



## THE ECONOMICS OF ECOSYSTEMS AND BIODIVERSITY (TEEB) FOR AGRICULTURE AND FOOD IN MALAYSIA

TEEBAGRIFOOD INCEPTION WORKSHOP MALAYSIA  
2-3 December 2020, from 3:00-5:30pm in Malaysia  
Virtual platform

### Workshop report

#### Summary

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#### Background

The Economics of Ecosystems and Biodiversity (TEEB) is a UNEP-hosted Initiative that, since its inception in 2008, aims to foster transformation such that the values of nature (and our dependencies on well-functioning ecosystems) are recognized, demonstrated and captured by decision-makers. In short, it is about making the economic case for nature.

The aim of the TEEBAgriFood Inception Workshop was to seek inputs from participants on the potential scope of a TEEBAgriFood assessment in Malaysia. The key question to be answered by a TEEBAgriFood assessment will be:

- *If the Malaysian government were to implement a change in economic incentives or regulations for agriculture and food systems, what would be the economic costs and benefits of this change relative to the no-change Business as Usual?*

Prior to the workshop, participants were requested to consider specific interventions that would be feasible and relevant to explore, along with suggestions of the geographic locations in which the assessment should focus. The workshop was attended by approximately 100 participants from government and non-government sectors, including research bodies, NGOs, and the private sector, over two online sessions. As a result of the discussions at this workshop, a longlist of options for the potential scope of the TEEBAgriFood assessment in Malaysia will be developed and taken forward to the project Steering Committee for consideration and selection in line with stakeholder priorities.

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#### Day 1 – Technical Session

The TEEBAgriFood Inception Workshop in Malaysia was opened on behalf of Ministry for Energy and Natural Resources by Mr. Arief Iskandar Mohamad, Principal Assistant Secretary, Ministry for Energy and Natural Resources (KeTSA). He welcomed participants and noted that the TEEB concept is in line with national biodiversity goals including mainstreaming biodiversity across all agriculture sectors.

Dr. Salman Hussain, United Nations Environment Programme (UNEP), introduced the TEEBAgriFood Project, by emphasising that agriculture relies heavily on well-functioning ecosystems, but also has major impacts on ecosystems and biodiversity. Typically, efforts in the agriculture sector focus on improving yields per hectare, however, this obscures the many other critical positive and negative impacts generated by current production systems. In

essence, the TEEBAgrifood initiative seeks to fix food metrics by incorporating environmental and other externalities into the economic analysis. Dr. Salman Hussain highlighted the coherence between the TEEBAgrifood initiative and Malaysia's Vision 2030, the 12<sup>th</sup> Malaysia Plan, as well as key Malaysian policy priorities in the agriculture sector.

There has been no TEEBAgrifood study in Malaysia to date. However, there are many existing programmes on economic valuation of natural capital in Malaysia. Four such programmes were presented at the workshop:

- Ms. Gan Pek Chuan, United Nations Development Programme-Malaysia (UNDP), presented ongoing work in the TEEB project in Protected Areas in Peninsular Malaysia, including the rationale behind the assessment, the approach, and how methods were applied, as well as the early analysis of results.
- Dr. Rosliza Jajuli, Institut Penyelidikan dan Kemajuan Pertanian Malaysia (Malaysian Agricultural Research and Development Institute - MARDI), spoke of the importance of sustainable development in agriculture practice and policy, and presented current MARDI research on ecosystem services in agriculture.
- Ms. Zara Phang, Sustainable Economy and Policy Analyst, World Wide Fund for Nature, Malaysia (WWF-Malaysia), outlined the importance of understanding the value of natural capital and presented ongoing work on two WWF-led valuation studies in the Heart of Borneo project area.
- Ms. Martine van Weelden, Capitals Coalition, presented the private sector engagement component of the TEEB for Agriculture and Food project promoting a sustainable agriculture and food sector. She introduced the Capitals Coalition and their draft Operational Guidelines guiding businesses to assess and integrate natural capital into their decision-making, as well as the schedule of activities in Malaysia.

An active discussion was facilitated by UNEP to elicit inputs from participants on the potential scope of a TEEBAgrifood assessment, including the geographic location in which the assessment should focus. Four options were put forward during Day 1 as the potential focus for the TEEB analysis. These are summarized, with the additional suggestions from the discussion in Day 2, and are presented later in this report. In particular, the discussion centred on the assessment of potential change in terrestrial ecosystems that has an impact on coastal ecosystem services and marine fisheries, potential changes in intensive production systems particularly in the vegetable production sector, the potential for increasing self-sufficiency in rice production, and intercropping in the agri-commodity sector.

Several other comments were raised, notably Ms. Rokiah Don, Nutritional Society of Malaysia, suggested that studies in this field should take into account the Malaysian Dietary guidelines promoting healthy eating. She argued that it is important that agricultural cultivation produces food for the general population that is both accessible and affordable. Malaysia is facing an increasing trend in non-communicable diseases (NCDs), and obesity is a major risk factor for the onset of NCDs. Dr. Salman Hussain noted that UNEP and international partners are promoting a One Health approach, which also emphasises the importance of micronutrients to human health, and seeks to address ecosystem health, animal health, and human health together in a holistic approach.

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## Day 2 – Policy Session

Dr. Khairul Naim bin Adham presented welcoming remarks on behalf of Dr. Mohd Mokhtar bin Tahar, Deputy Secretary General (Natural Resources), Ministry of Energy and Natural Resources (KeTSA). He noted that all sectors are doing their best to respond to the Covid-19 pandemic, and that KeTSA is directing all energy and attention to creating a new normal that better serves our future and the environment. KeTSA is currently reviewing the National Policy on Biodiversity (NPBD) 2016-2025.

Mr. Stefan Priesner, UN Resident Coordinator for Malaysia, Singapore and Brunei Darussalam, offered welcoming remarks and highlighted that balancing agricultural activities with biodiversity protection is crucial to achieving the interlinked SDGs and the Agenda 2030, and that the TEEB project would make the case for nature and the SDGs by developing systems solutions.

Representatives of four Ministries put forward key policy priorities on the sustainability of Malaysian agriculture.

- Mr. Yeoh Yuan Xiang, Assistant Secretary, Policy and Strategy Planning Division, Ministry of Agriculture and Food Industries (MAFI), presented Malaysia's agrofood policy priorities. He spoke about the issues and challenges to the agrofood industry, the achievements and gaps of the National Agrofood Policy 2011-2020, as well as the proposed policy framework of the new National Agrofood Policy 2.0 (2021-2030) which is now in final stages of development.
- Ms. Emelia Fantoza Saraih, Ministry of Plantation Industries and Commodities (MPIC), provided an overview of the Agricommodity Policy priorities of the Ministry of Plantation Industries and Commodities (MPIC), which is concerned with commodity crops such as oil palm, rubber, timber, cocoa, pepper, kenaf, and biofuels. Her presentation focused on food commodity crops (palm oil, cocoa, and pepper) with an emphasis on the potential for ensuring sustainability.
- Mr. Aszmy Mahmood Yusof Mohamed, Principal Assistant Director (Food Crops), Agriculture Section, Economic Planning Unit (EPU), summarised the evolution of Malaysia's agricultural policy, presented agriculture sector performance, and briefly noted the issues and challenges of the sector as well as ways forward proposed in the 12th Malaysia Plan.
- Mr. Quek Yew Aun, Ministry of Energy and Natural Resources (KeTSA), reminded participants that biodiversity is at the base of the pyramid which holds up the sustainable development goals, such as "Life on land" and "Life below water", and that without biodiversity, other sustainable development goals cannot come to fruition. Mr. Quek's presentation focused on the targets of the National Policy on Biodiversity 2016-2025 related to agriculture, including in relation to mainstreaming, sustainable resource management, prevention of invasive alien species, and genetic diversity of cultivated species and their wild relatives.

Dr. Salman Hussain introduced the discussion session by noting that the TEEB project can consider options for analysis that concern either a **commodity crop** (identifying the sector or subsector, the area and the specific change sought) or alternatively a **landscape** (which may have multiple crops and livelihood systems operating at the same time).

As a result of the workshop discussion, a longlist of options was developed which will be further explored and presented to the Steering Committee for consideration in selecting the focus of the TEEBAgriFood study. On the basis of the discussions in Day 1 and Day 2, the options discussed can be summarised as follows:

1. Promoting adoption of rice of higher nutritional value through regenerative of agroecological approaches
2. Changes in highland vegetable farming systems towards lower external inputs, addressing impacts throughout value chain
3. Improving terrestrial production systems generating ecosystem and feedstock benefits which are required in aquaculture systems
4. Improving agrofood certification systems through MyGAP or MyOrganic.
5. Promoting intercropping in forest plantation systems

The workshop documents, including workshop video and presentation slides can be found at [TEEBAgriFood Malaysia webpages](#)

### Session 1 – Introduction

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#### **The Inception Workshop was opened on behalf of Ministry for Energy and Natural Resources by Mr. Arief Iskandar Mohamad Principal Assistant Secretary, Ministry for Energy and Natural Resources (KeTSA)**

Mr. Arief commented that all sectors are adjusting to Covid-19 and seek to create a new normal that better serves the environment. He recognised the participation of multiple stakeholders at the Inception Workshop from the Economic Planning Unit (EPU), Ministry of Agriculture and Food Industries (MAFI), Ministry of Plantation Industries and Commodities (MPIC), United Nations Development Programme (UNDP), NGOs, and the private sector. KeTSA is the focal point for the Convention on Biological Diversity (CBD) in Malaysia – and has the mandate within the government to oversee all issues related to biodiversity.



Mr. Arief outlined the history of the project. KeTSA has agreed to be the focal point for coordination, until a suitable project is found, when the reins of the project will be handed to the Ministerial government agency involved. KeTSA welcomes the TEEB concept, as it is in line with mainstreaming biodiversity across all agriculture sectors, including agrofood and agrocommodities. Target 4 of the National Policy on Biodiversity (NPBD) 2016-2025 relates to

sustainable harvesting from production forests, agriculture, and fisheries. Efforts have been pioneered by MAFI and MPIC through programmes like the Malaysian Timber Certification Scheme (MTCS), Malaysian Sustainable Palm Oil (MSPO), and Malaysian Good Agricultural Practices (MyGAP). Much more must be done, and the TEEBAgriFood project is the first of many steps in the right direction.

#### **Outline of the TEEBAgriFood initiative and process**

**Dr. Salman Hussain, United Nations Environment Programme (UNEP)**, also underlined the importance of working not only with key policy makers in the environmental sphere, but also Ministries responsible for agricultural production, economic planning, and resource efficiency, making the case for biodiversity conservation in terms of its contribution to livelihoods of the Malaysian people. This case is even more relevant today in the context of the recovery from Covid-19.

