



→ Copy to Mr. C. Jesuetha
Professor, Dept. of
Remote Sensing -
ICIMOD

27/05/15
H.D. DRS

LETTER OF AGREEMENT

BETWEEN

INTERNATIONAL CENTRE FOR INTEGRATED MOUNTAIN DEVELOPMENT (ICIMOD),
Kathmandu, Nepal

AND

BIRLA INSTITUTE OF TECHNOLOGY (BIT),
Mesra, Ranchi, Jharkhand, India

FOR EXECUTING NASA-SERVIR PROJECT ON

Developing HKH (Hindu-Kush-Himalaya) level regional products on Agriculture Ecosystem
using time-series Satellite data

WHEREAS the International Centre for Integrated Mountain Development (hereafter referred to as ICIMOD), founded by the eight Hindu Kush Himalayan (HKH) countries of Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan and incorporated in Nepal under an Act of Parliament in the year 1983 as a regional research and development agency, has been working towards sustainable mountain development in the HKH region with the mission of helping to promote the development of an environmentally and economically sound mountain ecosystem, to contribute to sustainable management of water resources and flood risk reduction, and to improve the living standards of mountain populations in the HKH region;

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WHEREAS the Birla Institute of Technology (BIT) (hereafter referred to as Collaborator), established in 1955 aims to pursue excellence in education and research by developing appropriate curricula, teaching and industrial training, acquiring talented faculty and providing an environment conducive to learning particularly in the field of engineering, technology and applied sciences.

Address: Department of Remote Sensing BIT,
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THUS, having recognized the mutual objective of developing innovative solutions for long term ecosystem monitoring and having realized the need for collaborative efforts in fields of mutual interest, both Parties agree to sign a Letter of Agreement (LoA) to share their competencies in furthering the understanding of ecosystem in Hindu-Kush-Himalaya under NASA-SERVIR Program as described in the following Articles, which include a clear description of the roles and responsibilities of both the Parties.

Article I The International Centre of Integrated Mountain Development (ICIMOD) hereafter referred to as ICIMOD, and the Birla Institute of Technology (BIT), hereafter referred to as the Collaborator, hereafter both collectively referred to as the Parties, agree on the following assignment.

Title of the project: Developing HKH (Hindu-Kush-Himalaya) level regional products on Agriculture Ecosystems using time-series Satellite data

Objective: The current study aims to map, monitor and model the vegetation system (focus towards cropland) so as to better understand the long-term and short-term changes, status, character and dynamics over space and time. The study will deliver useful data products, algorithms, software tools and provide insight to phenology, vegetation stress, greening and browning pattern, change & trend pattern.

Time period of work and validation of agreement: 1 April 2014 – 31 December 2014

Activities, roles, and responsibilities: The work shall be carried out according to the attached Terms of Reference (Annex 1) which outlines the scope of work, milestones, deliverables, roles, and responsibilities.

Coordination: The Collaborator shall coordinate with ICIMOD through Dr. M.S.R. Murthy Theme Leader, Geospatial Solutions, ICIMOD.

Project reporting: The following items shall be delivered by the Collaborator:

Deliverables	Due date
1 st Progress report containing data reparation and standardisation 1 st Financial report (fund utilization up to May 2014)	June 2014
2 nd progress report containing agriculture and ecosystem products and report on the methodology in generating short term products and in-season crop monitoring products. 2 nd Financial report (fund utilization up to August 2014)	September 2014
Final progress report containing an overall technical report, including long term agriculture and ecosystem products and customised s/w tool to generate HKH level crop products Final audited financial report.	December 2014

The technical progress reports should be submitted in the format provided in Annex 2 and/or in other formats as provided by ICIMOD. Financial record keeping and reporting shall be done according to Article XV.

