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| Viale delle Terme di Caracalla, 00153 Rome, Italy | Fax: +39 0657053152 | Tel: +39 0657051 | www.fao.org |

FAO Budget Code: TF.FABGD.TF5C350015080 Your Ref.: UNJP/BGD/057/UNJ

GRMS Supplier Number:

PO Number (if available):

LETTER OF AGREEMENT

Between

The Food and Agriculture Organization of the United Nations (“FAO”)

and

Institute of Atmospheric Pollution Research – National Research Council (“CNR-IIA”) of Italy

Via Salaria Km 29,300 Monterotondo 00015 Rome

For provision of

“**Technical support for the Development**

**of the Bangladesh Land Cover and Forest Data Information System**”

1. Introduction

The Food and Agriculture Organization of the United Nations (hereinafter referred to as “FAO”) and the Institute of Atmospheric Pollution Research (hereinafter referred to as the “Service Provider”) (together hereinafter referred to as the “Parties”) have agreed that the Service Provider will provide certain services defined in detailed in the attached Annex (the “Services”) which forms an integral part of this Letter of Agreement (hereinafter the “Agreement”) in support of the project “UN-REDD Bangladesh National Programme” (UNJP/BGD/057/UNJ).

1. Purpose
   1. The purpose for which the funds provided by FAO under this Agreement shall be used are the following:
2. **Objective**. The Services will contribute to the following Organizational objective SO2 : Make agriculture , forestry and fisheries more productive and sustainable
3. **Outputs/outcomes**. The Service Provider will produce, achieve or deliver the following outputs or outcomes:

* Bangladesh Forest Information Service (BIS) API document specification (Deliverable 2);
* Deployment of a web-service publishing the HTTP BIS service API to manage (upload and query) data (Deliverable 3);
* Updated version of the HTTP BIS API service (Deliverable 6);
* Workshop proceedings (Deliverable 8).
* Documentation/user guide concerning the administrative back-end server panel (Deliverable 9)

1. **Activities**. The Service Provider will undertake the following activities:

In the following, the activities to be carried out by CNR\_IIA only are reported and numbered according to the concept note agreed with other Participants (i.e., FAO-consultants).

**Activity 1**: Design of the service API;

**Activity 2a**: Design and implementation of LCMLdb 2.0;

**Activity 3**: Production server configuration and Beta testing phase. Within this activity, CNR\_IIA will provide an updated version of the HTTP BIS API service and will support FAO Bangladesh in the production-server configuration.

**Activity 4**: Workshop on the use of the Land Cover and Forest data information system.

* 1. A detailed description of the Services including technical and operational requirements, budget, workplan and timeframe, performance indicators and means of verification, as well as inputs to be provided free-of-charge by the Service Provider and FAO, if any, are set out in detail in the Annex.
  2. The Service Provider recognizes that the receipt of funds by FAO for this Agreement takes place under specific terms of the European Commission which are duly reflected in this Agreement, as required.

1. General Conditions
   1. Funds provided by FAO under this Agreement are to be used by the Service Provider exclusively for the provision of the Services in accordance with the budget set out in the Annex. Neither the Service Provider nor its personnel nor any other persons providing the Services on its behalf, will incur any additional commitment or expense on behalf of FAO.
   2. The Service Provider will be responsible for all activities related to the provision of the Services and the acts or omissions of all employees, agents or other representatives, and authorized subcontractors providing the Services on its behalf. Neither FAO nor the European Commission will be held responsible for any accident, illness, loss or damage which may occur during the provision of the Services or any claims, demands, suits, judgements, arising there from, including for any injury to the Service Provider’s employees, or to third parties, or any loss of, damage to, or destruction of property of third parties, arising out of or connected to the Service Provider’s work or performance under this Agreement. Consequently, FAO and the European Commission, collectively or separately, will not entertain any request for indemnities resulting from such occurrence.
   3. The Service Provider shall not utilize funds received under this Agreement to subcontract services or procure items except as specifically provided for in the Annex or as specifically approved in writing by FAO. Any subcontracting arrangement shall in no way relieve the Service Provider of the responsibility for the provision/delivery of the Services required under this Agreement. Subcontracts or procurement of the items set forth in the Annex shall be procured in conformity with the Service Provider’s own procurement rules and procedures. The Service Provider confirms that its procurement rules and procedures, and their implementation, ensure that the procurement process is transparent and consistent with generally-accepted principles governing public sector procurement to obtain best value for money. The Service Provider will ensure that its agreements with any subcontractor include the obligation to maintain appropriate records for a period of five years and FAO’s or the European Commission’s right to review, audit and have access to all documentation and sites related to the activities carried out in connection with this Agreement.