**Dr. Salman Hussain presented the TEEBAgriFood Project**, explaining that as an initiative, TEEB was launched at the CBD COP 10 years ago. The idea was initially set up to provide a value for ecosystems and biodiversity and highlight the direct consequences of ignoring these values in economic analysis. In 2014, TEEB began to focus on agriculture and food systems. Agriculture relies heavily on well-functioning ecosystems, and simultaneously has a major impact on ecosystems and biodiversity. Typically, efforts in the agriculture sector focus on improving yields per hectare. However, a singular focus on productivity in agriculture has obscured the many other critical positive and negative impacts generated by these production systems. Agriculture production sectors often measure and account for inputs derived from human systems such as irrigation, fertilisers etc. and also the gains of employment and food produce. However, the invisible benefits provided by the environment, pest control, genetic diversity, pollination services, soil formation etc., are generally not accounted for, despite farmers recognising these benefits as critical. Negative impacts such as habitat encroachment

and pollution deplete the very source of our well-being, with respect to our agriculture and food systems. TEEBAgriFood therefore seeks to fix food metrics by incorporating such externalities into the analysis.



TEEBAgriFood puts forward a holistic assessment of the complete agricultural system - covering impacts and dependencies on Natural, Human, Social and Produced capital across the entire value chain, from agricultural production to manufacturing and processing, to distribution, marketing and retail, to household consumption. Dr. Salman presented a hypothetical example, illustrating a correction of markets as a result of incorporating more environmentally friendly policies, as well as existing case studies, including one in Ethiopia, showing the potential benefits of switching to shade grown coffee production under different policy scenarios. There are many TEEBAgriFood reports presenting the framework of analysis available from [the TEEB website](#).

The key question that would be answered by a TEEBAgriFood assessment is:

- *If the Malaysian government were to implement a change in economic incentives or regulations for agriculture and food systems, what would be the economic costs and benefits of this change relative to the no-change Business as Usual?*

The aim of the Inception Workshop was to seek inputs from participants on specific interventions that would be feasible and relevant to explore. As an example, an analysis could be carried out of a switch to agroforestry, or to organic rice production. Secondly, participants were asked to consider in which geographic location the study should focus. As a result of the discussions at this workshop, a longlist of options for the potential scope of the TEEBAgriFood assessment in Malaysia will be developed and taken forward to the project Steering Committee for consideration and selection in line with stakeholder priorities.

**Dr Salman Hussain highlighted the coherence between the TEEBAgriFood initiative and Malaysian policy priorities**<sup>1</sup>. Vision 2030 seeks shared prosperity, and includes a focus on green growth, improving the conservation of terrestrial and inland waters, intensifying the conservation of natural resources including biodiversity, and moving towards sustainable consumption and production practices. Links were also drawn with the project and the 12<sup>th</sup> Malaysia Plan, the National Agrofood Policy and the National Policy on Biological Diversity 2016-2025, which are outlined later in this document, as well as measures to tackle Covid-19 in the agrofood sector.

The TEEB process and next steps were outlined, including the work of the Capitals Coalition to engage the private sector. It was also explained that there are seven country pilots - Brazil, China, India, Indonesia, Malaysia, Mexico and Thailand. The role of the lead ministry will be to chair and then convene a series of Steering Committees to provide a policy steer, and to ensure that the policy question being assessed is relevant.

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<sup>1</sup> Based on a preliminary background review shared with participants, on which feedback was encouraged.

## Session 2 - Existing programmes on economic valuation of natural capital in Malaysia

**TEEB in Protected Areas of Malaysia** Ms. Gan Pek Chuan, United Nations Development Programme-Malaysia (UNDP) presented ongoing work in the TEEB project in Protected Areas of Malaysia. **Ms. Gan presented her experience of TEEB for Protected Areas in peninsular Malaysia in partnership with the Ministry of Energy and Natural Resources, including the rationale behind the TEEB assessment, the team composition, the approach, methods and data used, and how these methods are translated into the scoping and consultation, the surveys, and the early analysis of results.**



The assessment is being carried out in three Protected Areas (Taman Negara National Park, Royal Belum State Park, Endau-Rompin National Park), with the participation of local agencies namely the Department of Wildlife and National Parks, and two National Park Authorities. The aim was to make the values of Protected Areas visible and build a strong economic case for more Protected Area financing. There are, however, still gaps between the optimal financial needs for protection and the actual finances received. The project is exploring the feasibility of a performance-based financing structure to support effective Protected Area management in Malaysia.

The project included the following scope of analysis:

1. Site level valuation assessment in three Protected Areas in Malaysia;
2. Cost-benefit analysis of the investment subject area management to build a strong economic case for sustainable financing;
3. Measure total economic value of terrestrial Protected Areas in peninsular Malaysia.

After a review, scoping process, and stakeholder consultation, data was collected through surveys from four target groups, the indigenous people (Orang Asli), local communities surrounding the Protected Areas, the general public and tourists, mostly domestic tourists given the restrictions to international tourism. Secondary data was collected along with a cost survey to assess investments in Protected Areas. This was used in ecosystem service valuation in the three selected areas to assess the values of non-timber forest products, water, flood regulation, carbon storage, sediment regulation, tourism, species conservation, and forest conservation. This was supplemented by the spatial models of existing services available from the Forest Research Institute of Malaysia (FRIM). The entire valuation was put forward in a cost-benefit analysis.

Ms Gan noted that there are a number of existing valuation studies already being carried out in the Protected Areas of Malaysia. The research team identified gaps and drew lessons from these to improve the study design and consulted to identify existing ecosystem services from each Protected Area and the beneficiaries of these services. There were two levels of analysis - firstly expenditures, funding sources and revenue connection, and secondly, linkages with communities, and efforts to improve sustainable finance initiatives. Field surveys were launched from February to September 2020, including face-to-face and online surveys.

Choice experiments (a form of environmental economic valuation that is used to estimate the values of non-monetised attributes) were carried out giving people three options for selection by the target groups as a means to estimate willingness to pay to avoid: deforestation, species extinctions, and flooding. The hypothetical 'payment vehicle' in the choice experiments was that the local community and the general public would pay these costs through their electricity bill, while tourists would pay through entrance fees.

The results of the surveys with the indigenous peoples were presented in graphs, showing different benefits from the forest. The total economic value was almost 1 billion Malaysian Ringgit per year. Carbon sequestration has the highest value but the beneficiaries of this are global, and such values are difficult to capture. The non-timber forest products have the lowest value, but they are very important for the livelihoods of the indigenous people.

UNDP is still in the process of analysing the results from the cost surveys, but the early results demonstrate that there is great potential for local employment. Financing opportunities for Protected Areas potentially include carbon credits or biodiversity credits. The work is helping to build an economic case for ecological fiscal transfers.



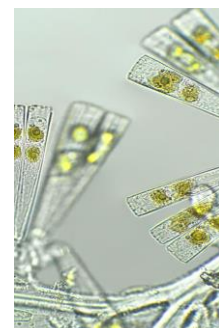
**Research initiatives in Agriculture, Biodiversity and Ecosystem Services in Malaysia.** *Dr. Rosliza Jajuli, Institut Penyelidikan dan Kemajuan Pertanian Malaysia (MARDI - Malaysian Agricultural Research and Development Institute) - presented the importance of sustainable development in agriculture practice and policy, along with current MARDI research on ecosystem services in agriculture*

Agroecosystems are very important for regulating as well as provisioning ecoservices, including climate change mitigation and food production. Biodiversity supports agriculture in different compositional, structural and also functional scales. The link between biodiversity and the food system is very complex, with threats and opportunities: energy, global trade, diet, and nutrition, are some of the threats while opportunities include, among other things, ecological intensification, breed development, and biotech.

Dr. Rosliza highlighted that there is international recognition of the importance of biodiversity for, and in, food and agriculture, as attested to by the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES). Major international decisions have led to action plans, and there is increasing information being produced on the importance of conservation in the food and agriculture sector.

Research on ecosystem services in agriculture carried out by MARDI includes work on biological control agents, eco-engineering in the fruit and vegetables, and rice ecosystems, as well as valuation of ecosystem services.

Research on ecological engineering has been conducted in vegetable (cabbage) fields with companion crops, to increase the population of beneficial insects and reduce pests in the fields. Dr. Rosliza presented data showing the status of biological control agents in the Cameron Highlands between 1990 and 2011. Over time, farmers used more pesticide, which is not conducive to biological control. She outlined the research methods, which included rearing biological control agents in their laboratory in the Cameron Highlands. The most recent results include effective pest control through a multi-virus pesticide suitable for controlling lepidopteran pests on crucifers. Other examples, included eco-engineering in mango farms, introducing flower strips to introduce beneficial insects.



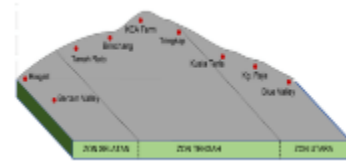
In relation to rice production systems, MARDI collaborates with IADA Barat Laut in developing flowering strips as pollen and nectar sources for biocontrol agents. In studies of rice ecological systems, the number of beneficial insects is found to be very high and increased over three seasons, while yields were also higher after three seasons, compared to the control plots.



MARDI also compared the financial costs of using conventional approaches and eco-engineering with biopesticides and found that farmers gained net benefits per hectare.

Dr. Rosliza presented a model of materials balance in the rice production cycle over three years, showing three different possible interventions. The first was to adapt the rice varieties towards high-yielding varieties, the second was an ecological engineering approach to improve rice ecosystems, and the third was to implement alternative management of rice straw and water. The water management tested flooding, soil saturation without flooding until later stages of maturity, and then soil saturation without any standing flood. Rice straw management tested with, versus without, burning and tilling (i.e. with or without microbial action). Depending on which of these water and straw management alternatives were applied, greenhouse gas (GHG) emissions could be reduced - in the case of alternative water management practices by over 30%. In terms of monetary benefits, the environmental value that could be reaped from these alternatives on an optimistic nationwide implementation is significant. Other ecological engineering projects have also been carried out in various parts of the country.

### BIOLOGICAL CONTROL AGENT STATUS IN CH



Population of *A. ruficornis* and percentage of parasitism in cabbage field in 2 main zone in Cameron Highlands in year 2001, 2005 and 2011

Parasitoid/Biocontrol	Southern zone/year			Middle zone/year			North zone/year		
1. <i>A. ruficornis</i> (b)(12) (par(%)	1990	1995	2011	1991	1995	2011	1990	1995	2011
2. <i>D. Scutellator</i> (5)	2.25	10.40	5.23	27.70	17.02	5.00	5.23	5.30	5.78
3. <i>C. vicinitor</i> (15)	11.50	9.00	4.78	7.55	2.80	1.50	10.33	2.90	2.07

1. David M. Eusepiawan S. Loh, N.K. Poo (2017). Cabbage looper (*Plutella maculipennis* L.) biocontrol agents in the management of cabbage looper and other leaf beetles. Proceedings of the 10th Malaysian National Insect Conference, Malacca, 28-30 October 2017, pp. 14-17.

