

# Policy dialogue on a bioeconomy for sustainable development in Thailand

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SEI report  
January 2020

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Cover photo: Plowing to prepare for cultivation, Thailand © chuchart duangdaw / Getty

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**Acknowledgements and Disclaimer:** The Policy Dialogue on which this brief is based was co-financed by Vinnova and the Swedish International Development Cooperation Agency (SIDA) although neither SIDA nor Vinnova were involved in the design of the project or the dialogues. Any opinions expressed are the sole responsibility of the authors.

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## 1. Introduction

This document reports the results from the second workshop, on Thailand, of the project “Policy Dialogues on a Bioeconomy for Sustainable Development”, held in Bangkok, Thailand, on 28 March 2019. A report on the first pilot workshop, on the Baltic Sea region, held in Tallinn, Estonia, is available on the SEI website.

This project is part of the SEI Initiative on Governing Bioeconomy Pathways. The overall goal of the project is to facilitate a more constructive dialogue on the development of the bioeconomy in particular national and regional contexts to get a better understanding of how a sustainable bioeconomy is envisaged and the possible ways of achieving bioeconomy-related goals.

The SEI Initiative on Governing Bioeconomy Pathways uses the definition of a bioeconomy agreed at the most recent Global Bioeconomy Summit (GBS): “The production, utilization and conservation of biological resources, including related knowledge, science, technology and innovation, to provide information, products, processes and services across all economic sectors aiming towards a sustainable economy” (Global Bioeconomy Summit, 2018).

Section 2 provides some brief background on the bioeconomy in Thailand and the Association of Southeast Asian nations (ASEAN) region. Section 3 summarises the workshop methodology and section 4 summarizes the group discussions at the workshop. Section 5 reflects on the methodology used and the changes to be incorporated into the planning of future policy dialogues/workshops.

## 2. Background to the bioeconomy in Thailand

Thailand has set formal bioeconomy-related development goals at the national level. The main national policy document on the topic is the biotechnology policy framework.<sup>1</sup>

There are several reasons why Thailand is considered to be a country with great potential for bioeconomy-related development:

1. The high level of infrastructure development, which gives Thailand more options for high-added-value development linked to the knowledge-based bioeconomy compared to its neighbours in the ASEAN region.
2. The history of bioeconomy-related policymaking and implementation at the national level. The first National Biotechnology Policy Framework was implemented in 2004–2009, and it helped to establish the country’s capacity to pursue biotechnology.
3. The Thai economy has excellent sources of raw materials with great potential for bioeconomy-related development, especially in key agricultural sectors (e.g. rice, cassava and sugarcane) (Lakapunrat & Thapa, 2017).

## 3. Bioeconomy policy dialogue in Bangkok: Method and process overview

The sustainable bioeconomy policy dialogue in Bangkok had three main stages: (a) conducting a participatory dialogue at the venue; (b) processing the workshop results; and (c) comparing the visions of a bioeconomy developed during the workshop with the existing visions in the literature. The methodological and process-related details related to each stage are discussed in this section.

<sup>1</sup> Government of Thailand, Ministry of Science and Technology. *Thailand’s National Biotechnology Framework, 2012–2021*. Bangkok, <<http://www.biotech.or.th/en/images/document/1.pdf>>.

### 3.1 Stage 1: Participatory workshop with the stakeholders

The workshop participants were selected on the basis of some diversity in backgrounds and expertise in the sectors associated with the development of a bioeconomy in Thailand and the ASEAN region. They were divided into three groups and asked to design sustainable bioeconomy pathways for Thailand up to 2050. Group membership was based on the background of the participants along with some division across the relevant sectors. The majority of the participants in Group 1 had a background in agriculture, which is naturally a key foundation for the bioeconomy in Thailand. Group 2 was designed for participants with experience of working on the social aspects of the development of a sustainable bioeconomy. Most of the participants in Group 3 had expertise in one or more biotechnologies. Dividing the participants in this way was expected to lead to some variation in the focus and scope of bioeconomy pathways developed by the end of the workshop.

