



## Briefing note on 'Towards INMS' and its Regional Demonstration activities

Mark Sutton, 26 March 2015

### Key questions

#### ***What is 'Towards INMS?'***

Towards INMS is a global 'targeted research project' with catalytic core funding from the Global Environment Facility (GEF) (the environment funding mechanism of the United Nations System). The project concept (Project Initiation Form, c. 40 pages) is approved, and we are now running the Project Preparation Grant (PPG). By mid Summer 2015 we must submit comprehensive documentation to allow the full project to be approved, which would run for 4 years (2016 to 2019).

#### ***Who is 'Towards INMS?'***

GEF projects are structured with an Implementation Agency, IA (one of 14 GEF Agencies, representing the customer) and an Execution Agency, EA (the organization coordinating the work). For Towards INMS, the United Nations Environment Program (UNEP) is the Implementing Agency, while the UK Natural Environment Research Council (Centre for Ecology and Hydrology) is the Executing Agency acting on behalf of the International Nitrogen Initiative (INI). INI is a global science network that addresses the challenges of too much and too little nitrogen, which is jointly established under the International Geosphere Biosphere Program (IGBP) and the Scientific Committee on Problems of the Environment (SCOPE).

#### ***What does 'Towards INMS' mean?***

INI has long recognized that the global nitrogen challenge is multi dimensional. Nitrogen supply and use is critical for global food, feed and (bio) energy production, while at the same time losses of nitrogen from agriculture, industry and transport activities contribute to many pollution problems. This can be summarized by the WAGES acronym introduced by the European Nitrogen Assessment (2011): Water quality, Air quality, Greenhouse gases, Ecosystems and biodiversity and Soil quality.



Yet, all of these issues have not traditionally been linked in international policy development, with the result that the co-benefits of good nitrogen management have not been fully quantified or appreciated. There is therefore a need to develop a more coordinated science support system that can provide clear evidence to inform future international nitrogen policy development. INMS stands for the International Nitrogen Management System, the establishment of which would be an eventual goal. The name of the GEF project 'Towards INMS' refers to the fact that the project works towards this goal.

### ***Is Towards INMS about science or policy?***

Towards INMS is about developing science evidence streams that can support policy development. Towards INMS is therefore not a policy process. Examples of international policy processes where nitrogen is important include the Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), the Convention on Long-range Transboundary Air Pollution (CLRTAP) and the Global Programme of Action for the protection of the marine environment from land-based activities (GPA). Towards INMS therefore has multiple policy audiences, and one of the challenges is to show how better nitrogen management can deliver co-benefits to each of them. By clarifying and quantifying these co-benefits, INMS holds the prospect to better understand the interactions that can help overcome barriers to change.

### ***Which would be the main policy process to which INMS reports?***

This is an open question at present, and work under development, as highlighted by the report *Our Nutrient World* (2013). The starting point is that INMS should inform and engage with each of the intergovernmental processes relevant for nitrogen and other international activities. Recent discussions by country representatives to the Organization for Economic Cooperation and Development (OECD), highlighted the possibility to develop a Policy Arena for Nitrogen, where the different processes come together to discuss the potential benefits of a developing a joined up approach for nitrogen. As the IA, UNEP potentially also has a key role to play, for example through the newly strengthened United Nations Environment Assembly.

### ***How should INMS look as a science process to support policy development?***

There are many ways in which science evidence support for policy has been provided in the past. A well known example is the Intergovernmental Panel on Climate Change (IPCC). This has developed a lot of traction, though a disadvantage has been the



separation between IPCC and UNFCCC, meaning that the scientists mainly provide assessment evidence, but with less direct interface between the science community and policy development. An example with a closer interaction is CLRTAP, where the science evidence development is closely embedded into the parent convention, allowing policy makers to ask questions of the science community, and vice versa, allowing a stronger interaction. We could list other examples. For the moment, the thinking of INMS has been strongly informed by the positive experiences of working with the CLRTAP framework. As the Towards INMS process develops, and we engage with different policy processes, we need to learn the best practices from each of them as we develop and characterise a way of working for INMS.

### ***In what way is Towards INMS a global process?***

Many of the challenges for better management of the nitrogen cycle operate at a global scale. These range from impacts on the global climate system through altered greenhouse gas emissions to understanding the barriers to change through global trade systems, for example circumstances that may make it difficult for farmers to transfer any costs of nitrogen mitigation actions to consumers. There is also a strong coupling between regional scale issues and hemispheric to global scales. An example here is transboundary air pollution. Embedded within this, are the regional and local nitrogen challenges from inequalities in the availability of nitrogen resources for agriculture to impacts on biodiversity through atmospheric nitrogen deposition or on freshwater and coastal water quality and biodiversity.

With this in mind, INMS is structured as a global project where the starting point is quantification of the main nitrogen sources and flows spatially across the world. This has been done in the past for single issues related to nitrogen. The global challenge for Towards INMS is to now start linking up the different drivers and forms of the nitrogen cycle, to develop the more comprehensive picture.

