic environment with other relevant stakeholders.

Intellectual Property

Outcome

Since its launch, BiotechCorp continues to work closely with MyIPO and MDV towards the realisation of the Intellectual Property Financing Scheme (IPFS) initiative. More awareness sessions were held throughout 2015 to bring in more BioNexus companies to apply for the IPFS.

BiotechCorp was invited as a co-sponsor for the Global Intellectual Property Valuation Conference (GIPVC) 2015 which was organised by MyIPO. BiotechCorp's Ms Sumah Ramachandran was invited and participated as a panel speaker for one of the sessions on technology.

Prior to the GIPVC, a session was held and chaired by Tan Sri Dr. Mohd Irwan Serigar Abdullah, the Secretary General of Treasury, Ministry of Finance (MOF) with stakeholders including BiotechCorp to discuss on various initiatives that can be done to promote the adoption and utilisation of the IPFS.

Expatriate Services

Outcome

The Immigration Department of Malaysia (IDM) has launched a new system at the Expatriate Services Division (ESD) for Employment Pass applications. Hence, all companies are required to create an account and register with the ESD portal. BiotechCorp is designated as a Monitoring Agency (Regulatory Body) for the application of Employment Pass for the bio-based industry. BiotechCorp provides advisory and facilitation for employers applying for related immigration passes for their expatriate employees.

MOVING FORWARD – PLANS

BIOSAFETY AND ABS

- Continue engagements with the Biosafety Department, to advocate the development of a balanced and industry-centric regulations to ensure compliance and facilitate bio-based industry growth.
- Resume consultative process towards the promulgation of the ABS law with MONRE and to provide awareness to the industry on the developments of the national ABS law.

PHARMA AND MEDICAL DEVICE REGULATIONS

Continue participation and contribution in the development of pharmaceutical and medical device regulations including harmonisation of regulatory framework for ASEAN region.

INTELLECTUAL PROPERTY

- Continue to work closely with MyIPO to encourage and guide BioNexus status companies to avail themselves to the IPFS.
- 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.
- Continue providing advisory services on IP-related matters to the stakeholders.

INTERNATIONAL ACCREDITATION

- 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.
- Continue engagement and provide advisory to BioNexus status companies to comply with the GDP and GDPMD requirements.
- Continuous engagement and provide support to the relevant stakeholders on the accreditation programmes and initiatives.

EXPATRIATE SERVICES

Continue providing advice and facilitation to the bio-based industry for expatriate applications.

BIONEXUS PARTNERS

Partnering & Growing Together

"Partnering for accessibility, partnering for recognition, thus, partnering for success."



Introduction

BioNexus Partners (BNP) provide technical support to BioNexus and bio-based companies by helping to source out for their research & development & commercialisation (R&D&C) needs through our network of laboratories and expertise from renowned universities, research institutes, government-linked companies and commercial laboratories from all regions of Malaysia. This is in line with BioNexus Bill of Guarantee no. 8 "Access to Shared Laboratories & Facilities".

10 YEAR ACHIEVEMENTS

BioNexus Partners Programme

2008

Received funds from MOSTI under RMK-9 plan and MOF during Phase 1 National Biotechnology Policy: Capacity Building to establish a network of key facilities to support the R&D&C needs of the biotechnology industry through the BioNexus Partners (BNP) programme.

Implementation of Phase 1 of the BNP programme (BNP status award to selected labs)

Outcome

20 selected laboratories from UM, UPM, UKM, FRIM, UTM, USM, UMT and UiTM were awarded with the BNP status to provide industry access to their facilities.

2010

Launch of the BNP Centre of Excellence (CoE) for Natural Product Development in FRIM by YB Datuk Seri Panglima Maximus Ongkili, MOSTI Minister.

Outcome

This BNP CoE will be the reference centre for natural product development. It consists of 6 BNP laboratories from FRIM. The Malaysian Herbal monograph was also launched by the minister.

Continuous marketing & promotion of BNP laboratories services.

108 collaborations / **RM0.8 million** revenue

2009

Implementation of Phase 2 and 3 of the BNP programme (BNP status award to selected labs).

Outcome

36 selected laboratories from UMP, MARDI, SIRIM, USIM, IIUM, UniMAP, KBioCorp, TPM Biotech, UMS and UNIMAS were awarded with the BNP status to provide industry access to their facilities.