The work evolved around the overarching question: *How do we shift to a sustainable bioeconomy in Thailand by 2050?* In addition, the participants were guided by supporting sub-questions to help design more elaborate bioeconomy visions and action plans. First, how is value created and realized in the bioeconomy? Second, who are the key stakeholders and decision makers? Third, what are the key feasible pathways to bioeconomic development? Finally, what instruments, regulations and policies are needed at different levels and how should governance processes be linked across these levels?

The group work and subsequent discussion lasted 3.5 hours, during which the participants designed a step-by-step action plan for achieving a sustainable bioeconomy in Thailand by 2050. The actions were designed in reverse, moving from the desired state in 2050 to the present time. The main expectation of the backward-looking methodology was that it would encourage the participants to be more open to ambitious and more imaginative conceptions of what a future bioeconomy could be like, in contrast to being focused on current conditions and the policy options available today.

There is no universal understanding of the sectoral divisions in a bioeconomy. Agriculture and forestry are usually included as the key sectors of a bioeconomy and as the primary suppliers of biomass. However, sectoral division in the bioeconomy is always highly contextual. In Thailand, for instance, there are several bioeconomy sectors and different pathways associated with them. These were identified before the workshop and given to the participants as a starting point. The sectoral pathways were: (a) a food and agriculture pathway; (b) a bio-based industry pathway; (c) a bioenergy pathway; and (d) a cross-sectoral pathway. These sectors correspond with the sectoral divisions in Thailand's biotechnology strategy.

### 3.2 Stage 2: Processing workshop results

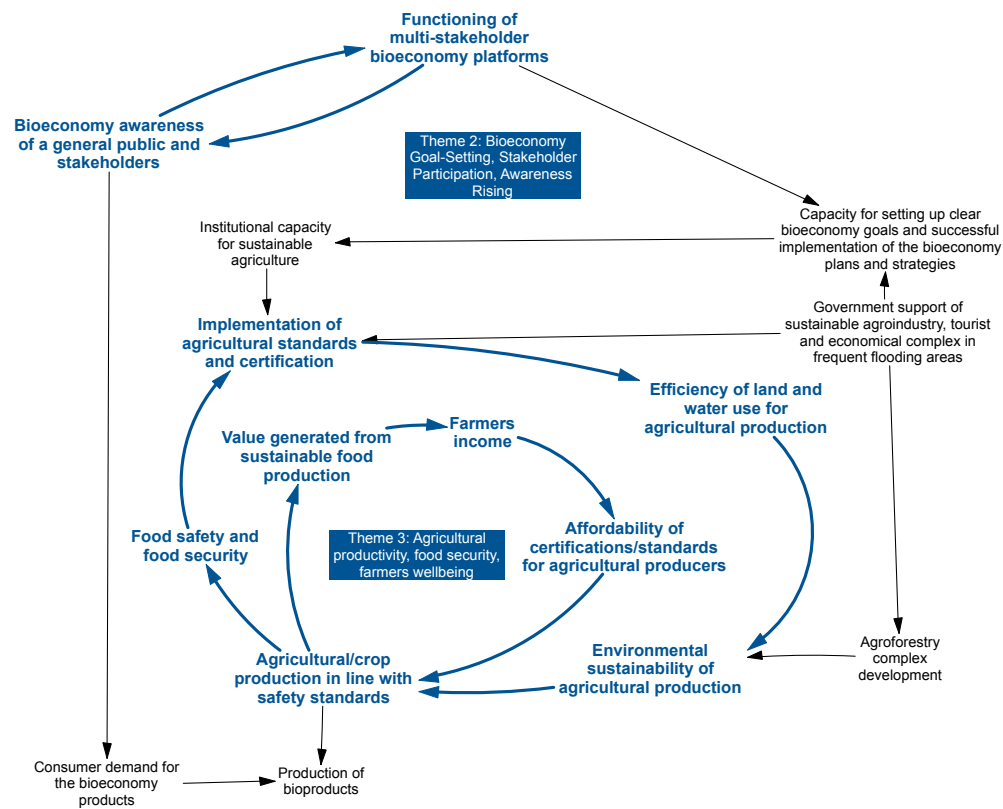
A conceptual causal loop mapping was used to analyse the workshop results, using causal loop diagrams (CLDs) as a tool (Sterman, 2000). The bioeconomy pathways were designed during the workshop as a sequence of actions connected to a timeline. In contrast, causal maps portray the actions and their interconnectedness. Of added analytical value is that the analysis reveals the underlying dynamics between the actions and provides policy insights on designing bioeconomy implementation plans in Thailand that would not be evident in the original pathways and action plans.

