

TERMS OF REFERENCE FOR CONSULTANTS

1. International consultants will be hired to implement the technical assistance (TA). An estimated 42 person-months of consulting services are required.

2. The terms of reference for the proposed TA will be fine-tuned during implementation. All consultants will be recruited in accordance with the Asian Development Bank's Procurement Policy (2017, as amended from time to time) and its associated Staff Instructions for ADB-administered consulting services and project implementation.

A. Earth Observation Expert in Artificial Intelligence (AI) Platform (international, 13 person-months, intermittent)

3. The consultant will lead the development of a set of satellite-based information on the AI platform. The processing will be done using a cloud-based solution, where AI algorithms will be hosted and made available to the other experts for applications in agroforestry, agriculture, and coastal planning. The outputs will be discussed with all the stakeholders and a complete training on the cloud processing platform will be delivered to the group of trainees indicated by ADB and local agencies. The final platform will be considered ADB property. S/he will support local stakeholders in the analysis and definition of potential strategies in support of more application domains or additional locations. S/he will lead and coordinate with national staff/consultants of relevant operations departments in the field.

4. **Detailed Tasks and Expected Outputs.** The consultant will undertake and deliver the following:

- a. collection of user requirements, platform design document;
- b. platform prototype to be accepted by ADB;
- c. a fully functional AI Platform with three subsequent version upgrades with refined algorithms and geoportals functionalities for maps navigation and download;
- d. specific training on support to the other consultants, ADB staff and trainees in DMCs; and
- e. skills transfer delivered in six different training sessions based on the use on the processing AI platform.

5. **Minimum Qualifications.** The specialist will be a professional with advanced knowledge and direct experience in machine learning and deep learning classifiers, demonstrated capacity to develop relevant algorithms and processing platform. Implementation of a processing platform is a key requirement; such a platform will accommodate multiple accounts for the trainees. Good command of English is a must. Strong communications skills and experience working with international organizations, including Asian institutions, are preferred.

B. Earth Observation Expert in Agroforestry (international, 6 person-months, intermittent)

6. The consultant will lead the development of a set of satellite-based information, to produce a complete set of coffee plantations. All processing will be done using AI cloud platform and combined all the layers into a GIS project, integrate the new project outputs with other GIS layers provided by ADB and government agencies. The outputs will be discussed with stakeholders and a complete training on the cloud processing platform will be delivered. Processing of Sentinel-2 and Sentinel-1 is required and the use of Very High Resolution (VHR) is suggested, where

conditions require. S/he will support local stakeholders in the analysis and definition of potential strategies in support of additional locations. S/he will lead and coordinate with national staff/consultants of relevant operations departments in the field.

7. **Detailed Tasks and Expected Outputs.** The consultant will undertake and deliver the following:

- a. estimates of actual coffee plantations and biomass baseline and improvement recommendation service;
- b. support the agriculture extensions to improve management practices with earth observation derived products;
- c. rural infrastructure mapping, and;
- d. skills transfer delivered in six different training sessions based on the use on the processing AI platform.

8. **Minimum Qualifications.** The specialist will be a professional with advanced knowledge and direct experience in mass processing. A minimum 5 years of experience is required. Using a processing platform is a key requirement; such a platform will accommodate multiple accounts for the trainees. Good command of English is a must. Strong communications skills and experience working with International and institutions in Timor-Leste is preferred.

C. Observation Expert in Marine and Coastal Planning 1 (international, 6 person-months, intermittent)

9. The consultant will lead the development of a set of satellite-based information, to produce a complete set of maps in support of inland and coastal planning. All processing will be done using AI cloud platform and combined all the layers into a GIS project, integrate the new project outputs with other GIS layers provided by ADB and government agencies. The outputs will be discussed with stakeholders and a complete training on the cloud processing platform will be delivered. Processing of Sentinel-2 and Sentinel-1 is required and the use of Very High Resolution (VHR) is suggested where conditions require. He/she will support local stakeholders in the analysis and definition of potential strategies in support of additional locations. S/he will lead and coordinate with national staff/consultants of relevant operations departments in the field.