Other terms and conditions

- Article II The Collaborator will organize the necessary research and support staff and provide logistic support for information gathering, analysis, and report writing.
- Article III The Collaborator undertakes full responsibility in respect of any loss, injury, or damage arising from the execution of the work carried out under this Agreement.
- Article IV Neither the Collaborator, nor anyone whom the Collaborator may employ to carry out the work, is to be considered as an agent or member of the staff of ICIMOD. Except as otherwise provided herein, the Collaborator shall not be entitled to any privileges and immunities, nor is it authorized to commit ICIMOD to any expenditure or other obligation.
- Article V The Collaborator and ICIMOD will have equal and free access to the data/information generated by the study.
- Article VI
- (i) Copyright and any other proprietary right with respect to the reports or manuscripts arising from this Agreement and each and any related part thereof, with the exception of any material already subject to copyright or other proprietary rights, shall be vested exclusively in ICIMOD.
 - (ii) As from the date of acceptance of any resulting manuscripts or publication of related reports, ICIMOD shall, subject only to the exception referred to in (i) above, be free to use the report or manuscript and each and any related part thereof, including thereby, without any limitation, the right to use, edit, print, and/or publish all or part of the manuscript in any form in any language.
 - (iii) ICIMOD may assign any or all of its rights to third parties upon such terms as it may decide.
- Article VII ICIMOD shall not be bound to publish the report(s), manuscript(s), or materials delivered under this Contract. If ICIMOD decides not to publish these materials, the Collaborator may publish it elsewhere subject to receipt of written authorization from ICIMOD, which shall not be unreasonably denied.
- Other publications in the form of research papers can be prepared by either institution unilaterally, provided due acknowledgement is given to the counterpart institution.
- Article VIII The Collaborator shall specify any material contained in the manuscripts (including illustrations, maps, and graphs) which is already subject to copyright or some other proprietary right and will warrant that it has obtained authorization to use such material from the owner or owners of such rights or their legal representatives. Any payments that the Collaborator may be required to make for authorization to use such material shall be borne by the Collaborator.
- Article IX With the exception of any material covered by the preceding Article, the Collaborator hereby warrants that it has the right to grant copyright and all other proprietary rights with respect to the contents of the manuscripts.
- Article X The Collaborator shall warrant that the manuscripts do not contain any libellous or otherwise unlawful matter.
- Article XI If any claim against ICIMOD or its officials or agents should arise out of the breach of any of the warrants made by the Collaborator pursuant to Articles VII, IX and X above, the Collaborator shall

be responsible for settling such claims and shall indemnify ICIMOD and its officials or agents for breach of the aforementioned warranties.

Article XII Any dispute arising out of the terms of this Contract shall be submitted to arbitration. Each Party shall appoint one arbitrator, and the two arbitrators so appointed shall appoint a third who shall act as Chair. In the event that the two appointed arbitrators should fail to reach an agreement on the appointment of the third arbitrator within 30 days, either Party may request the independent Chair of the ICIMOD Board of Governors to appoint a third arbitrator. The Parties agree that any decision rendered by the arbitrators shall be accepted as final adjudication of the dispute.

Article XIII Contributions and payment

(i) The total amount payable to the Collaborator under this Agreement is US\$ 25,000 (US Dollars Twenty-Five Thousand) only. The details of the budget are provided in the attached Terms of Reference (Annex 1 of this Agreement). The fund disbursement shall be made as follows:

Deliverables	Payment
On signature of LoA	40%
Deliverable 1 and 2	[40%]
Final technical and financial report	20%

(ii) ICIMOD shall cover the expenses of the travel of Principle Investigator and his team members in relation to the Agreement or for the project meetings as per ICIMOD rules.

Article XIV Financial review and audit

The accounts of the particulars will be subject to financial audit by ICIMOD anytime during the period of the agreement. If deemed necessary, ICIMOD might also assign an external auditor to do the final audit. Similarly, there may also be requests from the project sponsors/donors for a specific audit. In such cases, the audit schedule will be provided to the Collaborator in advance. The Collaborator needs to keep all records for the entire project period and conduct its own regular audit of the project accounts as specified in Article XV below.

ICIMOD will carry out a due-diligence of the financial and other administrative management systems of the Collaborator. For this a schedule would be mutually agreed upon. Based on such due-diligence, inputs on additional measures needed as required by the project in the overall financial management and other internal control systems in the organization will be identified and communicated for implementation and capacity building needs, if any will be addressed through mutually agreed upon initiatives.

Article XV Financial record keeping and reporting

(i) The Collaborator shall keep all vouchers and other documents for the entire project/activity period as required by law and shall make all vouchers and documents available to ICIMOD as and when required. The accounts should be kept in accordance with normally accepted accounting rules and regulations. ICIMOD rules will be followed

for field visits and overseas travel. The accounts shall be drawn up to the same level of detail as is done in the budget.