In the fig. 1, there are three CLDs presented. They summarize the results of the workshop and the dynamics of the key bioeconomy development themes discussed in each group.

Causal mapping of the workshop results allowed for more structured understanding of the underlying mechanisms of the selected policy actions as well as for comparing the results of the three groups. More discussion on this is available in the section 4 of this brief.

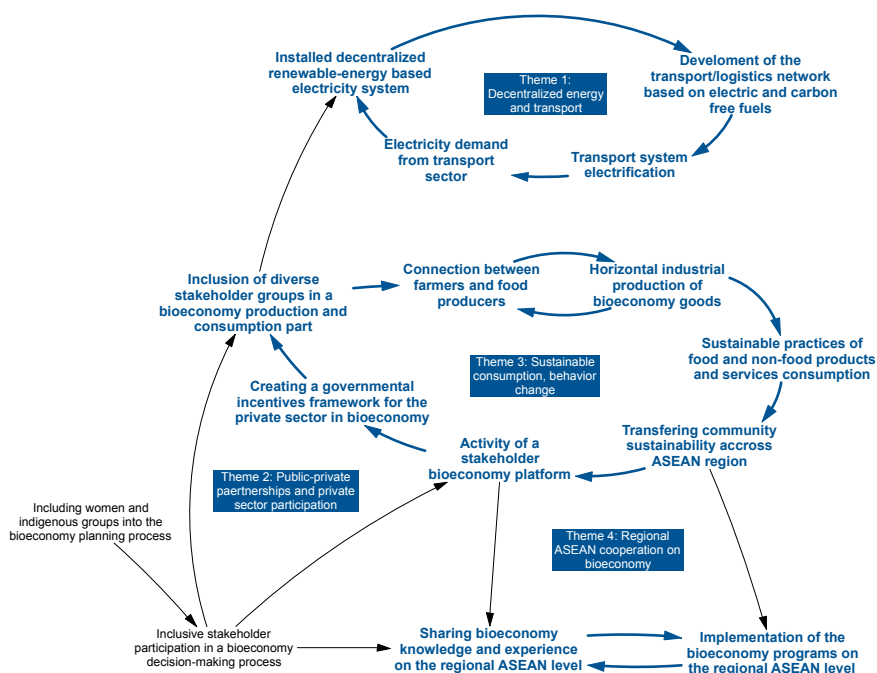
Figure 1. Causal loop diagrams

Group 1 (background in agriculture)