* 1. The Service Provider shall make and thereafter maintain, in compliance with national legislation, provision for adequate insurance to cover such risks as damage to property and injuries to persons, as well as third party liability claims.
  2. The personnel assigned by the Service Provider to provide the Services are not considered in any respect as being employees or agents of of FAO. Nothing in this Agreement or in any document or arrangement relating thereto shall be construed as conferring any privileges or immunities of FAO on the Service Provider, its personnel or any other persons providing the Services on its behalf.
  3. Nothing in this Agreement or in any document relating thereto, shall be construed as constituting a waiver of privileges or immunities of FAO, or as its acceptance of the jurisdiction of the courts of any country over disputes arising out of this Agreement.
  4. The present Agreement shall be governed by general principles of law, to the exclusion of any single national system of law. General principles of law shall be deemed to include the UNIDROIT Principles of International Commercial Contracts of 2010.
  5. In providing the Services, the Service Provider shall conform to all national laws applicable to its activities and its relations to third parties, including employees. The Service Provider shall promptly correct any violations thereof and shall keep FAO informed of any conflict or problem arising in relation to national authorities.
  6. The Service Provider confirms that it has not engaged in, nor will engage in, any corrupt, fraudulent, collusive or coercive practices in entering into or implementing this Agreement and agrees to adhere to the UN Supplier Code of Conduct which can be viewed at <http://www.un.org/depts/ptd/pdf/conduct_english.pdf>. For the purpose of this Agreement, the following terms shall have the following meanings:

## “Fraudulent practice” is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain, financial and/or other benefit and/or to avoid an obligation.

## “Coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party.

## “Collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party.

## “Corrupt practice” is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value whether tangible or intangible to improperly influence the actions of another party.

* 1. The Service Provider shall take all reasonable precautions to avoid any conflict of interest in the implementation of the Services and shall inform FAO without delay of any situation constituting or likely to entail a conflict of interest including any FAO personnel having an interest of any kind in the Service Provider’s activities.
  2. Unless authorized in writing by FAO, the Service Provider shall not advertise or otherwise make public that it has a contractual relationship with FAO, nor shall the Service Provider, in any manner whatsoever use the name or emblem of FAO, or any abbreviation of the name of FAO.
  3. The Service Provider shall take all appropriate measures to publicise the fact that the Services have received funding from the European Union, including the display of the European Logo (twelve yellow stars on a blue background). Information given to the press, the beneficiaries of the Services, all related publicity materials, official notices and reports shall acknowledge that the Services were carried out “with funding from the European Union”. Such measures shall be carried out in accordance with the Communication and Visibility Manual for EU External Actions laid down and published by the European Commission. This provision shall not apply in the event that publicity under this provision could put the staff of the Service Provider at risk.
  4. All publications by the Service Provider pertaining to the Services, in whatever form and whatever medium, including the internet, shall carry the following or a similar disclaimer: "This document has been produced with the financial assistance of the European Union. The views expressed herein can in no way be taken to reflect the official opinion of the European Union.”
  5. All intellectual property rights, including copyright, in the outputs produced under this Agreement are vested in FAO, including, without any limitations, the right to use, publish, translate, sell or distribute, privately or publicly, any item or part thereof. Neither the Service Provider nor its personnel will communicate to any other person or entity any confidential information made known to it by FAO nor will they use this information for private or corporate advantage. This provision will survive the expiration or termination of this Agreement.
  6. To comply with disclosure requirements and enhance transparency, FAO may release and/or publish the following information about this Agreement: (i) the name and nationality of the Service Provider; (ii) a brief description and location of the Services provided; and (ii) the amount of this Agreement. The Service Provider specifically consents to the release and/or publication of such information. FAO will not release or publish information that could reasonably be considered confidential or proprietary.
  7. The Service Provider shall return to FAO any unexpended funds budgeted and paid by FAO under this Agreement.
  8. This Agreement is not subject to payment by FAO of any levies, taxes, registration duties or any other duties or charges whatsoever. The Service Provider shall duly pay taxes, duties and other charges in accordance with prevailing laws and regulations applicable to the Service Provider.
  9. The Service Provider agrees to undertake all reasonable efforts to ensure that none of the funds received from FAO under this Agreement are used to provide support to individuals or entities associated with terrorism, as included in the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999) located at http://www.un.org/sc/committees/1267/consolist.shtml. This provision must be included in all subcontracts or sub-agreements entered into under this Agreement.
  10. The Service Provider shall take all appropriate measures to prevent sexual exploitation or abuse of any beneficiary of the services provided under this Agreement, or to any persons related to such beneficiaries, by its employees or any other persons engaged and controlled by the Service Provider to perform any services under this Agreement. For these purposes, sexual activity with any person less than eighteen years of age shall constitute the sexual exploitation and abuse of such person. In addition, the Service Provider shall refrain from, and shall take all reasonable and appropriate measures to prohibit its employees or other persons engaged and controlled by it from exchanging any money, goods, services, or other things of value, for sexual favours or activities, or from engaging in any sexual activities that are exploitive or degrading to any beneficiary of the services provided under this Agreement or to any persons related to such beneficiaries. The Service Provider acknowledges and agrees that the provisions hereof constitute an essential term of this Agreement and that any breach of these provisions shall entitle the Organization to terminate this Agreement immediately upon notice to the Service Provider, without any liability for termination charges or any other liability of any kind.