Marketing & promotion of BNP laboratories services was initiated.

52 collaborations / **RM0.5 million** revenue

2011

Launch of the BNP Centre of Excellence for Pharmacogenomics Research in UiTM by Y.Bhg. Tan Sri Dato' Muhyiddin Yassin, former Deputy Prime Minister of Malaysia.

Outcome

This BNP CoE will be the reference centre for personalised medicine and pharmacogenomics research. It consists of 3 BNP laboratories from UiTM. The Malay Genome sequencing projects was also launched by Y.Bhg. Tan Sri Dato' Muhyiddin Yassin.

Continuous marketing & promotion of BNP laboratories services.

121 collaborations / **RM0.7 million** revenue

10 YEAR ACHIEVEMENTS

2013

Award of the BNP Centre of Excellence for Industrial BioProduct Development to UTM by Y.B. Datuk Dr Abu Bakar Mohamad Diah.

Outcome

This BNP CoE will be the reference centre for development of industrial bioproducts involving fermentation technology, environmental and waste management. It consists of 6 BNP laboratories from UTM.

BioNexus Partners Award to high performing BNP laboratories.

Outcome

Recognitions for high performing BNP labs were given to:

- Animal Toxicity Unit, UKM for Best BNP Award for BioMedical Sector
- Herbal Product Development Lab, FRIM for Best BNP Award for AgBiotech Sector
- Fermentation Technology Unit, UPM for Best BNP Award for BioIndustrial Sector

Appointment of Melaka Biotechnology Corporation (MBC) as a BNP status laboratory.

Outcome

Melaka Biotechnology Corporation (MBC) was awarded the BNP status to provide industry access to their facilities.

Continuous marketing & promotion of BNP laboratories services.

282 collaborations / **RM2.2 million** revenue

2014

BioPartnering 2014 (Northern Series): "Generating biotechnology-based economy" on 15 May 2014, Kulim Golf & Country Resort, Kedah.

Outcome

BioPartnering 2014 was the first networking event gathering all industry players and entrepreneurs and key R&D&C facilities to explore business potentials. The event was launched by Y.B. Dato' Seri Haji Mukhriz Tun Mahathir and has attracted more than 300 entrepreneurs and local players to the event.

Continuous marketing & promotion of BNP laboratories services.

400 collaborations / **RM1.7 million** revenue

2015

Established BNP Centre of Excellence (CoE) for Halal BioProduct Development.

Outcome

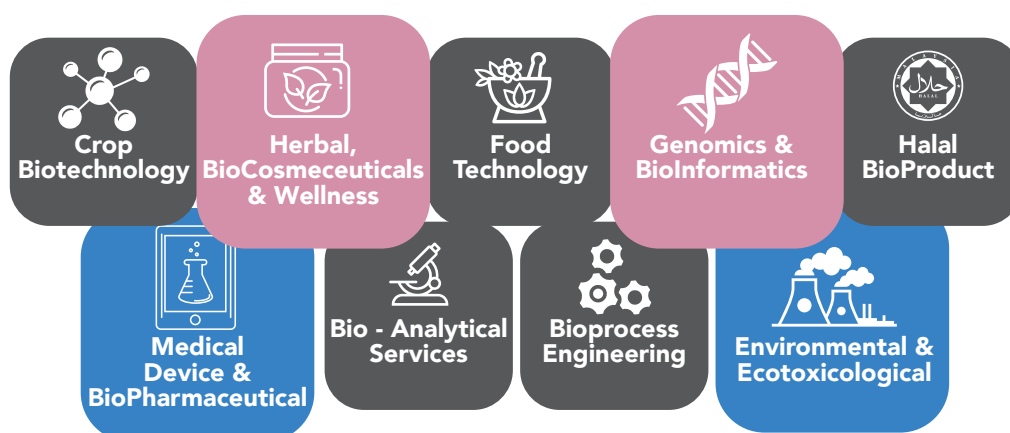
This BNP CoE will be the reference centre for Halal Product development. It consist of BNP laboratories from UPM, USIM, TPM Biotech & MBC.

Continuous marketing & promotion of BNP laboratories services.