10. **Detailed Tasks and Expected Outputs** The consultant will undertake and deliver the following:

- a. provision of an independent assessment of the operational resilience of coastal development investments;
- b. for the site and for an agreed surrounding area (boundaries to be defined based on the environmental and geographic context) provision of:
 - (i) optical analysis of physical changes to coastline (past) and future threats (e.g. analysis of regional rates and trends in sea level);
 - (ii) land cover/change assessment with potential upstream influence on marine water quality;
 - (iii) coastal and benthic habitats assessment, based on the regional water quality analysis (trends in Chl-a), and sea surface temperature trends will be mapped;
 - (iv) skills transfer delivered in six different training sessions based on the use on the processing AI platform.

11. **Minimum Qualifications.** The specialist will be a professional with advanced knowledge and direct experience in mass processing; a minimum 5 years of experience is required. Using a processing platform is a key requirement; such a platform will accommodate multiple accounts for the trainees. Good command of English is a must. Strong communications skills and experience working with Institutions and institutions in Cambodia is preferred.

D. Earth Observation Expert in Agriculture (10 person-months intermittent International)

12. The consultant will lead the development of a set of satellite-based information, to produce a complete set of wheat and cotton cropping systems. All processing will be done using AI cloud platform and combined all the layers into a GIS project, integrate the new project outputs with other GIS layers provided by ADB and government agencies. The outputs will be discussed with stakeholders and a complete training on the cloud processing platform will be delivered. Processing of Sentinel-2 and Sentinel-1 is required and the use of Very High Resolution (VHR) is suggested where conditions require. S/he will support local stakeholders in the analysis and definition of potential strategies in support of additional locations. S/he will lead and coordinate with national staff/consultants of relevant operations departments in the field.

13. **Detailed Tasks and Expected Outputs.** The consultant will undertake and deliver the following:

- a. estimates of actual water consumption and biomass baseline and improvement recommendation service;
- b. support of agriculture and water management practices with earth observation derived products;
- c. rural infrastructure mapping, and;
- d. skills transfer delivered in six different training sessions based on the use on the processing AI platform.

14. **Minimum Qualifications.** The specialist will be a professional with advanced knowledge and direct experience in mass processing; a minimum 5 years of experience is required. Using a processing platform is a key requirement; such a platform will accommodate multiple accounts for the trainees. Good command of English is a must. Strong communications skills and experience working with international institutions and in central Asia is preferred.

E. Earth Observation Expert in Marine and Coastal Planning (international, 7 person-months, intermittent)

15. The consultant will lead the development of a set of satellite-based information to produce a complete set of maps in support of inland and coastal planning. All processing will be done using AI cloud platform and combined all the layers into a GIS project. S/he will integrate the new project outputs with other GIS layers provided by ADB and government agencies. The outputs will be discussed with stakeholders and a complete training on the cloud processing platform will be delivered. Processing of Sentinel-2 and Sentinel-1 is required and the use of Very High Resolution (VHR) is suggested where conditions require. S/he will support local stakeholders in the analysis and definition of potential strategies in support of additional locations. S/he will lead and coordinate with national staff/consultants of relevant operations departments in the field.

16. **Detailed Tasks and Expected Outputs** The consultant will undertake and deliver the following:

- a. Provision of an independent assessment of the operational resilience of coastal development investments;
- b. For the site and for an agreed surrounding area (boundaries to be defined based on the environmental and geographic context), provision of:
 - (i) optical analysis of physical changes to coastline (past) and future threats (e.g. analysis of regional rates and trends in sea level);
 - (ii) land cover/change assessment with potential upstream influence on marine water quality;
 - (iii) coastal and benthic habitats assessment, based on the regional water quality analysis (trends in Chl-a), and sea surface temperature trends will be mapped;
 - (iv) skills transfer delivered in six different training sessions based on the use on the processing AI platform.

17. **Minimum Qualifications.** The specialist will be a professional with advanced knowledge and direct experience in mass processing; a minimum 5 years of experience is required. Using a processing platform is a key requirement; such a platform will accommodate multiple accounts for the trainees. Good command of English is a must. Strong communications skills and experience working with institutions in the Pacific small island states is preferred.