- (ii) The Collaborator shall keep a separate list of all non-expendable items (fixed assets) purchased out of this contribution in the format as provided by ICIMOD. A disposal plan for such items/assets should be presented for ICIMOD approval at the end of the project/assignment.
- (iii) The Collaborator is obliged to inform ICIMOD immediately if any changes, including overspending of budget lines or irregularities in the management of funds, are foreseen or have occurred. The total budget cannot be exceeded and shall be used only for the agreed purposes indicated in the attached ToR (Annex1). However, up to 10% variance on budget line item and/or component/activity would be accepted with proper justification.
- (iv) Financial reports certified by the Collaborator's officials covering ICIMOD contribution up to the reporting date shall be submitted before subsequent payments can take place. The Collaborator shall submit the financial reports as mentioned under Article I of this Agreement in the format as provided in Annex 3. Where separate bank account has been opened for the purpose of this Agreement, a bank statement shall be included with financial reports.
- (v) Any unspent balance or any savings of project/activity funds shall be returned to ICIMOD together with any interest accrued from the deposit.
- (vi) No offer, payment, consideration, or benefit of any kind that could be regarded as an illegal or corrupt practice shall be made, promised, sought, or accepted – either directly or indirectly – as an inducement or reward in relation to activities funded under this Agreement, including tendering, award, or execution of contracts. Any such practice shall be grounds for immediate cancellation of this Agreement and for such additional action, civil and/or criminal, as may be appropriate.

Article XVI Monitoring and evaluation

To maximise impact and sustainability as well as to ensure an appropriate level of monitoring, ICIMOD will require the collaborator to apply result oriented monitoring and evaluation system based on the defined indicators, baselines and targets for efficiency, effectiveness and impact. These indicators are agreed as part of the M&E plan jointly developed with the collaborator and ICIMOD. ICIMOD will conduct review and evaluation at any given point of time of the agreed plan. The date of the review and evaluation will be communicated in advance to the collaborator.

Article XVII Amendment and termination

- (i) This Agreement may only be amended in writing signed by duly authorised representatives of the Parties.

- (ii) Either Party may terminate this Agreement upon 30 days prior written notice to the other where it considers termination justified on the grounds that no further purpose would be served by continuing with the activity/project. Such notice of termination will only be given by either Party after full discussion with the other Party of the reasons for the proposal to give such notice.

Article XVIII Entry into force

This Agreement shall become effective when both Parties have signed it. Two originals of the text of this Agreement have been signed, of which the Parties have taken one each.

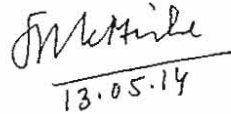
Signed by:



David Molden, Ph.D.
Director General, ICIMOD

Date:

Signed by:



M.K. Mishra, Ph.D.
Vice Chancellor, BIT

Date:

Annex 1: Terms of reference

1. Introduction

According to the Mountain Initiative Status Report (MISR) (ICIMOD, 2010), five strategic issues needing special attention were earmarked for further action: (1) Adaptation programmes in the Mountains, (2) Global and regional responsibility for black carbon, (3) Maintenance of Forests, Agriculture and Rangelands, (4) Payment for Environmental Services and (5) Country Positions on the Mountain Agenda. More importantly Hindu-Kush-Himalayan ecosystem is Asia's backbone providing water, maintaining biodiversity, and anchoring an important role in atmospheric/climatic dynamics in eastern part of the globe. Recent studies have revealed the vulnerability and sensitivity of Hindu-Kush-Himalayan ecosystem to changing climate scenario. It was observed that over the past 25 years the temperature in HKH region has increased by 1.5deg C and rainfall has increased by 163mm, and start of greening season has been advancing.

The monitoring such ecosystem level changes is a tedious job as it requires intensive field work, but remote and vast areas cannot be covered by ground work alone. Moreover, the environmental interactions at the micro-level are very complex and inter/intra-site variations cannot be up-scaled or interpolated to regional/global scale due to huge entropy especially over the various slopes, aspects, altitudinal, latitudinal, longitudinal gradients and HKH region is enormously rich and diverse in this regard.

Global models require continuous spatial information which cannot be reliably reproduced by mere sampled field data alone, and at a broader level we require landscape level information rather than species level. Besides this, comprehensive environmental monitoring strategic plan of ICIMOD trans boundary landscape program also envisaged a need for holistic hierarchical approach where multi-level information (in-situ to larger landscape level) revealing set of environmental and ecological indicators of ecosystem status, health and dynamics so as to evaluate conservation initiatives and to help the decision makers. In this regard satellite based mapping and monitoring comes handy and has evolved constructively since 1970s due to its synoptic and repetitive capturing of ground reality at multiple scales.