321 collaborations / **RM4.2 million** revenue

FOCUS AREAS

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



2015 HIGHLIGHTS

Participate in exhibitions and partnering platform to highlight and showcase BioNexus Partners (BNP) laboratory support services, facilities and expertise to the bio-based industry (local and international companies, SMEs, entrepreneurs & MNCs)

12th Malaysia International Halal Showcase (MIHAS) 2015,

KL Convention Centre
from 1 – 4 April 2015

Showcased the services, facilities and expertise available to support the halal industry for development of bio-based products such as Halal BioCosmeceuticals, Halal BioPharmaceuticals and Halal Food Products. The BNP laboratories highlighted included:

- Laboratory of Halal Services, Halal Product Research Institute (HPRI) of UPM
- Halal Services & Training Unit, IHRAM of USIM
- Halal Science Laboratory of TPM Biotech
- Melaka Biotechnology Corporation (MBC)

BioBorneo 2015,

Magellan Sutura, Kota Kinabalu, Sabah
from 20 – 21 April 2015

Showcased the services, facilities and expertise available in the Sabah and Borneo State to focus on supporting the industry with bio-based technologies for wealth creation through bioeconomy. The BNP laboratories highlighted included:

- Genomics & Microbial Laboratory, Biotechnology Research Institute (BRI) of UMS
- Natural Product Chemistry Laboratory, Institute for Tropical Biology and Conservation (ITBC) of UMS
- Morphological Characterisation Laboratory, ITBC of UMS

BioMalaysia & ASEAN Bioeconomy 2015,

PWTC
from 17 – 19 August 2015

Showcased the services, facilities, expertise and research outcomes of the BNP laboratories, particularly in the area of converting biodiversity to wellness products. Among the BNP laboratories involved were:

- Animal Toxicity Unit, Makmal Bioerasi, UKM
- GLP & ISO Product Testing Lab, Melaka Biotechnology Corporation (MBC)
- Laboratory of Halal Services, Halal Products Research Institute (HPRI), UPM
- Fermentation Technology Unit (FTU), UPM
- Institute of BioProduct Development (IBD), UTM
- Nano Electronics Laboratory, Institute of Nano Electronic Engineering (INEE), UniMAP
- Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM) Units, UPM

Establishment of BioLaboratories Services Transaction Centre (BioLabS) to create the industry's one stop platform for bio-based services, facilities, expertise and training.

An initiative by BiotechCorp to provide an easy access to bio-based services, facilities and expertise to the industry.

Through this transaction centre, BioLabS will help companies source out for the suitable services, facilities and expertise through our network of partners:

- testing services, pilot / animal / field and clinical trials
- laboratory, pilot and commercial scale facilities
- expertise in specific research areas
- technical trainings (basic to advanced)
- laboratory space / facilities for rental
- contract research and contract manufacturing organisations

Expand the BioNexus Partners (BNP) network globally to enhance Malaysia's position as a biotechnology hub by providing a conducive R&D&C ecosystem by promoting our local expertise and accredited facilities

BioKorea 2015,

COEX, Seoul, Korea
from 8 – 10 April 2015

Showcased services, facilities and expertise offered by BNP laboratories from Malaysia, focusing on:

- GLP facilities for in-vitro clinical testing
- Halal related services, training and facilitation for bio-based products
- Natural products and biodiversity related services and expertise

Recognition of the services and support given to the industry through the BioNexus Partners (BNP) Excellence Awards to top performing BNP laboratories

BioNexus Awards Night 2015,

PWTC
18 August 2015

Top Revenue Generating BioNexus Partners Award:

- Bioequivalence Laboratory, UM
- Animal Toxicity Unit, UKM
- Microscopy Unit, UPM

Most Collaborative BioNexus Partners Award:

- Bioprocess Engineering Laboratory, UTM
- Fermentation Technology Unit, UTM
- Pharmacognosy Laboratory, FRIM

BioNexus Partners Excellent Service Provider Award:

- Animal Toxicity Unit, UKM

BioNexus Partners Innovative Award:

- Fermentation Technology Unit, UPM

2015 HIGHLIGHTS

Conduct customised technical training for industry's specific area of interest. Focusing on the first series of training is on development of Halal certified bio-based products.