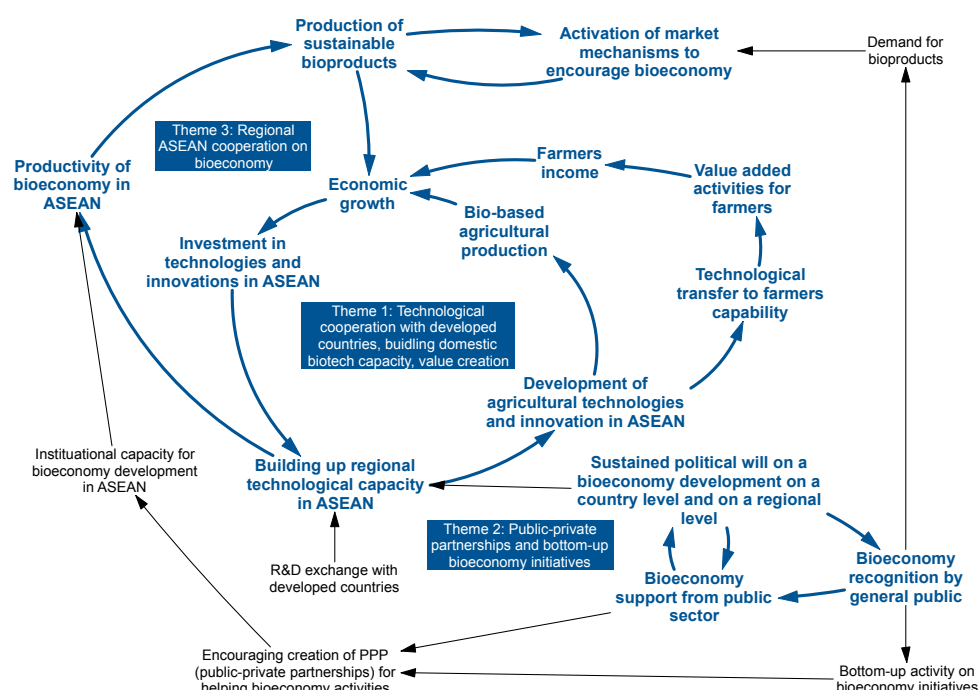
According to the Group 1, the most powerful policy feedback mechanisms are related to encouraging an increase in agricultural productivity and farmers income, as well as encouraging stakeholder participation in the bioeconomy.

Group 2 (background in working on the social aspects of sustainable bioeconomy development)



According to the Group 2, the most powerful policy feedback mechanisms are related to establishing decentralized energy and transport, connecting producers and consumers of bio-based products as well as stakeholder cooperation on the national and regional levels.

Group 3 (background in biotechnologies)



According to the Group 3, the most powerful policy feedback mechanisms are related to establishing domestic, regional and international technological cooperation as well as activation of market mechanisms for bioeconomy development and economic growth.

### 3.3 Stage 3: Comparing workshop results with bioeconomy visions in the literature

Three main sustainable bioeconomy visions were designed by the groups of participants as a result of the workshop. Summaries of these visions are provided in section 4. One of the goals of the bioeconomy policy dialogues is to compare the sustainable bioeconomy visions designed by the participants with existing bioeconomy visions available in the literature.

For this purpose, the sustainable bioeconomy visions designed by each group were compared with three 'reference' bioeconomy visions as synthesised by Bugge et al. (2016):

1. A *biotechnology vision* oriented towards biotechnological development and biotechnology commercialization.
2. A *bioresource vision* centred around new ways of using and creating value from biological raw materials in different economic sectors.
3. A *bioecology vision* that prioritizes environmental sustainability and the importance of ecological processes in economic and technological development.

The rationale behind this aspect of the workshop results processing was an attempt to conceptually relate the visions of a sustainable bioeconomy designed by the workshop participants to already existing, formalized visions. This process aimed to better understand the priorities and gaps in the national and regional bioeconomy visions, while also connecting the workshop results to the bioeconomy visions in the literature to create a more methodologically sound basis for comparing the results of the sustainable bioeconomy policy dialogues in different countries.

## 4. Workshop discussions summary: Bioeconomy pathways in Thailand

### 4.1 Key policy leverage points for sustainable bioeconomy pathways in Thailand

Participants in the workshop designed sustainable bioeconomy pathways and associated them with particular action points. The causal map analysis of the pathways and the action plans developed by each group revealed a number of important themes, as well as some key policy actions associated with them. Table 1 summarizes these themes and policy actions.

Table 1 shows that the choice of priority themes and actions for a sustainable bioeconomy correlated with the backgrounds of the participants in each group. However, some of the themes are present in and were prioritized by different groups regardless of the participants' backgrounds. The most notable of these are public-private partnerships and bottom-up bioeconomy-related initiatives, an increase in farmers' well-being and an increase in sustainable consumption.