2. David M. Eusepiawan S. Loh, N.K. Poo (2014). A survey of insect parasitoids of *Plutella maculipennis* in Cameron Highlands, Malaysia. National Insect Conference 2014, 28-30 October 2014, Kota Bharu, Kelantan, Malaysia.

**The way forward** - Integrated ecosystem services valuation is needed to support an agroecological transition. Agroecosystems should be treated as an important asset in the economy, while ecosystem services should be valued in a similar manner as any other form of wealth. We also need to understand the economics and ecology in assessing ecosystem services and their values and implications in a wealth accounting framework, as well as to achieve sustainable goals.



**NGO Initiatives in natural capital assessment. Ms Zara Phang, Sustainable Economy and Policy Analyst, World Wide Fund for Nature, Malaysia (WWF-Malaysia) outlined the importance of understanding the value of natural capital and presented ongoing work on two WWF-led valuation studies in the Heart of Borneo project area.**

The term natural capital is used to frame environmental resources, in the language of business and finance, as a form of capital. Stocks are the biodiversity and ecosystems and the flows are the services that come from those stocks, including water regulation, carbon storage, medicines, food, climate regulation, inspiration etc. Ms. Phang raised an example of a Thailand study on the many values of mangrove forests, which shows the importance of accounting for environmental costs and benefits, underlining that undertaking a cost-benefit analysis of different options allows for more informed decision-making.



WWF has carried out two studies in the Heart of Borneo project<sup>2</sup> area in Sarawak, in partnership with the Forest Department of Sarawak and the Economic Planning Unit, to quantify the value of benefits provided by the rainforest to local communities, and also to national and international communities. This aims to assess what is lost when a rainforest is degraded, and importantly who loses to help to understand the current economic and livelihood benefits that are generated by the forest for the local community, to Malaysia and to the world.

Ms Phang presented a case study in Baleh, one of the key watersheds for the Rajang River, a major transport channel for the interior of Sarawak. This area provides energy needs and water flows to the local communities. It is also a high conservation area hosting iconic species such as the Hose' civet, Bay cat, and Bulwers pheasant, and was proposed as a Protected Area, with importance as a transboundary habitat corridor.

Ecosystem services identified for valuation included provisioning (food, raw materials, fresh water, medicinal resources), regulating (sequestration and storage, moderation of extreme events, erosion prevention and maintenance of soil fertility), supporting (habitat for species), and cultural (recreation and mental and physical health, tourism, aesthetic appreciation and inspiration for culture, art and design, spiritual experience and sense of place) services.

Carbon sequestration generated the largest ecosystem service value. Non-carbon ecosystem values were also found to be relatively high. In terms of distribution across beneficiaries, only 3% of the benefits go to the local people directly. Nonetheless, such resources provide basic needs and as such, are very important for the local communities. The area generates value for the entire region, state, and also for the global community.

Three scenarios were identified: 1) Economic development following the Sarawak Corridor of Renewable Energy (SCORE) hinterland master plan; 2) Green economy: as scenario 1 with addition of best practices such as the adoption of MSPO, MTCS, sustainability standards; and 3) Conservation: with addition of desired Protected Area goals, desired outcomes from the Systematic Conservation Planning exercise led by WWF in collaboration with its partners, exclusion of certain other activities from Protected Areas, and integrated watershed resource management standards.

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<sup>2</sup> The Heart of Borneo is a government-led programme initiated by joint declaration of the governments of Brunei, Indonesia and Malaysia in 2007. This includes conservation projects across the landscape from traditional species protection to projects working on the green economy.

Modelling was carried out using InVEST, for example to assess the sedimentation that would result from land use changes in each of the three future scenarios. The analysis found that the net economic value of ecosystem services would fall with the Economic Development scenario and rise with the Green Economy scenario, with the highest net values resulting from the Conservation scenario. While a full conservation scenario may be challenging for the State government to adopt, the green economy scenario may be more feasible and would still result in significant gains in ecosystem service benefits. Taking into account the differences in ecosystem service values from the different scenarios, the study put forward policy recommendations to reduce economic loss from the loss of ecosystem services.

Recommendations from the study to support green economy policies included: 1) Support to the state's policy to make it mandatory for all timber licences to obtain forest management certification by 2022; and 2) Protect forest resources for use by local communities, because the watershed acts as an important economic safety net for the local community.



**Ms. Martine van Weelden, Capitals Coalition** presented the private sector engagement component of the TEEB for Agriculture and Food project promoting a sustainable agriculture and food sector. She introduced the Capitals Coalition, which is a global collaboration to support the uptake of natural, social and human capital to transform the way decisions are being made by including the value of nature, people and society. Its objective is that by 2030 the majority of business, finances and governments will include all capitals in their decision making, and that this will deliver a more fair, just and sustainable world.



Earlier this year, the Capitals Coalition drafted a set of Operational Guidelines to show how businesses can assess and integrate natural capital into their decision-making. These Guidelines were opened for consultation earlier this year. The guidelines are based on the TEEBAgriFood Evaluation Framework and are accompanied by user templates which help businesses use a natural capital assessment in a structured way<sup>3</sup>.

The Guidelines take businesses step by step through various stages, starting with framing the question - why they should take a natural capital assessment. The second stage is to define the scope and objectives of the assessment. The third stage is measuring and valuing to assess how these different impacts and dependencies should be measured. The fourth step is applying the assessment and moving forward. The Guidelines can be used by business

<sup>3</sup> The operational guidelines are structured according to the existing Natural Capital Protocol.

operators along the entire value chain from investors and banks, to input companies to farmers to traders to manufacturers and retailers.

The Coalition will hold round table activities to share experiences between different businesses, and training sessions on how to apply the capitals assessments, as well as work with different businesses to develop case studies on scaling up their assessments.

The proposed timeline of TEEBAgriFood for business activities in Malaysia is shown below:

- **Preparatory webinar:** Quarter 2 in 2021
- **Roundtable consultation:** Quarter 4 in 2021
- **Training sessions for business:** Quarters 1-2 in 2022
- **Case study application:** Quarters 2-3 in 2022

### Session 3 - Discussion

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An active discussion was facilitated by UNEP, and different options were suggested and explored during the open discussion session. A summary of the discussion on these options are presented in the report for Day 2 (below). Additional points raised in the discussion are noted here.

- **Rokiah Don, Nutritional Society of Malaysia**, highlighted that any study in this field should take into account the Malaysian Dietary guidelines promoting health eating. Agricultural cultivation, making available food for the general population, should be accessible and affordable. Malaysia is facing an increasing trend in non-communicable diseases (NCDs), and obesity is a major risk factor for the onset of NCDs. People are encouraged to purchase local fruits and vegetables. Unfortunately, some local produce is more expensive than imported alternatives.
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- Dr. Salman Hussain noted that UNEP and international partners are promoting a **One Health** approach, which is particularly important in response to the pandemic. This emphasises the importance of micronutrients to human health and seeks to address ecosystem health, animal health and human health together in a holistic approach. He also noted that the TEEBAgriFood framework incorporates the assessment of health impacts.
  - To have integration of business components and government policy is a priority component of the TEEB project.
  - Each TEEB assessment is based on the existence of a potential intervention at State level or national level that can make a change, so that where strong evidence is available, results are likely to be taken up.
  - It may be difficult to select a focus when there has not yet been an in-depth assessment of different sectors in order to make a comparative assessment of the potential ecosystem services and potential livelihood impacts. However, it would not be possible to do this on an ad hoc basis, across all sectors, across all of Malaysia, as it would require extensive data collection and specific analyses using environmental evaluation techniques, such as InVEST, Cropwat, or SWAT. Hence it is necessary to gather inputs from the key stakeholders present at the workshop on proposed options for

study, for a selection to be made by the project Steering Committee that TEEB can take forward for an in-depth analysis.

- The TEEBAgriFood project is focused on outcomes. The study, which is the focus of this scoping process, will in itself be only one output of the project. Where the study provides clear evidence for change, the project will work further to assess the enabling conditions for adopting the proposed changes, and a Theory of Change will be developed and implemented.
- **Dr. Chong Chau Min, MADA and UPM.** MADA has been involved in research with the Dept of Fisheries looking into development of aquaculture, and also research with MARDI and other Universities on bio-control agents and biopesticides to increase productivity without compromising the environment. Further extension work is needed to 'translate the results' so they can be put in practice. There is a gap between research and farmers. Farmers are keen to learn how to increase yields, but research results are not always 'translated' in a way that is accessible to them.

## Conclusion and Close

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### Closing remarks

*Dr Khairul Naim bin Adham, Undersecretary, Biodiversity Division,* noted that the inputs from the fruitful discussion can be used for the subsequent session in Day 2 with government policy presentations. Malaysia is a mega-diverse country and needs good tools towards the better conservation of biodiversity and natural resources. He reiterated KeTSA's hope that the project will be a platform to strengthen biodiversity across agriculture sectors. Target 4 of the NPBD states that there is a need to strengthen agricultural planning and practices to reduce the negative impacts of agricultural activities in Malaysia. There are high expectations that the TEEB project will assist Malaysia ultimately in achieving the three key objectives of the CBD - biodiversity conservation, promote sustainable use, and sharing the benefits of natural assets. A national approach is needed; every stakeholder needs to play a greater role in the conservation of biodiversity and natural resources, and we need to move fast.

### Opening Remarks

**Dr. Khairul Naim bin Adham on behalf of Dr. Mohd Mokhtar bin Tahar, Deputy Secretary General (Natural Resources), Ministry of Energy and Natural Resources (KeTSA).** He expressed his gratitude to the eleven ministries and agencies involved, and welcomed all participants including UN, EU, research agencies, private sector and civil society groups to the TEEBAgriFood Inception Workshop.



He noted the context of Covid-19, which has caused uncertainties in daily life. However, all are doing their best to respond to the situation, and KeTSA is directing all energy and attention to creating a new normal that better serves our future and the environment. He outlined the history of the project, noting that KeTSA has agreed to be the focal ministry until a suitable project and sector is agreed upon, when responsibility will be handed over to the lead ministry involved.

The project is in line with KeTSA's goal of mainstreaming biodiversity across all agriculture sectors, including agrofood and agri-commodities, which rely heavily on ecosystem services, such as water purification, pollination and pest control. However, it can be argued that the values of ecosystem services have not been fully captured by these industries and hence agriculture is often seen as antagonistic to biodiversity. He cited the IPBES global assessment shows that agriculture contributes to biodiversity loss, but more importantly is heavily affected by biodiversity loss. Covid-19 is result of the disregard of the value of ecosystem services.