Bio-Halal Workshop,

BiotechCorp

from 25 – 26 May 2015

Held workshop with all Halal related service providers in collaboration with Halal Development Corporation (HDC) to develop training modules

Modules developed including training on:

- Basic – Overview of Halal Certification for Bio-based Products
- Intermediate – Halal Certification for Bio-Cosmeceutical, Bio-Pharmaceutical and Food related Bio-Products
- Advanced – Halal Certification Application & Maintenance for Bio-products

Training on Halal Certification for Bio-based Products (Basic),

BiotechCorp

from 16 – 17 December 2015

The first of the series of Bio-Halal customised training was conducted for the bio-based industry by our partners from BNP laboratories and HDC. Through the training, participants were able to gauge the potential of tapping into the halal market for their bio-based products / services.

MOVING FORWARD – PLANS & INITIATIVES

PLANS

Further enhance the Bio-Laboratory Services (BioLabS) Transaction Centre to create a seamless and easily accessible system.

Expand the potential of the services, expertise and facilities offered by the BNP laboratories to the local and global

Continuously develop training modules based on the industry-demand.

Focus services on industry and market-driven clusters by fostering collaboration with relevant partners.

INITIATIVES

Develop an online portal for Bio-Laboratories Services transaction centre.

Initiate collaboration with global and local parties.

Conduct training workshops based on specific industry cluster.

Foster partnership with other relevant agencies or industrial partners.

INDUSTRY TALENT DEVELOPMENT & EDUCATIONAL SERVICES

Nurturing Talents

*"Talent can't be taught,
but it can be awakened. "*

Wallace Stegner



Introduction

Industry Talent Development & Educational Services serves to inspire graduates to pursue careers in biotechnology including through on-site recruitment, job search, personal development advice, career coaching and job match via the BioKerjaya portal. As emphasised in the National Biotechnology Policy, human capital development is an essential part in biotechnology ecosystem and more talent with specialised technical competencies are required.

10 YEAR ACHIEVEMENTS

2007

Biotechnology Executive Special Training (BeST)

First introduced in 2007 and have since trained 2441 biotechnology & life science graduates with the requirements needed for the students to enable them to be involved in the related Biotechnology industry. This class and theory based programme is popular among the students as they are exposed to the world of biotechnology, parallel with the program's mission. It also gives the opportunity for internship within the related biotechnology industry

2015

BioKerjaya Portal

BioKerjaya portal was created for job seekers to submit their resume and will be matched with companies' advertisement vacancies and vice versa. The web address of the portal is www.biokerjaya.my

2012

National Occupational Skills Standards (NOSS)

BiotechCorp has been appointed as Industry Lead Body (ILB) for biotechnology industry in 2012 by Department of Skills Development of MOHR. BiotechCorp's main responsibilities include implementing industry job analysis and developing National Occupational Skills Standards (NOSS) and Course of Study (CoS). BiotechCorp together with Department of Skills Development and the industry players have developed nine NOSS and CoS for biotechnology industry. The 9 completed NOSS:

- i. Bio-Processing
- ii. Plant Tissue Culture
- iii. Herbal Extraction and Production
- iv. Multi-Crop Seed Breeding
- v. Bio-Conversion
- vi. General Laboratory Biotechnology
- vii. Lobster Breeding
- viii. BioPolymerisation
- ix. Micro Algae Culture

10 YEAR ACHIEVEMENTS

2013

Intellectual Property (IP) Module at AIMST University

ITDES incorporated a 2 credit hour of Intellectual Property (IP) module which was a compulsory elective in AIMST curriculum. The programme outcome is to demonstrate a comprehensive understanding of Biotechnology and communication & interpersonal skills.

The objectives of this course are to produce students who have a general understanding of IP, different types of IP protection available in Malaysia and international IP landscape, IP management and commercialisation, competence in applying IP knowledge in decision-making on IP related matters, including innovative thinking, analytical skills and problem solving focusing on IP. This course also looks at the management and commercialisation of IP. As at today, total of **98 students have taken IP course.**

2015

Mini BioCareer Fair

Industry Talent Development & Educational Services (ITDES) organised a Mini BioCareer Fair in April 2015 which was held at Malaysian Biotechnology Corporation's HQ and acted as a platform for the industry and future talent to explore employment opportunities and establish network. The components of the event were on-site interview, BioKerjaya Specialised, Personalised & Advisory (SPA), Industry Sneak Peek by Halal Industry Development Corporation (HDC) and also BioKerjaya portal was promoted. The event was targeted to biotechnology and life sciences graduates.