Table 1. Themes and policy actions associated with sustainable bioeconomy development in Thailand

(NOTE: cells are empty where the group did not place emphasis on that aspect)

	Group 1 (background in agriculture)	Group 2 (background in working on the social aspects of sustainable bioeconomy development)	Group 3 (background in biotechnologies)
<b>Technology and Infrastructure</b>	1: Energy and transport	1: Decentralized energy and transport <ul style="list-style-type: none"> <li>Install a decentralized renewable energy-based electricity system.</li> </ul>	1: Technological cooperation with developed countries, building domestic biotech capacity <ul style="list-style-type: none"> <li>Build up regional technological capacity in Southeast Asia.</li> <li>Production of sustainable bioproducts.</li> <li>Activation of market mechanisms to encourage the bioeconomy.</li> </ul>
<b>Stakeholder engagement and relations</b>	2: Bioeconomy goal-setting, stakeholder participation and awareness raising <ul style="list-style-type: none"> <li>Functioning multi-stakeholder platform(s) for the bioeconomy.</li> <li>Bioeconomy awareness raising among general public and stakeholders.</li> <li>Set clear bioeconomy objectives and goals.</li> <li>Increase capacity for successful implementation of bioeconomy-related plans and strategies.</li> </ul>	2: Public-private partnership (PPP) initiatives and private sector participation <ul style="list-style-type: none"> <li>Activate a stakeholders' bioeconomy platform.</li> <li>Inclusive stakeholder participation in bioeconomy decision-making processes.</li> </ul>	2: PPP and bottom-up bioeconomy initiatives <ul style="list-style-type: none"> <li>Bioeconomy support from the public sector.</li> <li>Bottom-up activity related to bioeconomy initiatives.</li> <li>Encourage PPP creation to assist bioeconomy activities.</li> <li>Establish a communication platform for the production and consumption aspects of the bioeconomy.</li> </ul>
<b>Environmental and social sustainability</b>	3: Crop/agricultural productivity, food security and farmers' well-being <ul style="list-style-type: none"> <li>Agricultural/crop production in line with safety standards.</li> <li>Enhance efficiency of land and water use for agricultural production.</li> </ul>	3: Sustainable consumption, behaviour change <ul style="list-style-type: none"> <li>Sustainable practices of food and non-food products and services consumption, including service over ownership.</li> </ul>	3: Farmers' well-being
<b>Regional economic aspects</b>		4: Regional ASEAN cooperation on bioeconomy <ul style="list-style-type: none"> <li>Sharing of bioeconomy knowledge and experience at the regional level</li> </ul>	4: Regional ASEAN cooperation on bioeconomy <ul style="list-style-type: none"> <li>Sustained political will on bioeconomy development at the country level and the regional level</li> </ul>



## 4.2 Sustainable bioeconomy visions based on the workshop results

This section presents the three sustainable bioeconomy visions derived from the group work. These visions are extracted from the pathways and action plans developed by the participants.

### The sustainable bioeconomy vision of Group 1

Agriculture and energy are the most substantial parts of the bioeconomy. Zero use of fossil fuels and 100% access to healthy and sustainable food are the main goals of bioeconomy development in ASEAN and are the key objectives of the development of a sustainable bioeconomy. Crop production that allows for the sustainable and efficient use of land and water, and minimum possible waste creation is a fundamental part of agriculture in a bioeconomy. A combination of mechanization and traditional crop-growing practices that take account of regional climate and weather specificities are the key knowledge-based components of the agricultural aspects of a sustainable bioeconomy in the region. Farmers will be the key beneficiaries of the value created in the agricultural sector. Farmers' incomes and poverty reduction among farmers will be the main indicators for assessing the success of a bioeconomy.

Sustainable bioeconomy development should be based on an interdisciplinary and intersectoral approach. In this way, systemic synergies can be created in the bioeconomy across sectors. A transformation of the energy and transport sectors should be based on a mix of biofuels, sources of renewable electricity and hydrogen. The shift to these sources is especially important for reaching climate mitigation goals consistent with keeping global average temperature increase below 2C. A strong participatory component and stakeholder involvement at the local, national and regional levels, combined with top-down political actions will be the core mechanisms driving clear goal-setting in the bioeconomy, as well as ensuring implementation of all the defined goals.

### The sustainable bioeconomy vision of Group 2

Decentralization of energy and agricultural production is a fundamental component of bioeconomy development in Thailand and the ASEAN region. Shifting from large-scale, vertical production systems to small-scale, horizontal ones will ensure that environmental and social sustainability goals are reached. Social and technical innovations should be designed specifically to contribute to farmers' well-being. A strong participatory decision-making core is crucial for bioeconomy-related goal-setting and implementation processes. Public-private partnerships (PPP) enable the interests of the private and public sectors to be met in designing bioeconomy programmes and are one of the main instruments for realizing bioeconomy visions. The maximum diversity of stakeholder participation, enabling the inclusion of women and indigenous groups, is important and needs to be institutionalized by creating a participatory bioeconomy platform. In a regional ASEAN context, the effective coordination of the bioeconomy strategies of Asian states will be an essential component if bioeconomy visions are to be successfully realized. A shift to more sustainable consumer behaviour supported by awareness-raising campaigns will also be necessary for a bioeconomy to become fully functioning.

### The sustainable bioeconomy vision of Group 3

Technological development is the most essential component of bioeconomy development in Thailand. There is not currently enough technological capacity in the country and a massive boost is needed in investment in R&D. To achieve this, cooperation will be required between the ASEAN member states and between Thailand and developed countries of the global North. Top-down support for bioeconomy initiatives and sustained political will are important for fostering bioeconomy development. However, market competition among bioeconomy actors and biotechnologies should be the main driving force in activating and scaling-up the sustainable production and consumption of bio-based products. Nonetheless, coordination among different bioeconomy actors, and between producers and consumers of bio-based products, as well as overall support for bottom-up bioeconomy initiatives, will also be crucial. The creation of

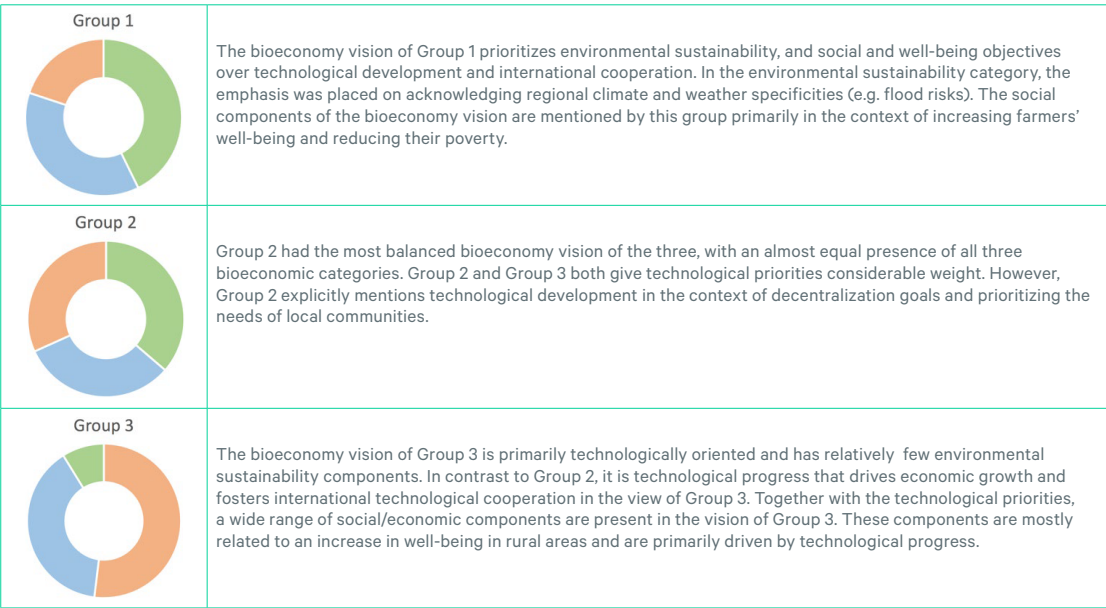
bioeconomy communication platforms and PPPs are valuable instruments for the constructive participation of different bioeconomy actors. Farmers' well-being and small-scale agricultural activities are important but not necessarily the core of the future bioeconomy. When major efforts are directed at technological development, farmers will also benefit. Overall, the goal of the bioeconomy is economic growth, which, however, must be environmentally sustainable and lead in particular to a decrease in GHG emissions.

4.3 Comparing the sustainable bioeconomy visions that resulted from the policy dialogue in Thailand with bioeconomy visions in the literature

Each of the three sustainable bioeconomy visions developed by the participants includes a number of environmental, technological or socio-economic priorities. The balance between the different priorities of each of the visions is shown in Figure 1. This allows a comparison of each of the visions designed during the workshop with the reference visions (Bugge, Hansen, & Klitkou, 2016) mentioned in section 3.

Based on a weighting of environmental, technological and socio-economic factors within each of the visions designed by the participants, there was no absolute match between any of them and the reference bioeconomy visions in the literature. However, it is evident that the visions of Group 1 and Group 2 are closer to the bio-ecology visions, and that of Group 3 is closer to the biotechnology vision. Interestingly, there is a strong emphasis in all the bioeconomy visions produced by the workshop participants in Bangkok on social components, especially in relation to rural development and sustainable food production. The bioeconomy vision of Group 3 is especially interesting in this context, because it includes both strong technological aspects and a strong social aspect. This is not very common since most of the biotechnological visions available in the literature largely exclude social components. The presence of a strong social component in the bioeconomy visions in Thailand, especially those related to rural development and farmers' well-being, can be explained by the cultural context and the generally high importance of rural activities to the Thai economy.

Figure 1. Comparison of the sustainable bioeconomy visions designed during the workshop in Bangkok



Colour legend: ■ Environmental Sustainability and Resource Efficiency priorities  
■ Technological and Cooperation priorities  
■ Social/Economic priorities

## 5. Reflections on and discussion of the stakeholder engagement methodology

Following the pilot sustainable bioeconomy policy dialogue in this series in Tallinn, various methodological aspects were changed. In particular, the principles behind the division of the participants into groups were based on their thematic backgrounds and expertise (i.e. agriculture, biotechnologies, social aspects of sustainable bioeconomy development), in contrast to Tallinn where the participants were divided into groups representing government, academia, and NGOs and the private sector. This modification allowed elaboration of more detailed and contrasting bioeconomy visions and pathways among the different groups of participants.

Causal loop analysis and a comparative analysis of the bioeconomy visions designed by the participants with the bioeconomy visions in the literature were added as stages of processing the workshop results. These additional stages contributed to a better analysis of the workshop results and will be used in future policy dialogue workshops.

The main driving question and the sub-questions provided during the workshop in Bangkok were more specific than those used in Tallinn. These questions added to the more constructive input from the participants in designing the sustainable bioeconomy pathways. One of the insights from this part of the process was that thinking within the national scale is more intuitive and less confusing for participants than thinking on a regional one. It is therefore important that the main driving question specifically notes the focus on the national level.

The main methodological weakness during the workshop in Bangkok was the lack of clarity around defining sustainable bioeconomy-related goals. Participants were encouraged to design bioeconomy pathways without first having a detailed group discussion on setting sustainable bioeconomy-related goals. This methodological shortcoming will be addressed in future policy dialogues. A part of the workshop process will be explicitly dedicated to a discussion of sustainable bioeconomy-related goals.

An examination of the connection between sustainable bioeconomy-related goals and the United Nations Sustainable Development Goals (SDGs) is an additional aspect that could contribute to enhancing the quality of the workshop results. The SDGs were mentioned multiple times during the workshop in Bangkok in terms of the broad development context. Future policy dialogues will explicitly address the interactions between bioeconomy-related goals and the SDGs in the workshop process. This will be especially relevant in the context of the less developed countries, where an exploration of the synergies and trade-offs between the SDGs and sustainable bioeconomy-related goals is particularly important.

Several more sustainable bioeconomy policy dialogues will be conducted. The final report will compare and synthesise the results of the various dialogues and draw policy-relevant conclusions based on them all.

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