Against this background, regional characterization of HKH region is initiated as part of NASA-SERVIR Himalaya and provide major information through a Continuous Mapping and Monitoring Mechanism (CMM) using time-series satellite data. The study would propose to utilise last 30 years of available coarse spatial resolution remote sensing data and recent 10 years of moderate spatial resolution data from MODIS along with other ancillary data in order to achieve the following two major objectives:

Create Standardised, Cleaned and Smoothed time-series satellite data over the long term (30 years) and short term (10 years) period.

Developing algorithms and software tools for deriving value added space-time regional products on Agriculture, Grasslands and Forest Ecosystems in the Hindu Kush Himalayan region which will help in understanding the underlying dynamics in relation with geo-bio-climatic system and effective natural resources management

Prof. Jeganathan, BITS, Ranchi, India is drawn to collaborate and undertake the job as per the details given in the present TOR addressing agriculture ecosystem.

2. Execution Process

The study has three major operational steps : 1) data base preparation, cleaning, smoothing and standardisation; 2) data analysis and software tool development to extract annual and intra-annual spatio-temporal change and associated trend; reliable annual and intra-annual phenology metrics and their trend along geographic, climatic and topographic gradients; 3) generation and dissemination of operational products. The study would adopt internationally accepted image processing techniques and develop operationally feasible regional products on agriculture and also customised S/W tool boxes. ICIMOD will provide necessary satellite data and high end H/W support at ICIMOD for processing large volumes of data.

3. Outputs and Time line

The following output delivery in different stages will be followed:

Stage	Output Description	Due date
1	Data Preparation and Standardisation Cleaned, Smoothed and Standardised time-series satellite data over a. Short term (2001 onwards – MODIS data) period and b. Long term (1982 onwards)	June 2014
2	Agriculture Ecosystem Products a. Short term Products using MODIS (2001 onwards) i. Crop Calendar 1. Start of Season 2. End of Season 3. Peak of season 4. Number of Cycles b. In-Season Crop Monitoring Products i. Crop Area Dynamics (percentage change, trend and annual anomaly) ii. Multi-spectral based products (TVDI, PMI, MMI, etc.)	September 2014
3	Agriculture Ecosystem Products Long term Products (1982 onwards) Crop are dynamics Spatio-temporal patterns, linkages to drought and other mesoscale climate processes Technical report	December 2014
4	Customised S/W tool to generate crop monitoring products – Operational HKH Level crop product delivery	December 2014

6. Cost Estimate

SNo.	Line items	Funds committed by ICIMOD
1	Staff Cost	15000
2	Travel	To be provided by ICIMOD (3 visits)
3	Equipment	4500
4	Workshop	1500
5	IT/Communication	1000
6	Material Supply	1000
7	Overhead	2000
Total		25,000\$

Annex 2: Technical progress reporting

The project progress shall be reported in accordance with the operational plan, if any included in the ToR (Annex 1) and the reporting requirements/deliverables as stated in Article I. Project progress reports, as well as all supporting documents should be submitted in hard copies and also in electronic copies. The Collaborator shall submit progress report on delivery basis to the Coordinator named in Article I in the following format.

Project/Activity Title:

Reporting Period:

1. Summary
2. Introduction and background of the project/activity
3. Project/activity implementation process and approach
4. Main activities undertaken during the reporting period (refer to LoA)
5. Any changes (e. g., different approach used to implement activities, delays, etc.), including justification for changes and corrective actions to minimize or avoid further changes or delays
6. Completed activities in accordance with LoA
7. Future plans and steps
8. Problems and recommendations
9. Annexes: Field activity reports

Annex 3: Financial progress reporting

Expenditures of the committed funds from ICIMOD shall be reported in accordance with the budget details provided in the ToR (Annex 1) and as stated in the LoA in the following format:

Project/Activity Title:

Reporting Period:

A. Budget utilization report

A1. Utilisation report by outputs/activities

S No	Outputs/activities	Funds committed by ICIMOD	Funds spent	Fund balance
1				
2				
3				
4				
	Total			

A1. Utilisation report by budget line items

S No	Line items	Funds committed by ICIMOD	Funds spent	Fund balance
1	Salary			
2	Consultancy			
3	Travel			
4	Equipment			
5	Workshop			
6	IT/Communication			
7	Material Supply			
8	Overhead			
	Total			

B. Fund status report

	Receipts	Payments	Balance
	Date Amount	Period Amount	
Total			

Fund receivable

Project Coordinator:

Date:

Director:

Date: