ICIMOD

TERMS OF REFERENCE (ToR)

Consultancy service on deployment of online and offline Chemical Transport Modelling (CTM) Frameworks for air quality simulations in the Hindu Kush Himalaya

Action Area: Air
Strategic Group: Climate and Environmental Risks

ToR

About ICIMOD

The Hindu Kush Himalaya (HKH) region stretches 3,500km across Asia, spanning eight countries – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. Encompassing high-altitude mountain ranges, mid-hills, and plains, the zone is vital for the food, water, and energy security of up to two billion people and is a habitat for countless irreplaceable species. It is also acutely fragile and vulnerable to the impacts of the triple planetary crisis of climate change, pollution, and biodiversity loss.

The International Centre for Integrated Mountain Development (ICIMOD), based in Kathmandu, Nepal, is an international knowledge organisation focused on the HKH region, working since 1983 to deliver greener, more inclusive, and climate-resilient development. Our work is guided by our Strategy 2030, Medium-Term Action Plan V (2023–2026) and the associated Results Framework, and our various policies. Learn more on our website.

Consultancy overview

ICIMOD intends to establish a streamlined, automated chemical transport modelling (CTM) framework on its computational infrastructure encompassing both online and offline modelling approaches. This framework will support efficient generation of baseline and scenario-based simulations, enabling policy-relevant air quality assessments under multiple emission mitigation pathways. ICIMOD, therefore, invites proposals from a qualified consultancy to deploy and operationalise this modelling framework as a foundation for sustained air quality management and decision support across the HKH region.

This consultancy will be responsible for setting up and operationalising both online and offline CTM systems on ICIMOD's computing infrastructure to enable comprehensive air quality simulations over the Hindu Kush Himalayan (HKH) region and support evidence-based air quality assessment and scenario analysis.

Scope of work

The scope of work for consultancy services includes:

- Install, compile, and configure both online and offline CTMs along with all required preprocessors (meteorological, emission, and others) on ICIMOD's computing resources, and conduct test simulations over the HKH domain using full chemistry configurations.
- Develop automated and/or semi-automated frameworks for acquiring input datasets (e.g. meteorological fields, land-use data, emissions), running preprocessors, executing CTM simulations, and generating emission scenarios in CTM-compatible formats.
- Assess and document the computational requirements, system performance, and infrastructure needs for sustained CTM operations on ICIMOD's computing systems.

- Ensure effective knowledge transfer to ICIMOD's Air Quality and IT teams through structured engagement, comprehensive operational documentation, and a proposed mechanism for post-contract technical support and bug resolution.

Detailed tasks and deliverables

Major task 1: Setup of online CTM on ICIMOD computing system

- Compile and install the online CTM (preferably – WRF-Chem) along with the complementary preprocessors on ICIMOD's computing resources.
- Compile all required preprocessors for WRF-Chem simulations, including:
  - WRF preprocessing system (WPS)
  - Emission preprocessors for anthropogenic, biogenic, forest fire sources, and ozone photolysis
- Conduct a test run of the setup over the HKH domain using full chemistry configurations.
- Prepare a comprehensive report detailing computational requirements, performance efficiency, and infrastructure needs.

Major Task 2: Setup of offline CTM on ICIMOD computing system

- Compile an offline CTM (CHIMERE or CAMx, or CAMQ) and all required preprocessors for meteorological and emission data.
- Conduct a test run over the HKH domain.
- Prepare a report detailing computational requirements, performance efficiency, and infrastructure needs.

Major Task 3: Develop an automated/semi-automated framework for model setups

- Develop an automated framework to download the required input datasets for CTM, including: meteorological input data, land-use data, fire emission data, and other relevant datasets.
- Develop an automated framework running preprocessors and executing the CTM.
- Develop a system to process emission data and generate emission scenarios as inputs for the CTM.

Major Task 4: Knowledge transfer and debug support

- Engage with ICIMOD's Air Quality and IT teams throughout the setup process.
- Propose a system to ensure continuity of knowledge and support for bug resolution beyond the contract period.
- Prepare detailed documentation for knowledge transfer, including operational guidelines and troubleshooting procedures.

Mandatory deployment and operational standards

- System provisioning, configuration, and deployment activities may be performed remotely where feasible. However, due to limited remote access capabilities for certain system configuration tasks, some activities may require on-site presence at ICIMOD premises.
- The consultant shall maintain close coordination with ICIMOD's technical and IT team and ensure the safe and secure use of systems, and protect the confidentiality and integrity of all data.
- The solution architecture and deployment strategy must demonstrate optimal utilisation of computing resources, ensuring high efficiency and minimal overhead throughout the engagement.
- The consultant must ensure the availability of resources to extend the engagement period if installation activities are delayed due to hardware malfunctions or technical outages in the provided computing infrastructure.

Timelines and deliverables

The contract will end on 31 August 2026, with the following timeline to be followed:

Phase	Deliverables	Description	Related major task(s)	Timeline (2026)
1	Online CTM (WRF-Chem) setup on ICIMOD servers, including installation of required preprocessors and execution of a test run	• Fully functional CTM and weather modelling system used in baseline simulation installation on ICIMOD computing resources • Installation of all required preprocessor and download input files • Additional setup for conducting nested simulation at 3 km resolution in Nepal and Bhutan	1	30 May 2026
2	Offline CTM (WRF-CHIMERE) with all required preprocessor	• Fully installed and configured CTM and meteorological model for the HKH domain (10 km), including suitable vertical levels, physical and chemical schemes, and nested domain configuration	2	30 June 2026
3	Emission inventory processing setup to generate emission scenarios as input	• Process emission inventory to generate CTM-compatible input files • Support generation of emission files for multiple scenarios. Output files can be used directly by the CTM or its emission preprocessor	3	30 June 2026
4	Semi-automated setup, execution	• Automated workflows for input preparation, emission scenario	3	15 August 2026

	script and documentation	generation, CTM execution, and post-processing, enabling reproducible simulations.		
5	Technical documentation and user manuals	• Documentation for compiled setup, including the versions of model and libraries, paths • Documentation for executing all the programmes in the setup for CTM simulations	4	15 August 2026

Reporting and supervising

The consultant will work closely with Action Area Air's Air Pollution Emission and Energy Specialist, Intervention Manager-Air Pollution Mitigation, and Action Area Air Lead. All deliverables will be reviewed and approved by the project team before finalisation.

Required expertise ~~and qualifications~~

The consulting firm must propose a qualified team comprising at least three experts with demonstrated experience and competencies in the following key technical areas:

- **High performance computing (HPC) system expertise:** Extensive experience in compiling, configuring, and building complex scientific models and dependent libraries across diverse computing cluster architectures.
- **Workflow automation:** Demonstrated capability in developing automated frameworks for efficient data download, processing, and pipeline management.
- **Programming proficiency:** Proficiency in Linux environments, Bash scripting, and Python is required. Additionally, the consultant must possess advanced working knowledge of Fortran, with the specific ability to troubleshoot and configure Fortran-based scientific applications.
- **Domain experience (preferred):** Prior experience in deploying or optimising Air Quality or Climate Models is highly desirable.
- **Track record:** Proven history of successfully executing assignments of similar technical scope and complexity.

Evaluation criteria

Proposals will be evaluated based on:

Criteria	**Weight**
Technical proposal	**60%**
1. Relevant experience, including human resources (experts' CVs to be attached)	25%
2. Methodology and detailed work plan aligned to the ToR	25%
3. Timeliness	10%
Financial proposal	**40%**

- **Relevant experience**: Proven track record in similar assignments.
- **Methodology**: Soundness and feasibility of the proposed approach.
- **Timeliness**: Ability to meet the proposed timeline.
- **Cost-effectiveness**: Reasonableness of the proposed fees in relation to the scope of work.

The consultant firm will be selected based on the highest-ranked technical proposal (60% weightage) and the lowest-cost financial proposal (40% weightage).

The consultant firm will be selected based on the highest cumulative scores obtained in the technical and financial proposals using the following formula:

- Technical score = Score obtained based on technical proposal (total 100)
- Financial score = Score obtained based on financial proposal (total 100)
- Total score = 60% of technical proposal + 40% of financial proposal
- The service provider scoring the maximum score based on the criteria will be awarded. However, the service provider should score at least 60 % in the total score from the technical proposal.

Duration and timeline

The consultancy is expected to be completed between March-August 2026.

Budget

The budget for this consultancy will be determined based on the scope of work and deliverables agreed upon.

Terms of payment

Payments will be made upon satisfactory completion of deliverables as follows:

Milestone	**Payment (%)**
Approval of the workplan	10%
Deliverable of Task 1 and 2	40%
Deliverable of Task 3, 4 and 5	50%

Proposal submission

The completed proposal should be submitted through email to consultancy.int@icimod.org by **6 pm (Nepal Standard Time, UTC+05:45), 30 March 2026**. Two separate files – a technical and a financial proposal – should be submitted along with valid legal documents as follows:

- Company registration certificate
- Tax registration certificate (i.e. VAT/PAN/TPIN registration)
- Tax clearance or annual tax return of the last fiscal year
- Audit report of the last three years

For further inquiries or to submit proposals, please contact:

consultancy.int@icimod.org +977-1-5275222 | ICIMOD | Kathmandu, Nepal.

ICIMOD's core values

Our core values are integrity, neutrality, relevance, inclusiveness, openness, and ambition. These values are an expression of our culture and are central to the guiding beliefs and principles of our work and behaviour. Our core values will lie at the heart of ICIMOD operations and delivery. They will underpin everything we do and frame how we work with our partners. They reflect our founding intentions and the balances we seek to hold, while equipping ourselves for the future.

Diversity, equity, inclusion, and safeguarding

ICIMOD's consultant selection process is based on the qualifications and competence of the applicants. As an employer, ICIMOD is committed to promoting diversity, equity, and inclusion, and offers equal opportunities to applicants from all backgrounds and walks of life, including but not limited to gender, age, national origin, religion, race, caste, ethnicity, sexual orientation, disability, or social status. ICIMOD strongly encourages applications from all eligible applicants, especially women, from all parts of the HKH region.

ICIMOD is dedicated to establishing and upholding a safe and nurturing work environment, where all its employees can participate fully and meaningfully without fear of violence, harassment, exploitation, or intimidation. Any type of abuse or harassment, including sexual misconduct [including child abuse], by our staff, representatives, or stakeholders is not condoned or tolerated.