KeTSA is currently reviewing the National Policy on Biodiversity (NPBD) 2016-2025. MAFI and MPIC are also reviewing their policies, presented below. This is an important opportunity to mainstream concepts into Malaysia's policy for the next 10 years.

**Mr. Stefan Priesner, UN Resident Coordinator for Malaysia, Singapore and Brunei Darussalam** offered welcoming remarks and highlighted that balancing agricultural activities with biodiversity protection is crucial to achieving the interlinked SDGs adopted in 2015, and that the TEEB project would make the case for nature and the SDGs by developing systems solutions. The UN Secretary-General has remarked on the very problematic state of the environment in terms of climate change and biodiversity degradation. The situation is very precarious. In 2021, the environment will be the focus area of the whole United Nations.



Malaysia is one of the last few biodiversity hotspots. There are numerous products from the rich rainforests that are not yet accounted for, such as resources with potential in treatments for cancer. It is important to make the case for nature. The TEEBAgriFood project is designed to support key stakeholders to recognize the critical contributions of biodiversity and ecosystem services in the agriculture sector and beyond, through a comprehensive assessment of impacts and dependencies on natural capital, scenario analysis, and

mainstreaming of results in national initiatives towards achieving the Sustainable Development Goals.

The health of people and the planet, are determined by these diverse interlinked food systems and consumer choices. Globally, agrofood systems are major drivers of environmental damage. However, as natural resources are exploited beyond sustainable limits, our food systems are in turn placed at risk. Most scientific research, government policy, and business practices continues to focus on certain components or subsystems of these large interlinked systems. However, taking a narrow perspective and designing solutions accordingly has consequences, trade-offs, and impacts far beyond their intended effects. To understand the full picture, systems thinking is required. Fundamentally, this is what the TEEBAgriFood project and the SDGs aim to achieve.

Sustainable food systems are at the heart of the 2030 Agenda for sustainable development. The UN Food Systems Summit will be held in 2021, to raise global awareness and seek global commitments to action to transform food systems that resolve hunger, reduce disease, and heal the planet.

### Summary Recommendations from Day 1

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**Mr. Quek Yew Aun, KeTSA** noted that the technical session of the workshop yesterday was attended by 96 participants from government and non-government sectors, NGOs and the private sector. Following the five presentations from UNEP, UNDP, MARDI, WWF and the Capitals Coalition, several main themes were brought up. These included: the need to integrate concepts of nutrition; the effects of agricultural practices towards aquaculture; supply chain networks in vegetable production; and sustainability in the agri-commodity sector.



The main suggestions for TEEBAgriFood project focus from the discussion in Day 1 were as follows:

- Exploring the effects of agriculture towards aquaculture farming, focusing on areas such as Perlis, Kuching and Sandakan.
- Exploring intensive agriculture production, specifically vegetable farming potentially in the Cameron highlands.
- Exploring rice production in the East or West coast of peninsular Malaysia.
- Improving aquaculture practices in coastal areas
- Improve current certifications through MyGAP, or MyOrganic.

### Presentation of relevant Malaysian policy priorities

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#### Agrofood Policy Priorities

**Mr. Yeoh Yuan Xiang, Assistant Secretary, Policy and Strategy Planning Division, Ministry of Agriculture and Food Industries (MAFI)** presented Malaysia's agrofood policy priorities. He spoke about the issues and challenges to the agrofood industry, the achievements and gaps of the National Agrofood Policy 2011-2020, as well as the proposed framework of the new National Agrofood Policy 2.0 (2021-2030) which is now in the final stages of development.

Agrofood is an important economic sector in Malaysia. It contributes around 3.5% of national GDP, and was the only sector that recorded positive economic growth in 2020 Q3, despite the Covid-19 pandemic. The sector also contributes to the manufacturing and food processing sectors, as well as the services sector and logistics. However, the agrofood sector in Malaysia also faces various issues and challenges. Agricultural workers in general have low productivity, compared with the services sector and manufacturing sector. This can be attributed to lower adoption of technology, and limited land size. This has restricted the use of machinery and automation on farmland. Malaysia is dependent on imported inputs which increases the production cost of food. Private sector investment in the sector is relatively low. The agrofood sector also needs to address basic issues to be more competitive, relating to land tenure, infrastructure facilities and database development. Inadequate capacity of the workforce poses a major challenge to the competitiveness of the agrofood industry, due in part to ageing population of farmers and low involvement of youth in the sector.

The agrofood sector is vulnerable to climate change, to natural disasters and emerging diseases which affects both the quality and quantity of food production. The current Covid-19 pandemic poses challenges to the resilience of the food system, particularly the food supply chain.

Mr. Yeoh briefly highlighted the key points of the current National Agrofood Policy (2011 to 2020) which has the following objectives:

1. To ensure adequate food supply and food safety
2. To develop the agrofood industry into a competitive and sustainable industry
3. To increase the income level of agricultural entrepreneurs

Several strategic directions have been proposed to ensure national food security, to increase the contribution of the agrofood industry, to complete the value chain, to strengthen human capital, to strengthen research and development, innovation and technology use, to create private sector-led business opportunities, to strengthen the service-delivery system. Priority food industries are 1. Paddy & Rice 2. Fruits 3. Fisheries 4. Livestock 5. Vegetables 6. Coconuts 7. Swiftlets 8. Aquaculture 9. Ornamental Fishes 10. Seaweed 11. Herbs and Spices 12. Floriculture 13. Mushrooms 14. Agro-based Food 15. Agrotourism.

Notable achievements and gaps in the last 10 years included: an increase in value-added which contributed to GDP; an increase in output per worker and an increase in land productivity; Malaysia ranked its highest level in the Global Food Security index in 2019; and the self-sufficiency level for fruit, fish, and poultry now exceeds 75%. However, the agrofood



sector is also faced with high production costs and high input reliances, especially upon inputs and animal feed. Due to urbanisation, there are land use concerns; agrofood uses less than 10% of the total land use of Malaysia. Furthermore, the agrofood sector is highly comprised of smallholders and is dependent upon foreign workers.

The new National Agrofood Policy 2.0, is currently being adopted by the Ministry of Agriculture and Food Industries. The new policy will address some of the challenges and gaps mentioned above, including productivity, value chain, human resources, sustainability issues, and the business environment. Mr. Yeoh highlighted some key features of the proposed policy framework: to embrace modernisation and smart agriculture; to strengthen domestic market



and export market to focus on high value crops; to build talent that meets demand of industry; to advance towards sustainable agriculture practices and inclusivity (this is the most relevant to the TEEB programme); and to create a conducive business ecosystem and robust institutional framework. Each of these thrusts are supported by strategies and action plans. Some the specific strategies are game changers for paddy rice, fruits and vegetables, livestock, and fisheries.

Mr. Yeoh highlighted policy thrust 4 - Advancing towards sustainable agriculture practices and inclusivity - particularly in relation to environmental conservation, biodiversity and climate change. Some of the related action plans and strategies include activities to increase the adoption of sustainable farming that includes the development of the MyGAP and MyOrganic certifications. There are proposals to extend land tenure for food production including for aquaculture, to designate more Marine Protected Areas, and to work with local communities to conserve marine biodiversity. There are also proposals to research varieties which are resistant to pests, disease and climate change.

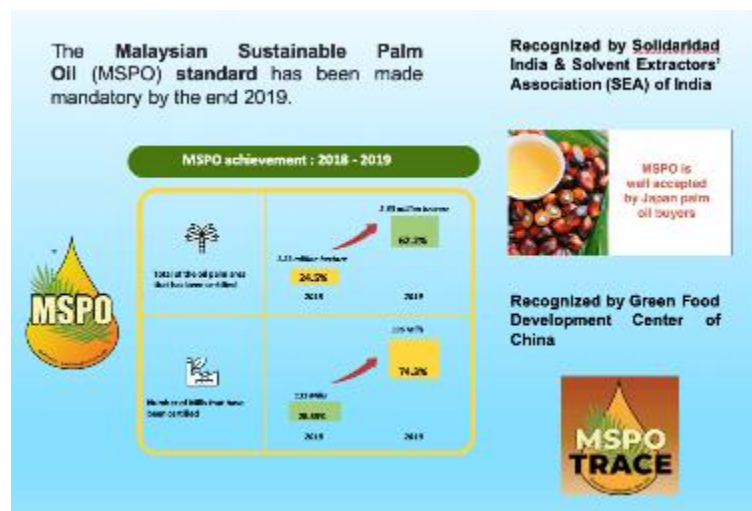
The proposed policy is in the final stages of adoption: the strategies and action plans are being refined in consultation with other stakeholders such as KeTSA. The policy is in line with the “Shared Prosperity” vision for Malaysia (Vision 2030), specifically key growth areas focus on smart and high-value farming. It is also in line with the 12th Malaysia Plan, which has five priority areas: to accelerate modern technology application; to optimise farm size for productivity; to establish efficient agrofood value change; to strengthen industrial specific produce; and to enhance value-added and food industry and agriculture related activities. It is also compatible with other sectoral national policies, such as the National Policy on Biodiversity, Climate Change, the upcoming new National Food Security Policy. Internationally, the policy is compatible with the Sustainable Development Goals, especially those which are directly related to agrofood systems, SDG Goals 2, 12, 13, 14 and 15.

The ultimate goal of the new National Agrofood Policy is to achieve national food security through a sustainable food system.

### Agricommodity Policy Priorities

**Ms. Emelia Fantoza Saraih, Ministry of Plantation Industries and Commodities (MPIC)** provided an overview of the Ministry Plantation Industries and Commodities (MPIC), which is concerned with commodity crops which currently cover around 7 million ha of land nationally, primarily oil palm (5.9 m ha) and rubber (1.1 m ha). Other commodities included in MPIC’s remit are timber, cocoa, pepper, kenaf, and biofuels from palm oil.

In the new Agricommodity Policy, MPIC aims to expand development of biomass and plant-based fibre. At present, Kenaf is the main plant-based fibre commodity, however MPIC is interested to explore bamboo, sugarcane, and corn. There are many upstream, mid-stream and downstream players, including 5,224 estates, 746,898 smallholders, many factories and 5,400 small and medium enterprises.



The sector faces similar issues and challenges as presented by MAFI: low productivity; diseases and pests; coordination of land use between federal and state government; ageing farmers and low levels of adoption of technology.

There are five policy thrusts in the current draft of the policy. Sustainability is a major emphasis of the policy, particularly in the palm oil, rubber and timber sectors. MPIC seeks to intensify value creation to new product applications to compete with other countries. Product diversity and increased complexity will be a major focus, upgrading raw materials to more complex products. Another proposed focus will be on expanding markets, thereby leveraging global supply chains for both traditional and developing new markets. To ensure fairer wealth distribution to communities, another policy thrust is concerned with inclusiveness. MPIC seeks to engage with approximately 800,000 smallholders in the agri-commodities industries, to assist them with better adoption of technology, better seedlings and better farming techniques. Finally, to improve productivity, MPIC will support research and development for the adoption of technology.

Ms Emelia's presentation focused on food commodity crops (palm oil, cocoa, and pepper). In the **oil palm** sector, Malaysia proposes to capture the leading position in sustainability, by strengthening implementation and standards of Malaysian Sustainable Palm Oil (MSPO), promoting global acceptance and recognition by buyers, and adoption by other countries, encouraging industry-driven responsible practices across the value chain in relation to workers rights, safety standards, food safety requirements etc. The plan proposed includes:

- Limitation of the area of oil palm cultivation nationwide to 6.5 million hectares
- Prohibition of new palm cultivation on peat land
- Prohibition of conversion of Permanent Forestry (HSK) land use for oil palm or other agricultural activities
- Provision of official map of oil palm areas for public access

According to the latest figures, 62.2% of the oil palm area has adopted MSPO certification in 2019. MSPO is recognized by India, Japan and China. MPIC is establishing an MSPO Trace which will trace the entire supply chain of palm oil.

In **Cocoa** the planted area is 15,000 hectares. Strategic collaborations are proposed to expand domestic production of certified and traceable cocoa beans through cluster farming/cooperatives, inter-cropping and estate development, and partnerships with downstream players, private plantations (small-to-mid-sized players). MPIC will work with state governments to ensure that cocoa is planted in lands with suitable soil and climatic conditions. Cocoa can be integrated with more economically viable crops, such as coconut. A traceability system is proposed to track and report on local cocoa beans production, including education and promotional activities, and will promote the 'My Cocoa Best' certificate. Finally, import volumes from certified source countries/ plantations will be secured to meet industry needs, such as through simplified procedures.

For **pepper**, the planted area is 7,730 hectares. Attention is given to ensure quality pepper production to protect consumer health, through better farming practices and extension services for minimal negative impacts on soil quality and the surrounding environment. In particular, planting materials will be improved with high resistance to disease, the efficient use of farm inputs will be promoted, and lab services will be provided that are accessible to smallholders. A conducive business and farming environment will be created to attract private sector and youths with modern farming practices, and an emphasis on sustainability.

For the non-food agri-commodity crops such as **rubber**, Malaysia is working to introduce a sustainability certification. For **timber** Malaysia already has the MTCS. For **biofuel** production, certification through MSPO, RSPO and ICC is encouraged. Investments in research and

development of second-generation biofuels. For **kenaf**, maintain sustainable management along the value chain, and promote green product certification.

### **Macroeconomic Policy Priorities (Agriculture and Plantation Industries)**

**Mr. Aszmy Mahmood Yusof Mohamed, Principal Assistant Director (Food Crops), Agriculture Section, Economic Planning Unit (EPU)** summarised the evolution of Malaysia agricultural policy, presented agriculture sector performance, briefly noted the issues and challenges of the sector, and ways forward proposed in the 12th Malaysia Plan.

In the 1960s, agriculture (through rural development) was the engine of economic growth, through up until the early 1980s. However, in the national strategic agenda document, Vision 2020, which aimed at establishing Malaysia as a developed industrial country, agriculture was labelled as a “sunset industry”.

In 1984, the 1<sup>st</sup> National Agriculture Policy was introduced, focussing on maximisation of returns on agriculture, and the efficient utilisation of resources so as to strengthen the sector’s contribution to the economy. In 1992, the 2<sup>nd</sup> National Agricultural Policy introduced the concept of sustainability. From 1998, the 3<sup>rd</sup> National Agriculture Policy increased focus on food security, competitiveness and productivity, as well as supply chain interlinkages. In the 21st Century, policy was divided into two distinct areas in accordance with the two separate Ministries overseeing these different sectors: firstly, the National Agrofood Policy (2011-2020) which was focussed on food security and increasing farmers’ income, and secondly the National Commodity Policy (2011-2020) focussed on increasing export revenues.

Below are some of the measures and initiatives undertaken in the evolution of Malaysian agriculture from conventional to modern farming, and the various bodies established to oversee the agricultural development in Malaysia.

- 1960s - Investment in infrastructure, New land development: FELDA, FELCRA, Drainage & Irrigation: MADA, KADA, Marketing FAMA, R&D MARDI, Financing agriculture bank, Extension activities
- 1970s - Crop diversifications: RISDA, MARDEC, KEJORA, KESEDAR, KETENGAH, Farmers’ Association: LPP, Intervention in paddy & fisheries industry: LPN, LKIM, R&D, Agriculture University: UPM
- 1980s - In-situ development: IADPs, Support services Commercialization, Further crops diversification: pepper, cocoa, coconut, pineapple, tobacco, floriculture, non-timber forest products
- 1990s - Fund for Food, Withdrawal of government intervention from rice market in stages, ICT application, Supply chain management, Research, Development and Commercialisation, New land in East Malaysia, Taman Kekal Pengeluaran Makanan (TKPM)

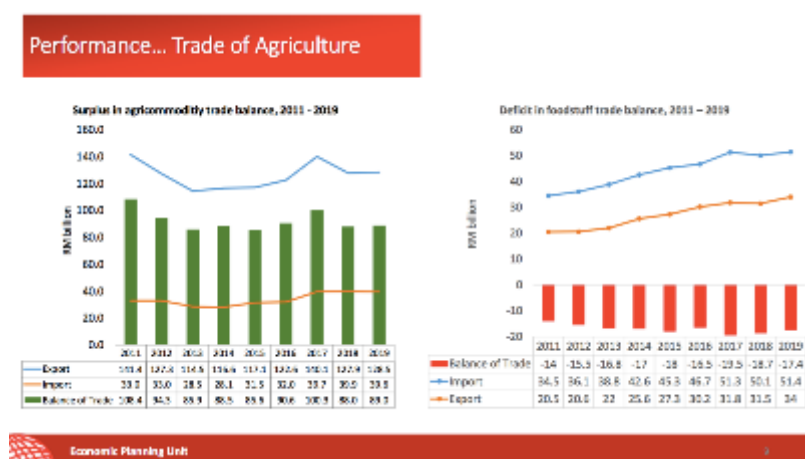
Since the 21st Century, agriculture has evolved through modernization and increases in productivity and income of farmers. Agricultural cooperatives were encouraged, to act as a central coordinating body of the farmers, to achieve economies of scale. The government stressed the importance of adopting good agricultural practices for sustainable agriculture.

Mr Azsmy presented graphs showing total federal government development expenditure, from the 1<sup>st</sup> Malaysian Plan to 10<sup>th</sup> Malaysia Plan. In essence, the funds for agriculture reduced until the 8th Malaysia Plan, after which there was a significant increase in the 9<sup>th</sup> Plan but this fell again in the 10<sup>th</sup> Plan. Nevertheless, agriculture remains an important sector for the country.

The contribution of agriculture to GDP is in the region of 8-7%, in line with some other developed nations, due to increase in manufacturing and services sector activities. The contribution of agrofood to GDP since 2019 has surpassed the contribution of agri-commodities. Forecasts for 2025 would be that agrofood sector would contribute 60% to the agriculture's share of GDP and agri-commodities would contribute 40%. Equally, agriculture's contribution to value-added growth has increased over the years, with agrofood roughly equal to agri-commodities in 2019, a significant change from 2010. Figures were also presented on labour productivity, agriculture-based industry performance etc.

**Employment** The latest figures are not available due to the impact of the Covid-19 pandemic; however, it is currently estimated for 2020 that, out of 15 million working adults, about 10% are working in the agriculture sector. Approximately 70% of the workforce in the agri-commodity sector are foreign workers, while in the agrofood sector, 35 - 38% are foreign workers, mainly in the fisheries industries.

**Trade** There is a surplus in the agri-commodity trade balance since 2011 until 2019. It is projected that this figure will continue to rise this year, despite the Covid19 situation. There was some movement, with the EU reduction of importation of palm oil. However, the demand for palm oil and its by-products are still expected to increase.



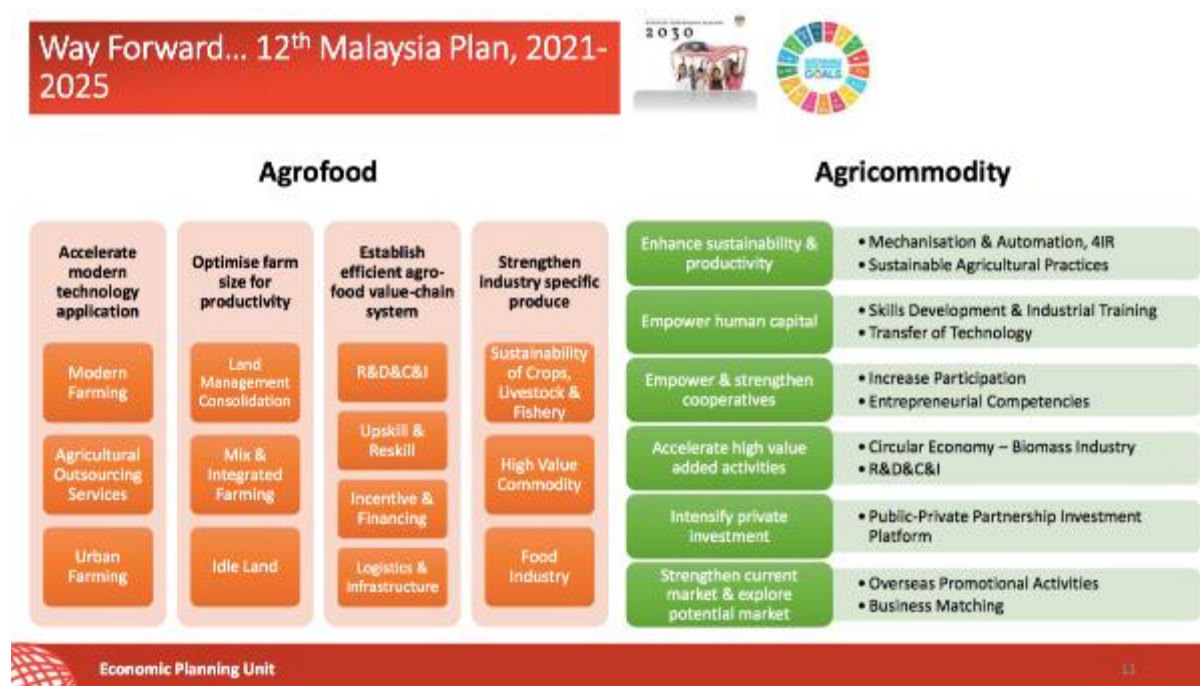
The balance of trade for agrofood: Malaysia has been experiencing a deficit balance of trade in agrofood since approximately 2002. Malaysia seeks to continue to reduce the balance of trade in the agrofood sector, and hopes to further increase exports of agrofood.

Issues and challenges identified and addressed in the 12<sup>th</sup> Malaysia Plan:

- Supply chain issues: low value addition, limited product complexity/innovation, limited market access/share, role of cooperatives not fully capitalised. Also, low public awareness on food safety, poor modern logistic support, and fragmentation between government initiatives.
- Human capital issues: high dependency on foreign labour, ageing farmers, lack of interest from youth, low skilled workers, low-income.
- Support system issues: low take-up of sustainable agriculture practice, low private investment in research and development, limited engagement for extension service high capital and maintenance cost, lack of adequate agricultural infrastructure. Also, low adaptation of modern technology, ineffective technology transfer, limited access to financing, insufficient investment, small-scale farming, and low conformance to standards (MyGAP)
- Issues with business models: unsustainable business models, limited involvement of agri-cooperatives along the value chain, lack of business models of interlinkages with other economic activities, conventional financing model, traditional agricultural programs, limited public-private-partnership (PPP) initiatives in research and development, marketing and financing.

Way forward: The tabling of the 12th Malaysia Plan has been slightly delayed in the context of the impact of Covid-19, to carry out in-depth consultations with stakeholders to identify

related issues and challenges. The 12th Malaysia Plan is consistent with Agenda 2030 and the SDGs, a commitment to eradicate poverty, to achieve sustainable development, to ensure that no one is left behind. It is in line with Malaysia’s long-term “Shared Prosperity Vision” for 2030 which makes a commitment to achieve sustainable growth, along with fair and equitable distribution across income groups, ethnicities, regions and also supply chains. The theme of the 12th Malaysia Plan is to realise a prosperous, inclusive and sustainable nation. The focus is on three main areas, environmental sustainability, social re-engineering and economic empowerment. The broad overview for the agrofood and agri-commodity sectors are summarised succinctly in the slide below.

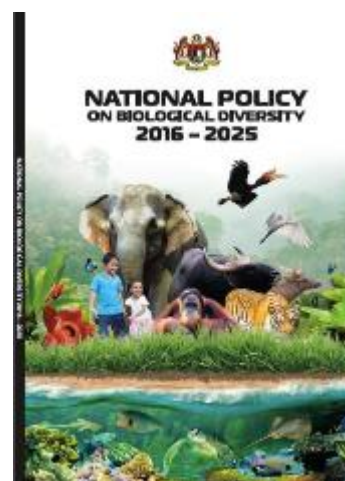


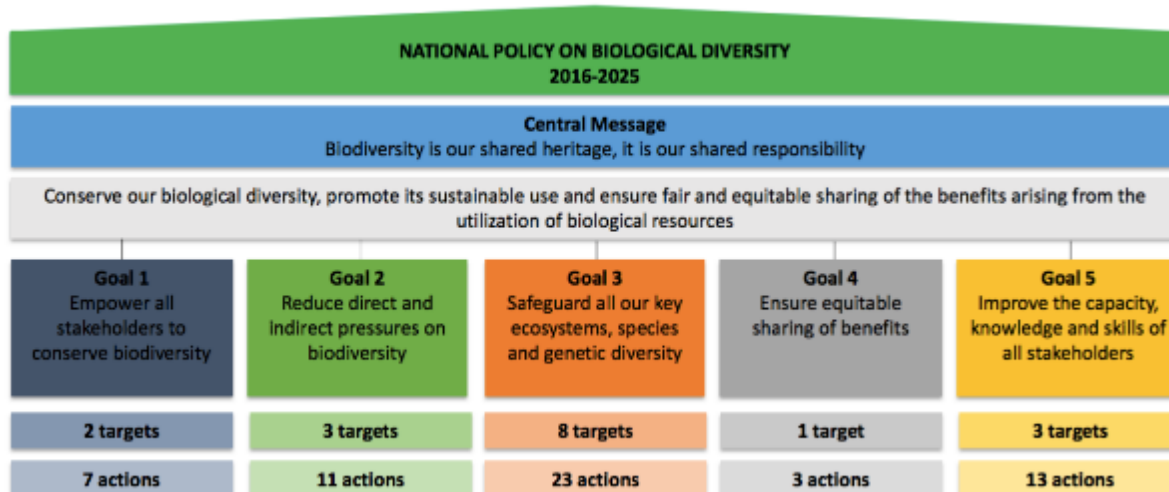
### Agriculture related targets in the National Policy on Biological Diversity

**Mr. Quek Yew Aun, Ministry of Energy and Natural Resources (KeTSA)** began by reminding participants that biodiversity is defined in the Convention on Biological Diversity as “...the variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part”. This comprises variety between ecosystems, variety between species, variety within species. Biodiversity is at the base of the pyramid which holds up the sustainable development goals, such as “Life on land” and “Life below water”. Without biodiversity, other Sustainable Development Goals cannot come to fruition.

The National Policy on Biological Diversity (NPBD) was a direct response to the Aichi targets set in 2010, and was linked to the three goals of the Convention on Biological Diversity: conservation of biodiversity; sustainable use; and the fair and equitable sharing of benefits from the use of biological resources.

Biodiversity is part of our shared heritage in Malaysia and it is a shared responsibility for all Malaysians to bring the policy to fruition. The slide below presents the basic outline of the policy in its current form.





Mr. Quek focussed on the targets related to agriculture, namely, **Target 3** which seeks to mainstream biodiversity conservation into national development planning and sectoral policies and plans. It is expected that the TEEB project may be able to help Malaysia achieve this target, in particular recognizing the economic value of biodiversity and ecosystem services (Action 3.2). Other key actions include protecting environmentally sensitive areas through land use planning. **Target 4** focusses on the sustainable management and harvest of production forests, agriculture production and fisheries. This includes strengthening certification programmes noted above such as MyGAP and MSPO. **Target 11** relates to an important issue in agriculture as it seeks to identify, control and prevent the introduction and establishment of invasive alien species. A TEEB project could be developed in this area perhaps. Finally, **Target 13** specifically seeks to conserve the genetic diversity of cultivated plants and farm animals. Maintaining the genetic diversity of wild relatives of cultivated species tends to receive less attention in the agricultural sphere but is equally important in case of blight or disease.

## Discussion

Dr. Salman Hussain introduced the discussion session by noting that the TEEB project can consider either a **commodity crop** (identifying the sector or subsector, the area and the specific change sought) or alternatively a **landscape** (which may have multiple crops and livelihood systems operating at the same time). One of the benefits of the landscape approach is to capture the inter-dependencies and present a more systems-wide analysis. This gives a more coherent answer to a policy change which would improve livelihoods and conservation. The downside is that such an analysis is location-specific. If the analysis looks more at a commodity such as rice, or a subsector of vegetables, for example, then even though the study areas may be small, the results could be relevant to these sectors elsewhere in similar agroecological zones, and socio-economic conditions. This would allow the study to be able to say something more general about the conversion from conventional to organic production in rice, for example, or agroforestry, etc.

As a result of the workshop discussion, a longlist of options will be developed to take forward to the Steering Committee and consider for the TEEBAgriFood study. On the basis of the discussion in Day 1 and Day 2, the options discussed can be summarised as follows:

1. Promoting adoption of rice of higher nutritional value through regenerative of agroecological approaches

2. Changes in highland vegetable farming systems towards lower external inputs, addressing impacts throughout value chain
3. Improving terrestrial production systems generating ecosystem and feedstock benefits which are required in aquaculture systems
4. Improving agrofood certification systems through MyGAP or MyOrganic.
5. Promoting intercropping in forest plantation systems

**Option 1: Promoting adoption of rice of higher nutritional value through agroecological production practices near coastal ecosystems of peninsular Malaysia**

- Proposed by various participants from MAFI, including DOA and MARDI.
- Rice is one of the agrofood sectors on which MAFI focussed, as proposed in the revised National Agrofood Policy. Highly productive varieties can contribute to Malaysia achieving self-sufficiency level in rice and can also be of high nutritional value.
- Rice production systems cover a much larger area than vegetable systems. There is thus a case to be made in support of rice; in terms of an intervention the TEEBAgriFood study will potentially have a larger impact.
- There are many rice production areas near coasts which also have influence on fisheries and aquaculture. Rice production practices affect the biodiversity of marine areas. There has been some work looking into the reduction of cockles etc. and the impact on quality of water, for example in Selangor.
- Main study locations proposed included:
  - Integrated Agricultural Development Area (IADA) in Seberang Perai, Penang, where there is high use of external inputs. The area connects with other suggested subsystems fisheries, aquaculture, and other agricultural crops. However, it was noted that results would be specific to that area, and as such, selecting another at least one other area to study would be advisable, so that TEEBAgriFood results are applicable to/transferable to a wider range set of agricultural landscapes.
  - Sarawak, where there are extensive mangrove areas, which provide very important ecosystem services; these mangroves are threatened and/or degraded by pressures from agrofood production on land. Sarawak was mentioned as an area where current production is focused on upland and fragrant paddy varieties.
  - Muda Agricultural Development Area (MADA) in Kedah state in the northern part of west Malaysia. A rice variety (MR 269?) has been developed by MARDI and is planted in the area. Kedah is one of the biggest rice production areas in Malaysia. People around Kuala Muda are engaged with the fishery sector and small-scale aquaculture, and there are mangroves in the area too. As such there is a similar interplay between terrestrial and coastal ecosystems as per the Sarawak option.
  - Selangor, where there are large areas of rice cultivation, as well as aquaculture: Kuala Selangor is an important area for coffee production and as such a TEEBAgriFood study here could apply a landscapes approach and consider multiple agricultural commodities.
  - It was suggested that the project does not focus on irrigated rice production systems.