The on-site interview session was by invitation and complimentary for companies which was the highlight where the companies had the opportunity to assess and scout for potential talents by advertising job vacancies and also internship opportunities. In total, there were 7 companies participated and about 190 vacancies were offered.

2015

Studio 1310 (BIO)

Launched and featured Studio 1310 (BIO) the first time during BioCareer 2015 in conjunction with BioMalaysia & BioEconomy Asia Pacific 2015 in August which attracted more than 500 jobseekers around Malaysia. It is a concept studio to suit up & make up the students to unleash their personal branding.

Components of Studio 1310 (BIO) are On-site Recruitment, Grooming & Personal Enhancement, Career Coaching, Corporate Make-up, Posing for Success and Career Kit & Preparation which includes Resume Designing and name card printing. The initiative is to pre-empt future talents in achieving their dream jobs by giving a first good impression during interviews once they graduated. Studio 1310 (BIO) also acts as a platform to initiate the awareness of current biotechnology industry in Malaysia.

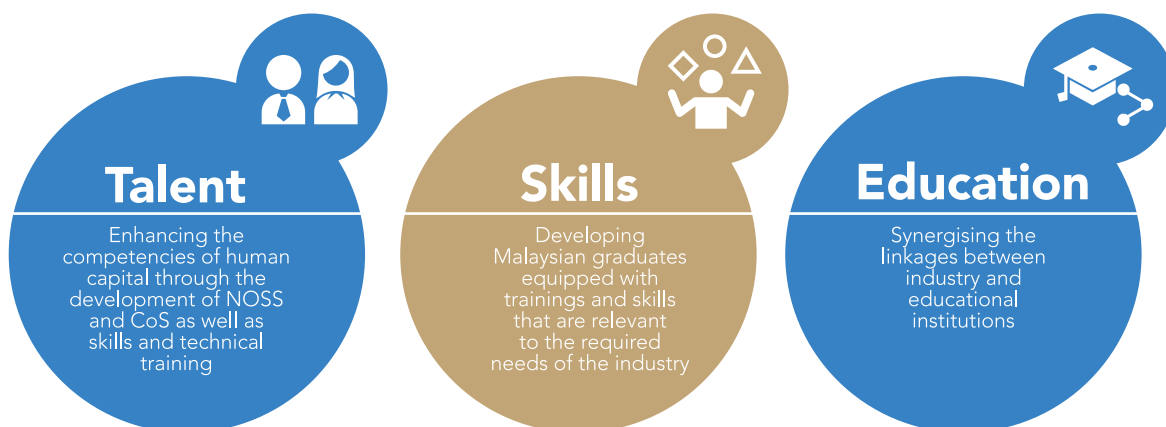
2016

MBA Bioeconomy Elective

ITDES collaborated with Universiti Malaysia Pahang (UMP) and developed MBA Bioeconomy which the first intake will be in February 2016. The duration of the programme is between 12 to 20 months with the total credit of 45. The classes will be held at Level 16, Menara Atlan and accredited by MQA.

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. The programme inculcates dynamic learning experience through insightful questioning, collaborative projects and interactions with industry panel. It will also involve lecture, case study, projects and seminar.

FOCUS AREAS



2015 HIGHLIGHTS

Development, completion & promotion of MBA Bioeconomy Elective

- Industry Talent Development & Educational Services Department and UMP via its subsidiary, UMP Advanced Education Sdn Bhd (UAE) worked together to design an MBA elective in Bioeconomy
- Promotions such as MBA previews and exhibitions were done for the 1st intake which is February 2016.