1. Reporting and Record Maintenance Requirements
2. The Service Provider shall submit to the Responsible Officer named in paragraph 9 below, the Reports listed in the Annex on the dates set forth therein, including a final report consisting of a narrative report and financial report (“Final Report”) within 30 days following the completion of the Services. The Final Report must be sufficiently detailed to allow certification of deliverables and of expenditures. The financial report shall be signed and certified as to its correctness by a duly designated representative of the Service Provider (e.g. executive officer, chief financial officer, chief accountant or similar).
3. The Service Provider shall keep accurate financial records and maintain supporting documentation showing the utilization of inputs and funds under this Agreement and any other documentation related to the Services for a period of five years following termination or expiry of the Agreement, during which period FAO or the European Commission, or a person designated by FAO or the European Commission, or the relevant auditing authority (e.g. national audit office) shall have the right, at any time, to conduct reviews and/or audits relating to any aspect of this Agreement. The Service Provider shall provide its full and timely cooperation with any such review or audit. Full and timely cooperation shall include, but not be limited to, making available employees or agents with knowledge of the Project to respond to questions and granting to FAO or the European Commission, or a person designated by FAO or the European Commission or relevant authority, access at reasonable times and conditions to the Service Provider’s premises or other sites where documentation related to this Agreement is kept or activities related to this Agreement are carried out.
4. The funds provided by FAO will cover costs that are eligible as direct costs for the implementation of the Services. To be considered eligible, costs must:
   1. be necessary for carrying out the Services, be provided for specifically in this Agreement and comply with the principles of sound financial management, in particular value for money and cost-effectiveness;
   2. have actually been incurred during the implementation period of this agreement;
   3. be recorded in the accounts of the Service Provider accounts, be identifiable, backed by originals of supporting evidence, and verifiable;
5. The following costs shall not be considered eligible:
   1. debts and provisions for possible future losses or debts;
   2. interest owed by the Service Provider to any third party;
   3. items already financed from other sources
   4. purchases of land or buildings;
   5. currency exchanges losses;
6. Delays and Termination
7. The Agreement shall enter into force upon signature by both Parties and shall remain in force until the Services have been satisfactorily provided or until otherwise terminated in accordance with the provisions herein.
8. The Service Provider will carry out the Services in accordance with the workplan and within the timeframe set forth in the Annex and shall notify FAO of any delays that will prevent delivery of the Services in accordance with the workplan and within the timeframe set forth in the Annex.
9. FAO may suspend or cancel all or part of this Agreement, obtain the Services elsewhere and make corresponding adjustments to any payments that may be due to the Service Provider, if the Service Provider fails to make delivery, or perform to a standard considered acceptable to FAO. Subject to consultation with the Service Provider, the determination of FAO, relating to this provision, shall be binding.
10. If at any time during the course of this Agreement it becomes impossible for the parties to perform any of their obligations for reasons of Force Majeure, that party shall promptly notify the other in writing of the existence of such Force Majeure. The party giving notice is thereby relieved from such obligations as long as Force Majeure persists. For the purpose of this Agreement, the term “Force Majeure” shall mean any unforeseeable exceptional situation or event beyond the Parties' control which prevents either of them from fulfilling any of their obligations under this Agreement, was not attributable to error or negligence on their part (or of their personnel, agents, or other representatives, or authorized subcontractors), and proves insurmountable in spite of all due diligence.
11. FAO shall have the right to terminate this Agreement, by written notice to this effect, if it considers that continued implementation of the Agreement is impossible or impractical:

## for unforeseen causes beyond the control of FAO;

## in the event of a default or delay on the part of the Service Provider after written notice by FAO which provides a reasonable period to remedy the default or delay.

1. In the event of termination as per 5e) above, the following shall apply:
   1. termination for unforeseen causes beyond its control, FAO shall complete all payments for expenses which have been incurred by the Service Provider up to the effective date of termination.
   2. termination due to the Service Provider’s default or delay, the Service Provider shall refund to FAO any payment already received in respect of Services that have not been performed to a standard considered acceptable to FAO.
2. FAO shall have the right to terminate this Agreement, by written notice to this effect, if FAO establishes in accordance with its adminstrative procedures:

* 1. irregularities, fraud or corruption on the part of the Service Provider in relation to this Agreement;
  2. a breach of the conflict of interest provision in paragraph 3l) above;
  3. a breach of the reporting requirements in paragraph 4 above.

1. In the event of termination as per g) above, the Service Provider shall refund to FAO all payments that were made on the basis of the irregularity, fraud or corruption, or as otherwise determined by FAO to be equitable and take other action as deemed appropriate by FAO.
2. Terms of Payment

## In full consideration of the services provided by the Service Provider, FAO will pay and/or reimburse the Service Provider up to a total amount which represents FAO’s maximum financial liability not to exceed:

**(**15,000 USD**)**

[Fifteen thousand US dollars].

1. The payments will be made after certification by the Responsible Officer of the request(s) for payment as follows:
   1. 1st payment (20%) not to exceed USD 3,000 [three thousands US dollars] upon signature of the present Agreement;
   2. 2nd payment (50%) not to exceed 7,500 USD [seven thousands and five hundreds US Dollars] upon acceptance by FAO of the deliverable(s) or on the date indicated in the Workplan/Timeframe in the Annex;
   3. Final payment (30%) not to exceed 4,500 USD [four thousands and five hundreds US Dollars] upon acceptance by FAO of the Final Report mentioned under paragraph 4a) above.
2. The amount set forth in 6a) will be paid in the currency stated above, in accordance with the detailed banking instructions provided by the Service Provider in 6d).
3. Detailed Banking Instructions [including: the name of the account holder, account number, bank’s name and its full address].

Name of account holder: Consiglio Nazionale delle Ricerche

Incassi e pagamenti giornalieri

Contact person for the account holder: Mrs Monica Palozzo

Email:([palozzo@iia.cnr.it](mailto:palozzo@iia.cnr.it))

IBAN: IT75N0100503392000000218150

BIC/S.W.I.F.T. code: BNLIITRR

1. The Service Provider shall submit each request for payment to the address indicated below:

Mike Robson

FAO Representative in Bangladesh

House # 37, Road # 8, Dhanmondi, Dhaka-1205,

Tel: 880-2-8118015-8, Fax: 880-2-5815 2025,

Email: FAO-BD@fao.org

1. FAO enjoys certain privileges and immunities which include exemption from payment of Value Added Tax ("VAT" or "IVA"), customs duties and importation restrictions.

1. If the Service Provider fails to submit the Final Report mentioned in 4a) above no later than 30 days following completion, expiry or termination of this Agreement, FAO may, after provision of due notice of the default, terminate this Agreement without making the final payment.
2. Settlement of Disputes
3. Any dispute between the parties arising out of the interpretation or execution of this Agreement, if not settled by negotiation between the parties or by another agreed mode of settlement, shall be submitted at the request of either party, to one conciliator. Should the parties fail to reach agreement on the name of a sole conciliator, each party shall appoint one conciliator. The conciliation shall be carried out in accordance with the Conciliation Rules of the United Nations Commission on International Trade Law, as at present in force.
4. Any dispute not resolved by conciliation shall, at the request of either party, be settled by arbitration in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law, as at present in force. The arbitral tribunal shall have no authority to award punitive damages. FAO and the Service Provider agree to be bound by any arbitration award rendered in accordance with this article, as the final adjudication of any such dispute.
5. The parties may request conciliation during the execution of this Agreement and in the period not to exceed twelve months after the completion, expiry or termination of this Agreement.  The parties may request arbitration not later than ninety days after the termination of the conciliation proceedings. All dispute resolution proceedings shall be conducted in the language in which the agreement is drafted provided that it is one of the six official languages of FAO (Arabic, Chinese, English, French, Russian and Spanish).  In cases where the language of the agreement is not an official language of FAO, the conciliation or the arbitration proceedings shall be conducted in English.

1. Amendments. Any changes or amendments to this Agreement shall be made in writing and on the basis of mutual consent of the signatories to this Agreement.

1. Designation of the FAO Responsible Officer. Mr. Matieu Henry, Chief Technical Advisor, FAO project Office, Forest Department/Ban Bhaban, Plot No: E-8, B-2, Sherebangla Nagar, Argaon, Dhaka, 1207, Bangladesh, +880281180158 , email ([matieu.henry@fao.org](mailto:matieu.henry@fao.org)) is designated the officer responsible for the management of this Agreement (“Responsible Officer”) on behalf of FAO.
2. Entry into force and period of validity. The Agreement will enter into force upon the date of signature by the Service Provider, by FAO or on Monday 24th October (24/10/2016), whichever of the three dates is the latest and will terminate on June 15th 2016.

**Signed on behalf of the Food and Agriculture Organization of the United Nations:**

Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mike Robson

FAO Representative in Bangladesh

House # 37, Road # 8, Dhanmondi, Dhaka-1205,

Tel: 880-2-8118015-8, Fax: 880-2-5815 2025,

Email: [FAO-BD@fao.org](mailto:FAO-BD@fao.org)

Signed on behalf of the [full name of the Service Provider]:

Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ing. Nicola Pirrone

Director of Institute of Atmospheric Pollution Research

National Research Council (“CNR-IIA”)

Tel +390690625349Fax: +390690672660,

Email: pirrone@iia.cnr.it

The Service Provider will sign two copies of this Agreement and return one to the Responsible Officer.

ANNOTATED OUTLINE FOR PREPARATION OF STANDARD ANNEX I OF

THE LETTER OF AGREEMENT

**ANNEX 1**

TERMS OF AGREEMENT

1. Context

Bangladesh faces several issues related to inconsistency of land representation between (sub-) national legends and over time such as (1) incomplete datasets may mean that some land cover/use may not be represented, (2) If different national datasets exist they may vary, e.g., in their estimates of forest land area, and thus limit the integration of sub-national data and activities, and (3) inappropriate description and documentation of the national classification system limits its use by different entities and individuals over time and the overall sustainability of the system. The inconsistency between the land representation systems of existing datasets (forest inventory and land cover map) impacts the robustness of the results used to assess trends in land cover/use change and forest cover and stock change.

In Bangladesh, the information about land cover and forest inventory serves multiple purposes, such as commercial uses, natural resources management and conservation, climate change mitigation and tracking of greenhouse gas emissions. During the last decades several national and international entities were involved in land cover/land use mapping, at different levels, by making use of remote sensing and ancillary data (Akhter & Shaheduzzaman, 2013). Akhter and Shaheduzzaman (2013) have made an inventory of national and sub-national land cover products and forest inventory data in Bangladesh. But due to differences in organizational purposes, methodologies, boundaries, definitions, classification systems, varying means and capacities, the different land cover maps are different and not comparable in time and space.

Thus, there is a long-standing data integration problem in Bangladesh in the domain of land cover mapping and forest inventory: how to reconcile semantic differences between classification systems. This hinders for example comparative analysis of multi-temporal mappings (for change detection) as also data validation. Additionally there is much interest in being able to use one thematic dataset as basis for reporting on classes from another classification, for example because of its better spatial coverage or accuracy. The need to improve the interoperability between datasets can be achieved overcoming differences in data semantics.

LCCS3, which is based on the Land Cover Meta Language (LCML) ontology, is the user-friendly data model that allows the translation of different legends to a common language. By using LCML common semantic framework (based on the objects), users can easily re-interpret the maps assuring a basic semantic interoperability, while maintaining the flexibility of the legend to focus on specific details. Through a bottom-up approach, local knowledge can be integrated in the legend to accommodate the context of the intended used of the data.

It is thus expected that the harmonization of the existing classification systems will help to reduce the reporting burden, thus reducing costs and, in some cases, also improving the quality, robustness, completeness and transparency of the information.

Since 2013, FAO is supporting the Government of Bangladesh to improve the land representation system and the forest monitoring system ([Di Gregorio 2013](#_ENREF_2), [Shaheduzzaman and Akhter 2013](#_ENREF_11), [FAO 2015](#_ENREF_6), [Costello, Potapov et al. 2016](#_ENREF_1), [FAO 2016](#_ENREF_7), [Hadi, Udita et al. 2016](#_ENREF_9), [Jalal, Iqbal et al. 2016](#_ENREF_10)).

In 2016, a national reference system has been developed using LCCS3/LCML and a land cover map is under development, led by the Bangladesh Forest Department and in collaboration with several national institutions such as BSGI, BUET University, CEGIS, SRDI, SPARRSO and SoB. In 2016, FAO published several technical documents to support the implementation of LCCS3/LCML to improve the development and use of land representation system for various purposes including forestry ([Di Gregorio 2016](#_ENREF_3), [Di Gregorio 2016](#_ENREF_4), [Di Gregorio and Leonardi 2016](#_ENREF_5), [Gregorio 2016](#_ENREF_8)).

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2. Terms of Reference.

* 1. Objectives
* Provide support to Bangladesh through the development of the Bangladesh Information System (BIS);
* Provide technical support to the Bangladesh Forest Department to better understand the development of the system;
* Support knowledge transfer and transfer of capacities through capacity building activities and training workshop

Definition of Output(s) and/or Outcome(s):

- *Bangladesh Forest Information Service API document specification. (Activity 1)*

This document will contain all the information needed to enable the BIS client to successfully interoperate with the BIS services, including the supported protocols and data models

- *Deployment of a web-service publishing the HTTP BIS service API to manage (upload and query) data.* *(Activity 2a)*

Bangladesh forest data will be imported at the end of this activity. A public endpoint for this service will be available.

- Updated version of the HTTP BIS API service. The updated version will address the issues found in beta version of the serve:

Deployment of a web-service publishing the HTTP BIS service API to manage (upload and query) data. Bangladesh forest data will be imported at the end of this activity.

NNNNN

- Fully functioning Bangladesh Forest Information System:

NNNNN

- User guide and documentation:

NNNNN

- Workshop proceedings:

The workshop proceedings, including the list of participants, the training materials and the results from the activities implemented during the workshop will be reported and provided.

NNNNN

* 1. Description of Services

**Activity 1: Design of the service API:**

This activity will produce a document where the BIS service API are defined and described. This document will contain all the information needed to enable the BIS client to successfully interoperate with the BIS services. To provide the opportunity to three national experts from Bangladesh to be part of the development of the system and ensure it correspond to their expectation, a workshop will held at CNR.

The activity will include two parts:

In the first part a high level description of use cases will be agreed upon, useful to understand the operations and the abstract objects that are involved in the system design, including the operational parameters and the output results to be provided for each use case.

In the second part the definition of the HTTP binding of the BIS service API will be provided. This part will describe the single HTTP operations to be developed for providing the required functionalities. Parameters and results encoding will be described as well (e.g. using a specific XML schema).

Responsibility:

CNR-IIA, in collaboration with FAO-Bangladesh Users.

*Expected output:*

**Deliverable 2.** (Feb. 2017). BIS Service API document specification. This document will contain all the information needed to enable the BIS client to successfully interoperate with the BIS services, including the supported protocols and data models. Responsible CNR-IIA.

**Activity 2b: Design and implementation of LCMLdb 2.0:**

This activity concerns the full design of the new framework to manage LCCS3/LCML data, based on a document-database to store LCML information, and a geo-database to store geographical data. The framework will implement the service API specification identified by activity 1.

The design includes the definition of the architecture of the composed system, in terms of its enterprise, information, computational, engineering and technology viewpoints.

The software will be implemented according to the technologies identified by the design phase.

The data of Bangladesh will be loaded into the LCMLdb 2.0.

Tests on the component functionalities will be designed and implemented.

Sub-activities:

Design of the LCMLdb 2.0

Implementation of LCMLdb 2.0

Loading of Bangladesh data into LCMLdb 2.0

Component tests

Development (test) server setup

Responsibility of system design: CNR-IIA designs the LCMLdb 2.0 database for storing LCCS3/LCML data

**•** CNR-IIA, is responsible for developing the API for storing LCSS3 data associated with a particular map, along with suitable functionalities for accessing and querying the document-based database. Additional services might be provided for user authentication and authorization to view and work with the map(s).

• CNR-IIA will setup the development (test) server and import the data, with the support of FAO-Consultants

Expected output:

**Deliverable 3.** (April 2017). Deployment of a web-service publishing the HTTP BIS service API to manage (upload and query) data. Bangladesh forest data will be imported at the end of this activity. A public endpoint for this service will be available. Responsible CNR-IIA.

**Activity 3: Production server configuration and Beta testing phase**

This activity will achieve interoperability of the BIS client(s) and service developed as the result of activities 2a and 2b and will verify that the developed functionalities satisfy user requirements.

Indeed, even if the two software components have been built taking as the reference the same BIS API specification (output of activity 1), this is not guarantee that they will correctly interoperate. This phase of work will be needed to test the two components together, with the goal of correcting possible implementation problems. Indeed, it is expected that no new functionalities should be added in this phase (as they should be already in place). The effort will be totally dedicated to improve the correctness and robustness of the overall system. Frequent contacts (e-mail, virtual meetings) are expected to happen in this test phase between the client and the service developers and the final users.

Each test case listed in the user requirement document (output of activity 0) should be exercised on the final BIS. In case of issues, responsibility (client, server, or both sides) of the failure should be identified and a correction be made. Then, the full list of test cases should be again exercised, until achievement of a fully functioning system.

Responsibility of implementation:

* CNR-IIA is the developers of service and is responsible, in collaboration with FAO-consultants, to test the full system, identifying possible issues and resolving them.

Expected output:

* **Deliverable 6.** (End of May 2017) Updated version of the HTTP BIS API service. The updated version will address the issues found in beta version of the server.   Responsible CNR-IIA

**Activity 4: Workshop on the use of the Land Cover and Forest data information system**

One workshop will be organized by CNR-IIA, at the end of June 2017, in Bangladesh for capacity building. Responsibility of implementation: CNR-IIA

Expected output:

- Training materials

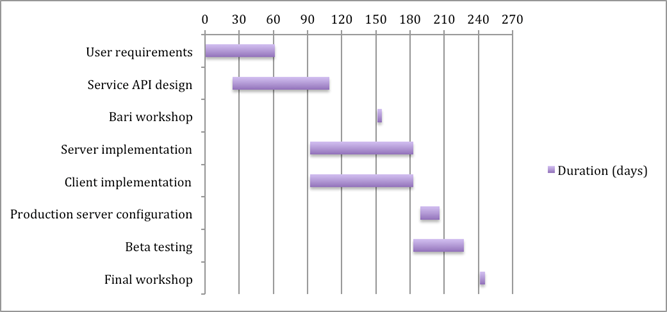
- List of participants

**Deliverable 8.** Workshop Proceedings. Responsible CNR-IIA

**Deliverable 9**. (Mid June 2017). Documentation/user guide concerning the administrative back-end server panel. Responsible CNR-IIA.

* 1. Workplan and Timeframe (Duration)

In the following table all the activity are reported.



2.4 Monitoring Mechanisms and Reporting Requirements

The Service Provider shall submit to the FAO representatives in Dhaka and Mr. Rashed Jalal, Remote Sensing/GIS Expert, the following reports in English:

1. by the time of the signature, a proposed detailed work plan;
2. End Feb. 2017: Deliverable 2 from Activity 1;
3. End April 2017: Deliverable 3 as defined in Activities 2a;
4. End May 2017: Deliverable 6, as defined in Activity 3;
5. End June 2017: Deliverable 8, as defined in Activity 4;
6. Mid June 2017: Deliverable 9, as described in Activity 4..
7. The Service Provider shall submit to Mr. Matieu Henry, Chief technical Advisor, an itemized “statement of expenditures" (certified by the Chief Accountant or similar officer of the RO) prior to receiving final payment for the works/services performed.
8. The Service Provider: (i) shall maintain supporting documentation showing the utilization of funds under this Agreement and all other documentation and records related to the project for a period of three years following the completion of the project, during which period, FAO or a person designated by FAO shall have the right to review or audit the relevant records; and (ii) shall make available employees or agents with knowledge of the project to respond to questions from FAO.
9. Inputs to be provided free of charge by Service Provider

List and describe in detail all inputs (including quantities, if applicable) to be provided by the SP in addition to those included in the budget (see para. 5) without, however, costing such inputs. These inputs might include the following:

* 1. List of Inputs

List and describe in detail all inputs (including quantities, if applicable) to be provided by the SP in addition to those included in the budget (see para. 5) without, however, costing such inputs. These inputs might include the following:

1. use of premises and facilities/installations;
2. provision of expertise and support personnel;
3. use of equipment and provision of materials/supplies.

N.B.: This paragraph is particularly important in those cases where the SP receives only a partial contribution from FAO (e.g. expertise is provided free of charge but funds received from FAO are used to defray local travel, etc.). This also highlights the economic advantages of the use of the LoA.

