



The Economics of Ecosystems and Biodiversity  
Promoting a Sustainable and Food Sector Project (China)

## Summary of the 3<sup>rd</sup> Project Steering Committee Meeting Guidance and Responses

**【Deliverable 4.5】**

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## Background

The Economics of Ecosystems and Biodiversity: Promoting a Sustainable Agriculture and Food Sector Project (TEEBAgriFood Project) aims to contribute to the transformation of agri-food systems, and thus to biodiversity conservation and ecosystem services provisioning in the region, by evaluating the natural, economic and social impacts of targeted agricultural policies over time. The project is funded by the EU-Partnership Instrument, and organized and coordinated by the UNEP in seven countries: Brazil, China, India, Malaysia, Mexico, Thailand, and Indonesia.

In July 2020, the Project Steering Committee (PSC) selected Tengchong City, Yunnan Province as the study area for the China case. October 2020, the project implementation team conducted the first local stakeholder consultation to understand the current and future development priorities of Tengchong's agricultural system, land use patterns and other socio-economic conditions, and developed the TEEBAgriFood China Scoping and Scenario Setting Report. The report was reviewed and approved by the PSC in February 2021.

The purpose of this PSC meeting is to review the TEEBAgriFood Data and Methodology Report. The Report, the second in a series of TEEBAgriFood technical reports, is based on information gathered from the second local stakeholder consultation in May 2021, and outlines the data and modelling approach to be used in the scenario analysis for Tengchong. The report, finalized after review and guidance by the PSC, will serve as the technical basis for the scenario analysis to be conducted by the project implementation team.

## Project Steering Committee

**LI Jun-sheng** (PSC Chair), Director of Institute of Ecology, Chinese Research Academy of Environmental Sciences, Ministry of Ecology and Environment

**WANG Quan-hui**, Chief Expert in Energy Ecology, Rural Energy and Environment Agency, Ministry of Agriculture and Rural Affairs

**ZHUANG Yan**, Director of International Organization Programs, Bureau of International Cooperation, Chinese Academy of Sciences

**ZHANG Linxiu**, Director of International Ecosystem Management Partnership, United Nations Environment Programme

**XIA Feng**, Director of Natural Ecology Protection Division, Department of Ecology and Environment of Yunnan Province

**ZHAO Guipin**, Director of Bureau of Baoshan Ecological Environment

**XUE Zhong**, Deputy Director of Bureau of Baoshan Ecological Environment (presiding



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over the Tengchong Branch)

## Guidance from the PSC

### **WANG Quan-hui:**

In the context of climate change, methane emissions from beef cattle breeding have been an important source of agricultural greenhouse gases emissions, and while the Asian Development Bank and others are no longer providing financial support to large-scale cattle breeding project. Is it reasonable from the perspective of climate-smart agriculture (livestock) that the TEEBAgriFood China project identifies an increase in beef cattle as a future scenario, especially in year 2050? Is this a “positive scenario”?

Is it possible to look at the development of a low-carbon emission livestock industry in Tengchong, or even the development of fisheries that can potentially be a carbon sink? That together with ecological cattle breeding could form a reasonable carbon emission livestock structure, and establish a low-carbon, high-efficient livestock, aquaculture, plantation and forestry (the big food system) agro-industrial complex of the future. This should be regarded as the direction for climate-smart agriculture in the future. Further, a low-carbon, ecological, healthy and sustainable big food system will lead the community of Tengchong to optimize toward a healthy food structure.

### **XIA Feng:**

No objections on the report in general, only a recommendation. The report is very scientific and technical in nature, and the terminology and presentation are international as a product from an international cooperation project. This may be easier for technical people to understand, but more difficult for government officials. If in the future the report is to be provided to governmental agencies, it is recommended that a concise, easy-to-understand short version be provided to government departments.

### **ZHAO Gui-pin:**

In the report, the expression of “total beef cattle breeding increases from 140,000 heads in 2020 to 200,000 in 2025, and remains unchanged in 2035 and 2050” in section 1.2.1 baseline policy scenario and section 1.2.2 optimistic policy scenario are inconsistent with data in the corresponding charts, please verify.

### **XUE Zhong:**

By collecting opinions from various relevant government departments in Tengchong, we made suggestions to modify the specific numbers in the scenario setting, which are detailed in the Data and Methodology Report (Tengchong suggested version).

The Tengchong suggested version of the report proposed the following revisions in the scenario setting: 1) the scale of beef cattle breeding is expected to be 300,000 heads by 2025, and the number remain unchanged in 2035 and 2050, 2) the total amount of pesticides and fertilizers used in 2020 were 410.77 tons and 23,300 tons respectively, and



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3) the potential area for the development of agroforestry is roughly estimated to be 500,000 mu (33,333 ha).

**ZHUANG Yan:**

The report is complete in structure, clear in thoughts, and detailed in data and methods. It is a good project output and I hope that the project team keeps communication with relevant teams within CAS. In addition, I would like to suggest on the scenario setting: the methane emission of cattle breeding is significant, and the increase in the scale of the beef cattle industry will increase the greenhouse gas emissions. It is recommended that the project team pay due attention to the impact of GHG emissions, based on the actual situation in Tengchong, to see if there is potential to reduce GHG emissions or increase carbon sinks. This is in line with our long-term goal of achieving “carbon neutrality” by 2060.

**ZHANG Lin-xiu:**

The report being reviewed by the PSC is about the methodology and data base to be used in the scenario analysis of the next step, which is more technical in content. In fact, before it goes for the PSC's review, the project team has already asked experts from the Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences for technical guidance on its content. I hope that the project team could maintain an open attitude and conduct more expert consultations on possible technical challenges to ensure that the scenario analysis is science-based and reasonable, and that the results are reliable. At the same time, to maintain the interaction and communication with other pilot countries of the project.

**LI Jun-sheng:**

After nearly two years of research and practice, the report has mapped out the composition and structural characteristics of Tengchong's agriculture systems, and also understands the nodes and influencing factors of different agricultural systems in their value chains. The report was developed based on openness and active incorporation of local stakeholders' opinions, so that the scenarios set out in the report will be an important guide to the development of sustainable agriculture in Tengchong, local biodiversity conservation and the enhancement of ecosystem services in the future.

It is recommended that the report and the next steps of the project be further improved in the following aspects.

1. As a mainstay industry, beef cattle breeding occupies an important position in sustainable agricultural development in Tengchong. In the scenario analysis, especially in the optimistic scenario, methane emission control measures for the beef cattle industry should be considered, such as i) precise nutrition control in large scale breeding to improve the absorption and use efficiency of feeds and reduce the methane and other gas emissions due to incomplete rumen digestion; ii) the use of



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certain feed additives, such as the seaweed or ginger-kind to inhibit the production and emission of methane and other gases; and iii) the bio-gasification of manure through anaerobic digestion for collection and utilization of methane, meanwhile, the digestate is returned to the farming field as organic fertilizer.

2. Concerning the plantation, the concept of eco-farm should be advocated to preserve agricultural biodiversity by reasonably matching and hedging different crops on the one hand, and to reduce pests and diseases, pesticide use and agricultural non-point pollution. Thirdly, the combination of eco-ranching and eco-farm plantation can reduce the use of chemical fertilizers and nitrogen in the soil.
3. Synergies between agricultural and other sectors in relation to biodiversity conservation and how to establish the mechanism to realize it could be mentioned.
4. Being aware of the importance of gender balance in sustainable agriculture and biological conservation, the active participation and training of women and inhabitants from different ethnic groups should be emphasized, as well as the protection of traditional agricultural knowledge related to biodiversity conservation.
5. It is suggested to continue to strengthen the publicity of the project results to enhance the demonstration and leading effect of the project.

In addition, please further check the specification of charts and graphs, such as the location of Yunnan Province in Figure 1 which lacks a north compass and the legend is not clear, etc.

### Response from the project implementation team

In response to the comments and guidance from the PSC, the project implementation team carried out careful discussions and arguments around GHG emissions from beef cattle breeding, mix-cropping plantations, and space for the development of agroforestry. The Tengchong agriculture and forestry departments were further consulted during the process, and the following planned improvements were formed.

#### 1. GHG emissions from beef cattle breeding

Beef cattle is the pillar industry of Tengchong. According to the existing plan, the scale of beef cattle breeding in Tengchong will grow from 125,200 heads in 2020 to 300,000 heads by 2025. In addition to the development of eco-pastures and large scale (300-head) standardized breeding plants, there are also moderate scale (50-head) family breeding and some small-scale pen-breeding.

Tengchong is mountainous, with a limited number of ponds. With the restrictions of environmental impact control, aquaculture is not a focus for future growth, and only a small number of rice fields may be developed for rice paddy-fish farming. However, compared to the methane emissions from the 300,000 heads of beef cattle, the contribution of rice paddy-fish farming as a carbon sink is very limited. To deal with the



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implications of the GHG emissions from the beef cattle breeding, the project proposes to focus on the management of the feeds, and add two measures under the positive scenario: 1) fine management of the feeds to reduce the total amount of feeds used and increase the use efficiency, and 2) addition of methane inhibitors to the feeds (such as probiotics and certain enzymes). In terms of manure management, cattle manure contains high lignin and low moisture, which leads to it being a low efficient material for methane production (for energy) as compared to pig and chicken manure. The current manure management measure in Tengchong, i.e. making organic or farmyard manure from cattle manure, is considered a good means to control emissions.

### 2. Mix-cropping system

Under the national policy of reducing the use of pesticides and chemical fertilizers and increasing the use efficiency, Tengchong continues to cut the use of chemicals by producing farmyard or organic manure from cattle manure and returning them to the fields as well as developing mix-cropping systems. At present, it has realized that all cattle manure from the pen-breeding is made into farmyard or organic manure, and approx. 10% of the arable land applies mix-cropping.

Arable land that is below 1,600 meters of altitude is suitable for mix-cropping plantations in Tengchong, and there is still room for development. Given this, the project proposes to divide the crop plantation in Tengchong into the “mix-cropping plantation” model and the “conventional plantation” model.

### 3. Agroforestry

Tengchong is rich in forest resources and has developed certain areas of agroforestry, mostly for medicinal herbs. A rough estimation of suitable area for agroforestry in Tengchong is about 500,000 mu (33,333 ha), a number arrived by deducting areas with protective status or low accessibility from the total forest area. The project will set the scale of agroforestry under the positive scenario based on GIS simulation results combined with this value.

In the subsequent scenario analysis process, the project team will continue to maintain communication with experts from the Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, to ensure that the technical analysis process is science-based and reasonable and the results are reliable; meanwhile, also maintain interaction and communication with other project countries in scope.

During the policy advocacy phase of the project, attention will be paid to 1) the synergies between agriculture and other sectors for biodiversity conservation, and exploring suggestions for mechanisms to promote such synergies, 2) the role of women and ethnic groups and traditional knowledge in sustainable agriculture and biodiversity conservation, and 3) strengthening publicity to enhance the project's demonstration and leading effect.



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For awareness-raising, the project team, with support from the UNEP TEEB Office, will prepare a project brief to share with policy-makers.