Mini BioCareer Fair 2015

Level 16, BiotechCorp Office, Kuala Lumpur
from 14 – 15 April 2015

The Mini BioCareer Fair 2015 was a platform for the industry and future talent to explore employment opportunities and establish network in the biotechnology and life sciences industry. The components of the event are:

- On-site interview – by invitation and complimentary for companies
- BioKerjaya Specialised & Personalised Advisory (SPA)
- Industry Sneak Peek by Halal Industry Development Corporation (HDC)
- BioKerjaya portal

Career Blossom 2015

Washington DC

from 17 – 19 April 2015

Organised by The United States East Coast Presidential Council (US.EPIC) in collaboration with Education Malaysia, the event served as a stepping stone for students to indulge in career fairs and various forum sessions conducted by top companies to expose Malaysian US graduates to amazing career and internship opportunities back in Malaysia. Therefore, encouraging Malaysian students to return to Malaysia and help shape & contribute to Malaysia's biotechnology industry via BioKerjaya portal.

BioBorneo 2015

The Magellan Sutera, Sutera Harbour Resort, Kota Kinabalu, Sabah

from 20 – 21 April 2015

As one of a highlight in the BioBorneo, BioCareer comprised of a BioKerjaya SPA, Resource Centre, Bio'Art and NOSS & BNP Lab Mini Sessions. These 4 sessions uniquely provides a good platform for the BioGraduates to synergise the importance of theoretical knowledge, industry updates, and personal charisma to become a better future talent.

BeST Sales & Marketing Training (B-SMArT) Programme

from 19 October – 20 November 2015

The inaugural BeST Sales & Marketing Apprenticeship Training (B-SMArT) Programme is a strategic collaboration between ICoE Healthcare, Novartis and BiotechCorp. The B-SMArT offers comprehensive modules ranging from sales & marketing excellence to strategic relationship management and patient access.

BeST @ USA

- Philadelphia • San Francisco

June 2015

- BeST@USA was held at 2 venues; San Francisco and Philadelphia in conjunction with BiotechCorp's San Francisco office opening and 2015 BIO International Convention that was held at Pennsylvania Convention Centre.
- The inaugural BeST@USA Programme by Industry Talent Development & Educational Services (ITDES) is a specialised career coaching aimed to reach out to the Malaysian US graduates specifically around San Francisco and Philadelphia which aimed to attract them as our Malaysian BioTalent Pool.
- It is a platform for BiotechCorp to brand itself as the preferred talent & career advisor to the Malaysia biotechnology related graduates.
- BeST @ SF – 11 participants, 7 universities
- BeST @ Philly – 11 participants, 6 universities

Mini STUDIO 1310

Centre for Academic Information Services (CAIS), University Malaysia Sarawak (UNIMAS)

from 2-3 October 2015

Industry Talent Development and Educational Services (ITDES) represented Malaysian Biotechnology Corporation (BiotechCorp) by taking part in Innovations, Career & Education (ICE 2015) which was held at Centre for Academic Information Services (CAIS), University Malaysia Sarawak (UNIMAS), organised by Graduate Employability Unit of UNIMAS. ITDES promoted Studio 1310 (BIO) for the second time and served as a pathway for students to pre-empt themselves in achieving their dream jobs by giving a first good impression during interviews once they graduated. Approximately 360 students attended Studio 1310 (BIO).

Purple Fiesta

Bio-Xcell Malaysia, Nusajaya Johor

from 12-13 December 2015

- A career campaign to promote and educate the stakeholders on bioeconomy careers in Malaysia of the career prospects in the bioeconomy industry.
- There were several workshops under the brand of Studio 777 (Studio Train The Trainers) focusing the educators, lecturers and career counsellors that featured sessions on Technology of Engagement to attract Gen-Y in the teaching delivery, Biotechnology Industry Updates by Senior Management of BiotechCorp, Bio-Xcell Tour and also Personal Grooming session.
- 241 students and graduates were coached from 8 universities and 22 educators attended the event.

MOVING FORWARD – PLANS & INITIATIVES



Develop more educational products that is relevant to the industry



Continue collaborations with other universities to reach out to the talents via Studio1310 and BeST Programme



Constantly develop the industry driven NOSS in collaboration with DSD through MOHR and has also received the approval from the MOHR to develop NOSS for 2016

Knowledge Biosphere

*"As knowledge increases,
wonder deepens."*



Introduction

BiotechCorp Resource Centre (RC1310) aims to be the information network for the biotechnology industry in Malaysia in enhancing knowledge management and knowledge sharing in the field of bioeconomy and bio-based industry. RC 1310 has developed core collections in life sciences which include biotechnology, food and agricultural biotechnology, healthcare and pharmaceutical biotechnology, industrial and environmental biotechnology and intellectual property & law. RC1310 houses over 4,000 hardcopy and online resources that can be broadly classified into biotechnology and life sciences, business and management, law and regulation, accounting and finance and other supporting areas. Effective January 2015, RC1310 became part of the Bioeconomy Academy Department to embrace the knowledge economy through education and skills training. RC1310 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. Among the initiatives are to establish a Library Consortium with other academic special and public library, publishing special reports and to serve as knowledge hub to the MBA students and other future educational programmes.

10 YEAR ACHIEVEMENTS

2006

- Resource Centre was established in 2006 and was located at Level 21, Menara Atlan (previously known as Menara TR), Jalan Ampang
- The first BioNews was published and emailed to the staff of BiotechCorp on 5th January 2006

Outcome

News update on biotechnology and life science industry in Malaysia and worldwide.

2007

Establishment of KOHA Library System

Outcome

Smooth operations of the process of library management and access to the library collection for RC1310.

2008

- Resource Centre first appearance in BioMalaysia 2008 (7-8 October 2008) @ KL Convention Centre
- National Science Centre and a few book publishers joins RC during the event. RC promoted its services to the visitors and members

Outcome

- Enhance the visibility of RC1310
- Increase memberships

2009

- Biotechweek @ National Library of Malaysia (16-18 March 2009)
- Biotechweek @ KL Public Library (22-27 June 2009)

Outcome

Enhance public interest and awareness on the biotechnology industry in Malaysia.

10 YEAR ACHIEVEMENTS

2011

Library collaboration with Bursa Knowledge Centre

Outcome

Providing information access and knowledge exchange to users with interest in investments, trading and stock exchange.

2012

- **Bookfair @ RC (1 & 2 August 2012)**
- **Library collaboration with Petronas Resource Centre**

Outcome

Providing information access and knowledge exchange to users with interest in petrochemical, fossil fuel and natural gas.

2013

Bookfair @ RC (22 – 25 July 2013)

Outcome

Increase the reading habit among BiotechCorp's staff and the public through RC.

2015

- **Library collaboration with: UMS Library / CAIS Unimas / UMP Library UniKL Library & Resource Centre / AIMST Library**
- **RC @ Google Business View - goo.gl/maps/nHVrr**

Outcome

Providing information access and knowledge exchange to users and to increase the visibility of RC1310 to the public.

2015 HIGHLIGHTS

BioCoffee Talk Series

– BiotechCorp, Level 16, Menara Atlan

- Series 1 @ 20/3 - with A Anbalagan, Head Steward, Malaysian Airline (Grooming & Personal Branding)
 - Series 2 @ 17/5 - Ustaz Don Daniyal Don Biyajid "From Lecture Hall to Board Room"
 - Series 3 @ 18/5 - Azhar Sulaiman celebrity "What a designer say to a scientist?"
 - Series 4 @ 17/5 - Jeffrey Scott Yablon from Indipharma - "An Overview of Life Science Industry in Malaysia and Potential Career Option"
 - Series 5 @ 25/6 - with Desmond Ho, founder of Terra Garden Group (Container Garden Demo)
 - Series 6 @ 2/7 - with Chef Saiful Azli, Politeknik Metro, KL (Cooking Demo)
 - Series 7 @ 8/9 - Workshop on make-up techniques and skills by Victoria Jackson
 - Series 8 @ 27/11 - with cartoonist Fakhru Anour (Kelas / Melukis / Komik)
- BioCoffee Talk Series are programmes organised by RC1310 to promote knowledge sharing among the staff. Subject Matter Experts have shared their knowledge, experiences and insights during the two-hour session in RC1310.

- The sharing session has given the opportunity to the staff of BiotechCorp to join any series with the topic they are interested in. There were a combination of topics given, from talent to leisure, to cater the needs of all users.
- Every session was attended by 40 – 50 users of RC1310 at the brand new RC1310 at Level 16.

RC Bazaar on 26 - 27 Nov 2015 - Back to School Sale with MPH – BiotechCorp, Level 16, Menara Atlan

- Initiative taken by RC1310 to inculcate reading habit among BiotechCorp's staff and the public through RC Bazaar.

Librarianship Competencies Workshop For Special Library held on 15 & 16 December 2015 at Petroleum Resource Centre, Petronas, Level 4, Tower 1, Petronas Twin Towers, KLCC, K.L. in collaboration with Petronas Resource Centre

- Positioned RC1310 as the leading special library in the Special Library community.

MOVING FORWARD – PLANS & INITIATIVES

PLANS

Online Knowledge Centre

"Less people visit Resource Centre, more people go online". Catering to the need for remote and continuous information accessibility.

Online Learning Environment

Using RC1310 portal as a gateway, students can access reference materials for their examination and education modules for MBA and other education products produced by Bioeconomy Academy. It will also include setting up of an online testing and assessment system for the education programmes.

Enhanced Research Services

RC1310 inspires to be the first source of information to the stakeholders. RC1310 encourages and supports researchers to generate ideas through bioeconomy and bio-based data & information.

INITIATIVES

Library Collaboration @ Smart Partnership

In line with Malaysia entering into Phase 3 of the National Biotechnology Policy entailing commercialisation, RC1310 will expand and collaborate with relevant libraries for information sharing to assist the successful implementation of the global business phase. Acknowledging the importance of close collaborations and information sharing, RC1310 have initiated library alliance with other 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.

Commercialising Technology

"Technology and innovation work in unison, crafting the best for the industry."



Introduction

In 2007, BiotechCorp initiated the acquisition of four bio-based platform technologies in order to facilitate the development of core and priority biotechnology areas and establish an advanced biotechnology industry in Malaysia. This aims to accelerate growth of the biotechnology industry and build the required skills sets and knowledge base through public and private R&D partnerships, domestically and internationally, internal collaborations and smart strategic alliances. The key responsibilities of Technology Management & Innovation (TMI) division are to manage, develop and commercialise the technology acquired by BiotechCorp under the 9th Malaysia plan's Biotechnology Acquisition Programme (BAP).

FOCUS AREA

In managing, developing and commercialising the acquired technology platforms, TMI focuses on areas that are directly related to the technology platforms. These are:



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

2015 HIGHLIGHTS

The activities carried out by TMI throughout 2015 are to support the utilisation and commercialisation effort of the technology platform and generally categorised as the follows:

Workshops/Training on the understanding and the operation of the technology platforms for the following target segments:

- Industry players
- Academic personnel
- Research institutes

In 2015, several workshops/training were conducted. These were:

- Seminar on Supercritical Fluid Technology Facilities, Formulation & Industrial Perspective
- BiotechCorp-USM-Industry Dialogue: Commercialisation of Gold & Iron Oxide Nanoparticles
- SFE Open Day For Faculty Members of UPM
- Supercritical CO₂ extracts product launch

Outcome

- Create awareness and interests that could lead to new business/products development opportunities
- Increase adoption and utilisation of the technology platform by industry & RUs/RIs
- Generation of revenue via continuous utilisation of the technology platforms in business operations and research projects

Conference/Trade fair participation, domestic and overseas such as

- BioMalaysia 2015
- BioBorneo 2015
- Plant Genomics Congress Asia 2015
- PAG Asia Singapore 2015
- VitaFoods Asia Hong Kong 2015
- Cosmetic 360 France 2015
- BIOTech Japan 2015
- ThaiLAB 2015
- Medical Fair Bangkok 2015

Outcome

- Generation of business leads resulting in revenue-generating business deals for MAS and SFE platforms
- Generation of research interests resulting in research collaborations for all technology platforms

Commercialisation services for entrepreneurs, start-ups, spin-offs, and companies such as:

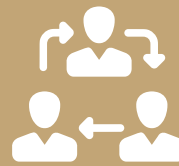
- Identification of strategic alliances for market ready products
- Identification of new industries and markets for clients
- Technology scouting
- Facilitation of business funding
- Conduct workshops and events

MOVING FORWARD – PLANS & INITIATIVES



TMI is expected to embark in the intensification of further collaboration and strategic alliances particularly via the following:

- Public-private research and development (R&D) partnerships
- International commercial collaborations
- Smart strategic alliances



With the intensification of R&D collaboration and technology adoption, the creation of regional clusters/regional centre for technology development and technology provider could potentially be the outcome in the upcoming future.



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