The Service Provider will contribute:

1. Ancillary data support
2. Technical assistance
3. Office facilities as required.
   1. Timing of Inputs

Establish timing of such inputs (if appropriate); outline negative repercussions in event SP does not comply, as well as any consequences this may have for SP (e.g. suspension of FAO payments or even recovery of payments already made).

The inputs specified in 3.1 shall be provided from the signing of the present Agreement to its termination.

4. Inputs to be provided in kind by FAO

* 1. List of Inputs

List and describe in detail all inputs (including quantities, if applicable) to be provided by FAO without, however, costing such inputs. These inputs might include the following:

1. FAO personnel expected to cooperate;
2. equipment to be loaned and (imported) materials/supplies to be provided;
3. logistics (transport, etc.);
4. use of (project) premises and facilities/installations.

N.B.: List only those inputs that FAO is required to place (temporarily) at the disposal of, or provide to, SP, thus enabling it to carry out agreed upon activities. This also includes inputs purchased by project specifically for this purpose; such inputs, although possibly an important part of the Agreement, are not to be part of the financial arrangements. Ensure that all relevant clauses (e.g. input distribution clauses) are included in the Agreement as required).

* 1. Timing of Inputs

Establish timing of such inputs (if appropriate) and detail any related conditions.

5. Detailed budget

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Activity 1: Design of the service API:* | | | | |
| **Sl. No.** | **Item Description** | **Unit of measurement** | **Qta.** | **Unit Cost (USD)** |
| 1.1 | Principal Specialist, 1 person | working day | 3 |  |
| 1.2 | Associate Specialist, 1 person | working day | 6 |  |
|  | **Sub-Total** |  |  |  |
| *Activity 2: Design and implementation of LCMLdb 2.0:* | | | | |
| 2.1 | Principal Specialist, 1 person | working day | 2 |  |
| 2.2 | Associate Specialist, 1 person | working day | 4 |  |
|  | **Sub-Total** |  |  |  |
| *Activity 3: Implementation of the LCCS3/LCML specific tools :* | | | | |
| 3.1 | Junior Specialist, 5 person | working day | 225 |  |
| 3.2 | Associate Specialist, 3 person | working day | 72 |  |
| 3.3 | Principal Specialist, 1 person | working day | 6 |  |
|  | **Sub-Total** |  |  |  |
|  | *Total Professional Time Cost* |  |  |  |
| *Activity 4: Production server configuration and Beta testing phase:* | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| *Activity 5: Workshop on the use of the Land Cover and Forest data information:* | | | | |
|  |  |  |  |  |
| **B. Direct Cost** | | | | |
| 1.1 |  |  |  |  |
|  | **Sub-Total** |  |  |  |
|  | *Total Direct Cost* |  |  |  |
|  | **Grand Total** |  |  |  |

Provide detailed budget, specifying items, unit costs and quantities, and showing the total amount which FAO agrees to finance (strictly on an actual cost basis).

Such items may include:

1. SP’s regular personnel used for agreed activity/service;
2. hiring by SP of temporary staff or services;
3. transport (tickets, fuel for vehicles);
4. daily subsistence allowances;
5. rental of existing SP facilities/equipment;
6. hire of locally available (non-SP) facilities/equipment;
7. purchase of essential supplies and materials;
8. administrative and operational costs (i.e. indirect variable costs)

N.B.: (i) It may not be practical in all cases to itemize costs in the LoA budget, however, in those cases where only a “lump-sum” payment is indicated, the responsible FAO officer must maintain documentation on file which supports the calculation of the lump-sum payment.

(ii) *If limited procurement (g) and/or subcontracting (b) is foreseen,* ensure that all relevant clauses (i.e. (i) wherein the SP agrees to subcontract and/or procure in a transparent manner consistent with generally accepted principles governing public procurement, and (ii) obligations to maintain records available to inspection also apply to subcontractor) are included in the Agreement as required.

*(iii) Follow guidance in particular as to eligible indirect variable costs (h).*

6. Responsible Officer

The Responsible Officer named in the Agreement (e.g. in the field usually Field Project Manager or FAOR) and/or in FAO Headquarters usually a Technical or Operations Officer) has been designated by the Budget Holder responsibility to manage and monitor the proper implementation of the Agreement on behalf of FAO and to certify to the Budget Holder that the terms of the Agreement have been satisfactorily met and that appropriate payments can be made.

7. Reimbursements

Provide for reimbursement by the SP of any overpayments that may have been effected or excess funds, which may remain after completion of the services.

8. **Any other relevant Information**

To be included here