### **Option 2: Changes in highland vegetable farming systems – shifting to a system with lower external inputs, addressing impacts throughout the value chain in Cameron Highlands, or TKPMs in peninsular Malaysia**

- Proposed by MARDI and FRIM
- Vegetables sector is one of the priority sectors on which MAFI focussed, as proposed in the revised National Agrofood Policy.
- The sector is characterised by highly intensive practices affecting water catchment areas. High quantities of pesticides are used and there have been significant changes in the landscape and in land use which are affecting farmers and have a direct cost on the environment. Current production practices have a serious negative impact on the environment, not just the agrofood landscape but also broader provisioning of ecosystem functions in the area that affect other sectors as well.
- Changes to be explored could include organic production, but perhaps more helpful would be to explore intermediate approaches that are more environmentally-friendly as compared with current practices, e.g. the promotion of agrobiodiversity but without necessarily meeting the standards required for organic farming standards.
- It may be useful to focus on the crucifers sector (brassicas).
- MAFI are promoting MyGAP to encourage farmers to adopt good agricultural practices, regarding inputs of pesticide and fertiliser to make sure that their product is safe and good for consumer.
- Specific areas proposed include:
  - Cameron Highlands area, a food basket for Malaysia. It may not be easy to change practices here, however, current practices are not sustainable, even within the timescale of the next 10 years. There are multiple commodities in the same location, including vegetables, tea production etc. There is substantial existing scientific work in this area. This area has significant forest areas and is also a tiger landscape.
  - Agrofood park areas (TKPMs) to be further explored.

### **Option 3: Improving terrestrial production systems generating ecosystem and feedstock benefits which are required in aquaculture systems in various areas of East and West Malaysia**

- Proposed by MADA. Malaysian Aquaculture Development Association - a private sector organisation, with 300 industry members producing aqua-based protein, in response to challenges of Covid-19 for better nutrition.
- A caveat is that TEEB is focussed on terrestrial biodiversity, and would need to focus on production systems on land which affect aquaculture, or marine fisheries.
- Bamboo, produced through an agroforestry system, provides key fibre compounds for insect protein, which is used as a feedstock for aquaculture, and also provides carbon sequestration. There is a direct interface between terrestrial production, food and non-food products. Applying farming systems that use inputs from the natural ecosystem, free from disease, have been found to provide higher yields.
- There is a fixed global trend towards Recirculating Aquaculture Systems (RAS) on land and on floating vessels in the sea, with huge investments taking place. However, this requires a very specific precision feed in the form of plant-based nutrients (phytogenics) from active compounds. Currently phytogenics are imported from Switzerland.
- There has been intensive research, over the last 10 years, identifying the critical role of biodiversity and natural capital in the mangroves. Mangroves require microorganisms which are essential to water quality; these are now being used in the RAS systems.
- Fisheries is one of the agrofood sectors on which MAFI focussed, as proposed in the revised National Agrofood Policy.



- This option would be in line with policy interest digital smart agriculture, with the use of information technology, big data etc, linking smallholder farmers with young educated stakeholders, and encouraging smallholder farmers to conserve the area.
- Areas proposed include:
  - Perlis, North of Peninsular Malaysia,
  - Kuching in Sarawak, East Malaysia
  - Sandakan in Sabah, East Malaysia.
  - Each of these are each unique ecosystems, with intensive human population, and natural heritage. They are natural mangrove areas, cleared by the government 3 decades ago, each already designated for agriculture. These are areas where ecosystem restoration could be promoted, re-introducing genetic profiles and biodiversity needed for aquaculture, and planting bamboo in areas of depleted soils.
  - MADA have established a small processing plant in Sarawak to conduct pilot modelling with key stakeholders globally.
- This option would require working closely with related State governments, and with key stakeholders such as the Dept of Fisheries.

#### **Option 4 Improving agrofood certification systems through MyGAP or MyOrganic.**

- MAFI noted that sustainable agriculture and the sustainable use of natural resources, including agrobiodiversity is a key priority area. MAFI are promoting MyGAP to encourage farmers to adopt good agricultural practices, regarding inputs of pesticide and fertiliser to make sure that their product is safe and good for consumer.

#### **Option 5 Promoting intercropping in agricommodity plantation systems**

- In rubber sector, work is ongoing to develop models for preserving biodiversity in the state rubber plantations.
  - The upcoming Agricommodity Policy 2021-2030 promotes sustainability and biodiversity in the whole agricommodity sector including rubber.
  - Information has been provided to KeTSA regarding model practices to reduce the impact of rubber plantations to the environment and biodiversity at Bukit Kuantan, Pahang.
- In the oil palm sector, Malaysia has already developed MSPO standards. However, given the scale of the oil palm plantations, it could be interesting to work with this sector.
  - There has been a lot of research on intercropping in the oil palm plantation and the challenges presented. In particular, pineapple and banana intercropping in the oil palm plantation has been promoted to smallholder farmers for increased incomes, through incentive schemes, particularly in Johor state. These two crops could be investigated further, along with watermelon, to allow diversification of income when oil palm prices are low.
  - Corporations are proposing land optimisation. In areas that are unsuitable for palm, this can be replaced with coconut in certain areas such as flood-prone areas, for example. Many companies are also looking at intercropping with bananas and pineapples.
- Cocoa sector: Interest was expressed in exploring agroforestry and intercropping.

- As there are extant operational schemes pertaining to Option 5, there is a question as regards the value that would be added by a TEEBAgriFood study. The TEEBAgriFood study is designed to examine evidence for a shift in current behaviours – rather than assess initiatives that are already well supported.

The final comment came from Dr. Lillian Chua, FRIM, who suggested to look at both a specific crop, and also look at a landscape level ecosystems approach “*These two case studies would benefit Malaysia. The landscape level analysis could be even more exciting, as it combines plantation crops, smallholders, habitats that provide the ecosystem functioning. [Admittedly, studying both] would be a handful for 3 years, but why not?*”

#### **Final remarks from the Secretariat**

All participants were encouraged to continue to follow the work going forward. Once the project Steering Committee has decided the focus of the TEEBAgriFood project in Malaysia, an interim meeting will be held to receive further inputs on how to steer policy and ensure mainstreaming.

All workshop documents including workshop video and presentation slides can be found at [TEEBAgriFood Malaysia webpages](#)



## THE ECONOMICS OF ECOSYSTEMS AND BIODIVERSITY (TEEB) FOR AGRICULTURE AND FOOD IN MALAYSIA

Inception Workshop  
2-3 December 2020, from 3:00-5:30pm in Malaysia  
Virtual platform

### Programme

TECHNICAL SESSION  
WEDNESDAY, 2 DECEMBER 2020

Time	Agenda
3:00 pm – 3.10 pm	<b>Opening Speech</b> <i>Mr Arief Iskandar Mohamad</i> <i>Principal Assistant Secretary, Ministry of Energy and Natural Resources (KeTSA)</i>
3.10 pm – 3.30 pm	<b>TEEB AgriFood Project Presentation</b> <i>Dr. Salman Hussain</i> <i>United Nations Environment Programme (UNEP)</i>
3:30 pm – 3:40 pm	<b>TEEB in Protected Areas</b> <i>Ms. Gan Pek Chuan</i> <i>United Nations Development Programme-Malaysia (UNDP)</i>
3:40 pm – 3:55 pm	<b>Research Initiatives - Agriculture, Biodiversity and Ecosystem Services in Malaysia</b> <i>Dr. Rosliza Jajuli, Institut Penyelidikan dan Kemajuan Pertanian Malaysia - Malaysian Agricultural Research and Development Institute (MARDI)</i>
3:55 pm – 4:10 pm	<b>NGO Initiatives in natural capital assessment</b> <i>Ms Zara Phang, Sustainable Economy and Policy Analyst</i> <i>World Wildlife Fund Malaysia</i>
4.10 pm – 4.20 pm	<b>Private Sector engagement of TEEBAgriFood project</b> <i>Ms. Martine van Weelden</i> <i>Capitals Coalition</i>
4.20 pm – 5.20 pm	<b>Discussion</b> -Facilitated by UNEP
5.20 pm – 5.30 pm	<b>Conclusion and Close</b> <i>Dr Khairul Naim bin Adham, Head, Biodiversity Management Division, KeTSA</i>

**POLICY SESSION**  
**THURSDAY, 3 DECEMBER 2020**

Time	Agenda
3:00 pm – 3:10 pm	<b>Opening Remarks</b> <i>Dr Khairul Naim bin Adham on behalf of Dr. Mohd Mokhtar bin Tahar, Deputy Secretary General (Natural Resources), Ministry of Energy and Natural Resources (KeTSA)</i>
3:10 pm – 3:20 pm	<b>Welcome Remarks</b> <i>Mr. Stefan Priesner  UN Resident Coordinator for Malaysia, Singapore and Brunei Darussalam</i>
3:20 pm – 3:35 pm	<b>TEEB AgriFood Project Presentation</b> <i>Dr. Salman Hussain  United Nations Environment Programme (UNEP)</i>
3:35 pm – 3:45 pm	<b>Summary Recommendations from Day 1</b> <i>Quek Yew Aun, KeTSA</i>
3:45 pm – 3:55 pm	<b>Agrofood Policy Priorities</b> <i>Mr. Yeoh Yuan Xiang  Ministry of Agriculture and Food Industries (MAFI)</i>
3:55 pm – 4:05 pm	<b>Agricommodity Policy Priorities</b> <i>Ms. Emelia Fantoza Saraih  Ministry of Plantation Industries and Commodities (MPIC)</i>
4:05 pm – 4:15 pm	<b>Macroeconomic Policy Priorities (Agriculture and Primary Industries)</b> <i>Mr. Aszmy Mahmood Yusof Mohamed, Principal Assistant Director (Food Crops), Agriculture Section, Economic Planning Unit (EPU)</i>
4:15 pm – 4:25 pm	<b>Agriculture related targets in the National Policy on Biological Diversity</b> <i>Mr. Quek Yew Aun, Ministry of Energy and Natural Resources (KeTSA)</i>
4:25 pm – 5:20 pm	<b>Discussion</b> -Facilitated by UNEP
5.20 pm – 5.30 pm	<b>Conclusion and Close</b>

## PARTICIPANT LIST

## THE ECONOMICS OF ECOSYSTEMS AND BIODIVERSITY (TEEB) FOR AGRICULTURE AND FOOD PROJECT IN MALAYSIA WORKSHOP

**Dates** : 2-3 December 2020  
**Time** : 3:00 – 5:30 pm  
**Venue** : Online (Zoom Platform)

No	Name	Position	Organisation
1.	Dr. Khairul Naim Adham	Under Secretary	BPB, KeTSA
2.	Mr. Arief Iskandar Bin Mohamad	Principal Assistant Secretary	BPB, KeTSA
2.	Mr. Quek Yew Aun	Assistant Secretary	BPB, KeTSA
3.	Mr. Muhammad Syazwan Bin Mohd Amir	Assistant Secretary	BPB, KeTSA
4.	Ms. Intan Shahirah Binti Ramli	Principal Assistant Director	EPU
5.	Dr. Noorsyazwani Binti Zulkifli	Assistant Secretary	KASA
6.	Ms. Yusliza Binti Jamalut	Principal Assistant Secretary	MAFI
7.	Dr. Perumal Ponnusamy	Senior Principal Assistant Secretary	MAFI
8.	Mr. Yeoh Yuan Xiang	Assistant Secretary	MAFI
9.	Ms. Noor 'Abidah Binti Mohd Dawi	Assistant Secretary	MAFI
10.	Mr. Abdul Hakim Bin Abdul Rauf	Senior Principal Assistant Secretary	MAFI
11.	Ms. Marianis Binti Md. Din	Senior Principal Assistant Secretary	MAFI
12.	Ms. Aida Baizura Binti Mohd Nor	Senior Principal Assistant Secretary	MPIC
13.	Ms. Firna Azura Ekaputri Binti Marzuki	Principal Assistant Secretary	MPIC
14.	Mr. Tengku Muhammad Aiezuddin Shah	Senior Assistant Secretary	MPIC
15.	Mr. Mohd Firdaus Muhammad Ali	Principal Assistant Secretary	MPIC
16.	Ym Raja Raimi Dato' Raja Nasron	Senior Assistant Secretary	MPIC
17.	Ms. Zulailatun Nor Binti Zainuddin	Senior Assistant Secretary	MPIC
18.	Mr. Muhammad Imran Bin Razali	Assistant Secretary	MPIC
19.	Ms. Asnita Binti Abu Harirah	Principal Assistant Director	DOA
20.	Ms. Zakiiyah Binti Jasni	Senior Principal Assistant Director	DOA
21.	Ms. Lucyana Anak Dominic Ritay	Senior Principal Assistant Director	DOA
22.	Ms. Nor Aila Illiani Binti Ayob	Deputy Director of Crop Industry Development Division	DOA

## Annex 2

23.	Ms. Khazana Binti Ibrahim	Deputy Director of Soil Management Division	DOA
24.	Ms. Lailatul Jumaiyah Binti Saleh Huddin	Senior Principal Assistant Director of Plant Biosecurity Division	DOA
25.	Ms. Izarenah Binti Md. Repin	Fisheries Officer	DOF
26.	Ms. Lim Ai Gaik	Fisheries Officer	DOF
27.	Mr. Mohd Ridzuan Bin Mohamad Mokhtar	Assistant Fisheries Officer	DOF
28.	Ms. Aishah Binti Yusof	Senior Fisheries Officer	DOF
29.	Ms. Hemalatha Raja Sekaran	Senior Fisheries Officer	DOF
30.	Dr. Samsiah Binti Harun	Senior Assistant Director	DVS
31.	Dr. Suratun Bin Kamarudin	Deputy General Director	DVS
32.	Dr. Saifullizam Bin Abd Kadir	Senior Principal Assistant Director	DVS
33.	Dr. Mohd Hafizal Bin Ahmad	Senior Assistant Director	DVS
34.	Dr. Lillian Chua Swee Lian	Senior Research Officer	FRIM
35.	Mr. Mohd Parid Bin Mamat	Research Officer	FRIM
36.	Ms. Tuan Marina Binti Tuan Ibrahim	Head of Forest Planning and Economics	JPSM
37.	Ms. Siti Hawa Binti Sulong	Director of Economics, Licensing and Enforcement Division	LGM
38.	Mr. Muhamad Thalhah Bin Ab Karim	Administrative Officer of Economics Planning Unit	LGM
39.	Ms. Radhiah Binti Dato' Hj Abdul Kadir	Research Officer	LGM
40.	Dr. Tee Yei Kheng	Research Officer	LKM
41.	Dr. Rozita Binti Osman	Research Officer	LKM
42.	Mr. Mohd Fadzhel Bin Mohd Nasir	Deputy Director General	LKTN
43.	Mr. Imraan Fahmi Bin Tajul Arifin	Deputy Director	LPNM
44.	Dr Rosliza Binti Jajuli	Deputy Director of Resources Consumption and Agrobiodiversity Conservation Programme	MARDI
45.	Dr. Engku Elini Binti Engku Ariff	Deputy Director of Economic Programme	MARDI

## Annex 2

46.	Mr. Badrulhadza Bin Amzah	Deputy Director of Pest and Diseases Control Programme	MARDI
47.	Dr. Hairazi Bin Rahim @ Abdul Rahim	Senior Research Officer	MARDI
48.	Mr. Kevin Muyang Tawie Anak Sulok	Research Officer	MPB
49.	Dr. Khew Choy Yuen	Research Officer	MPB
50.	Mr. Chen Yi Shang	Research Officer	MPB
51.	Ms. Safura Abdul Malek	Manager	MPC
52.	Mr. Ab. Rashid Omar	Senior Manager	MPC
53.	Mr. Darul Adizul Ishak	Manager	MPC
54.	Ms. Nur Fatimah Mohd Zaki	Assistant Manager	MPC
55.	Ms. Nik Sasha Khatrina Khairuddin	Peat Ecosystem and Biodiversity Unit Head	MPOB
56.	Dr. Kho Lip Khoon	Research Officer	MPOB
57.	Ms. Bettycopa Anak Amit	Research Officer	MPOB
58.	Dr. Kamil Azmi Tohiran	Head Of Group	MPOB
59.	Dr. Noor Lida Habi Mat Dian	Food and Feed Technology Unit Head	MPOB
60.	Ms. Rafidah Binti Abd. Hamid	Research Officer	MPOB
61.	Ms. Rafizah Binti Mazlan	Research Officer	MPOB
62.	Ms. Nik Aznizan Binti Nik Ibrahim	Research Officer	MPOB
63.	Ms. Norpaezah Binti Mohd Dahalan	Deputy Director of Forest Plantations	MTIB
64.	Ms. Hazlinda Binti Zainal Abidin	Senior Assistant Director	MTIB
65.	Mr. Wan Mohd Adib Bin Wan Mohd Yusoh	Principal Assistant Director	PERHILITAN
66.	Dr. Rospidah Ghazali	Senior Lecturer	LESTARI, UKM
67.	Mr. Rose Asman Samsul Bahrin	Management Committee	EMPA
68.	Mr. Ng Yih Chen	President	MADA
69.	Mr. Chan Thye Huat	Committee Member	MADA

## Annex 2

70.	Dr. Chong Chou Min	Committee Member	MADA
71.	Mr. Ryan Tan	Committee Member	MADA
72.	Ms. Erin Tan Chung Wei	Assistant Secretary	MADA
73.	Mr. Ahmad Zachry Bin Anifah Aman	Member	MEOA
74.	Ms. Shreen Xavier	Senior Manager	MPOA
75.	Dr. Ruslan Bin Abdullah	Director of Science and Environment Division	MPOC
76.	Ms. Yazreen Binti Md. Sabri	Manager	MPOCC
77.	Ms. Erlena Binti Ibrahim	Manager	MPOCC
78.	Ms. Mahirda Binti Mohd Nor	Senior Executive	MPOCC
79.	Ms. Vathani Panirchellvum	Executive	MPOCC
80.	Ms. Marie Goh Chooi Fong	Manager	MPOCC
81.	Assoc. Prof. Rokiah Don		Nutrition Society Of Malaysia
82.	Ms. Hoo Zhi Xin	Project Coordinator	BCSD Malaysia
83.	Mr. Syed Mohazri Syed Hazari	Deputy Head of Department	DHI Water & Environment
84.	Dr. Surina Ismail	Group Head of Sustainability	IOI Corporation Berhad
85.	Dr. Fatimah Kamal	Associate Director	KPMG
86.	Dr. Mohd Azid Kabul	General Manager	Kumpulan Sawit Kinabalu
87.	Mr. Ahmad Nizam Bin Muuti	Marketing and Corporate Manager	Risda Livestock Sdn Bhd
88.	Mr. Jacob Mathan	Group Senior Farm Manager	The Holstein Milk Company Sdn Bhd
89.	Dr. Salman Hussain	TEEB Coordinator	UNEP
90.	Ms. Rebeca Leonard	Coordinator, TEEBAgriFood Malaysia	UNEP
91.	Ms. Lucy Cockerell	Research Officer	UNEP
92.	Mr. Ole Vestergaard		UNEP
93.	Ms. Annika Reimann		UNEP



## Annex 2

94.	Ms. Anna Hellge		UNEP
95.	Ms. Naomi Young		UNEP
96.	Mr. Stefan Priesner	UN Resident Coordinator for Malaysia, Singapore and Brunei Darussalam	UN
97.	Ms. Pek Chuan Gan	Biodiversity Programme Manager	UNDP
98.	Mr. Francesco Floris	Delegation	EU Delegation
99.	Mr. Pekka Penttila	Delegation	EU Delegation
100.	Ms. Martine Van Weelden	TEEBAgriFood Project Manager	Capitals Coalition
101.	Ms. Lavanya Rama Iyer	Head of Policy and Climate Change	WWF-Malaysia
102.	Ms. Zara Phang Yuet Mei	Sustainable Economy and Policy Analyst, Policy and Climate Change Unit	WWF-Malaysia
103.	Mr. Chan Choon Keat	Assistant Secretary	BPP, KeTSA
104.	Mr. Aszmy Mahmood Yusof Bin Mohamed	Principal Assistant Director	EPU
105.	Mr. Muhamad Dinie Bin Kamaruzaman	Assistant Director	EPU
106.	Ms. Norbaity Binti Mohd Noor	Assistant Director	EPU
107.	Ms. Julaiyha Binti Datuk Nasir	Assistant Director	EPU
108.	Ms. Mahfuzah Binti Mohid	Assistant Director	EPU
109.	Ms. Nur Saleha Binti Mohd Zuliaddin	Assistant Director	EPU
110.	Ms. Theenarachigee Muniandy	Senior Assistant Secretary	MAFI
111.	Ms. Emelia Fantoza Saraih	Deputy Under Secretary	MPIC
112.	Mr. Nazar Azly Bin Zaberi	Principal Assistant Secretary	MPIC
113.	Ms. Emelia Anak Gunggu	Senior Assistant Secretary	MPIC
114.	Ms. Nur Azreena Mahmud	Assistant Secretary	MPIC
115.	Ms. Rosmawati Binti Selamat	Director of Plant Biosecurity Division	DOA

Annex 2

116.	Mr. Mohd Nazri Bin Abu Seman	Director of Strategic Planning Division	DOA
117.	Ms. Zanariah Binti Othman	Senior Assistant Director	MTIB
118.	Mr. Tee Seng Heng	Management Committee	EMPA
119.	Mr. Lee Min Khin	Management Committee	EMPA
120.	Dr. Wong Wey Lim	Committee Member	MADA
121.	Mr. Benedict Lim	Committee Member	MADA
122.	Ms. Yeo Bee Hong	Environmental Economist	Expanse Consulting
123.	Mr. William Siow	Sustainability Manager	IOI Corporation Berhad
124.	Mr. Abdullah Bin Bakri	Senior Manager	The Holstein Milk Company Sdn Bhd