## **Regional Demonstration in Towards INMS**

### ***How does regional demonstration link to the global approach?***

Global analysis has the advantage of linking the different key issues enabling quantification of how they fit together. By contrast, global analyses will necessarily lack important details relevant at the regional scale, for example about how practices differ, about the priorities between key nitrogen issues, and about the opportunities and barriers to change. Each of these can be expected to differ between regions.



INMS therefore includes a strong focus on regional demonstration where we map the developing ideas of INMS into different key world regions. This also provides a basis to start to interact at sub-regional and local levels which is important in developing stakeholder engagement.

### ***What do you mean by the word demonstration?***

The word demonstration is one commonly used in GEF projects, but there are many different kinds of demonstration. In Towards INMS we aim to demonstrate how a cross cutting approach that joins up different parts of the nitrogen cycle, including the benefits and threats, can deliver a stronger gravity for better management of these issues. We could refer to it as the nitrogen snowball – where joining up the snowflakes gives much bigger impact.

As a targeted research project, the regional work of Towards INMS is therefore primarily scientific demonstration – focused on evidence gathering. However, part of the nitrogen challenge involves understanding better what are the limitations to action and what are the key drivers for action. Therefore, the regional demonstration helps to provide more concrete information on how key world regions face a mix of similar and contrasting challenges. This is critical information that can then inform developing approaches at the global scale.

### ***How many INMS regional demonstrations do you anticipate?***

The number of regional demonstrations in Towards INMS is not exactly fixed yet. The principles in the guidance from GEF have been that we develop sufficient critical mass to support and inform a global approach, where all the key regions are included. On the other hand, the resources for GEF demonstration are primarily targeted at developing and transition economies.

With this in mind we have four categories of regional demonstration included a) developing regions with too much nitrogen, b) developing regions with too little nitrogen, c) transition economies, often with problems of too much nitrogen, and d) developed economies with too much nitrogen. The last of these is included where other national and international funding resources allow it (i.e. beyond the GEF resources).

At present we are looking towards mapping this out with the following five demonstrations funded directly through Towards INMS: a) South Asia, East Asia, Latin America, b) East Africa, c) East Europe. In regard of d) we have an offer for



engagement from West Europe (Atlantic coast) but other regions may also be possible.

### ***What should a demonstration 'region' look like in Towards INMS?***

There is no exact size to a region, but common issues can be identified. In particular, we see INMS regions as being characterized by more than one country allowing transboundary challenges to be addressed (both in water and air, but also considering policy and trade interactions). In practice (for achievability) groups of perhaps 3 to 5 countries working together looks optimal.

Secondly, each regional demonstration should ideally have at least one existing intergovernmental policy process which it would directly support. This provides a mechanism for direct engagement between science and policy at the regional scale. For example, in the case of South Asia (provisionally India, Bangladesh, Sri Lanka, Nepal, but potentially others), we envisage a direct partnering with the South Asian Cooperative Environment Programme (SACEP). Each of the regions should develop the relationship with the key regional policy audience.

The choice of the INMS region boundaries would also naturally link to some part or parts of the nitrogen cycle. For example, in the case of East Africa, we consider the Lake Victoria catchment, which links Kenya, Uganda, Tanzania and Burundi. In the case of East Europe, we consider selected key catchments running into the Black Sea. In the case of East Asia, there are major challenges for eutrophication of the pacific coastal waters as well as common regional air pollution through nitrogen, therefore we consider linking countries around this domain (e.g. China, Japan, Philippines, South Korea). This workshop is a step on the way towards refining these ideas and the partnerships necessary.

### ***What kind of work would Towards INMS fund in the regional demonstrations?***

We envisage developing a broadly common approach to be replicated for each of the INMS demonstration regions. The aim is to develop an approach that is comparable, while recognizing that the detailed priorities and challenges faced by each region will differ. By taking a common approach, the report of the regional work to the overall Towards INMS process, will therefore allow us to better characterize both the *common challenges and opportunities* and the *specific regional challenges* of each.

The following evidence stages can be considered, for which evidence needs to be gathered.



A) Quantification of the main nitrogen flows (and pools) according to key sources, as far as possible on spatially differentiated basis.

B) Better access and understanding of the data availability and limitations for quantifying these flows.

C) Based on analysis of A) and B), characterization of the main source sectors contributing to nitrogen flows, and consideration of the issues of shortage and excess, as well as identification of the key uncertainties (i.e. where further evidence gathering is needed and development of strategies to gather that evidence).

D) Considering the fate of those nitrogen flows in terms of both beneficial and adverse impacts, and characterization of these nitrogen impacts in this region. This includes using improved datasets to apply available models to deliver better spatial and temporal information (selected examples, to demonstrate, rather than promise modelling of every issue – including a feasibility check).

E) First analysis of the priorities of nitrogen threats and benefits for each region in regard of the kinds of issues and the main contributors to these issues. (This may be informed by cost-benefit analysis to the extent that it can be incorporated).

F) Assessment of nitrogen performance indicators (in cooperation with the global scale work), building the basis for a common descriptive/reporting framework.

G) Based on identification of the source and issue priorities, reviewing the available options for mitigation and better management across the nitrogen cycle, including identification of the potential co-benefits (or trade offs). Development of a priority list of the key management and mitigation options according to the regional priorities.

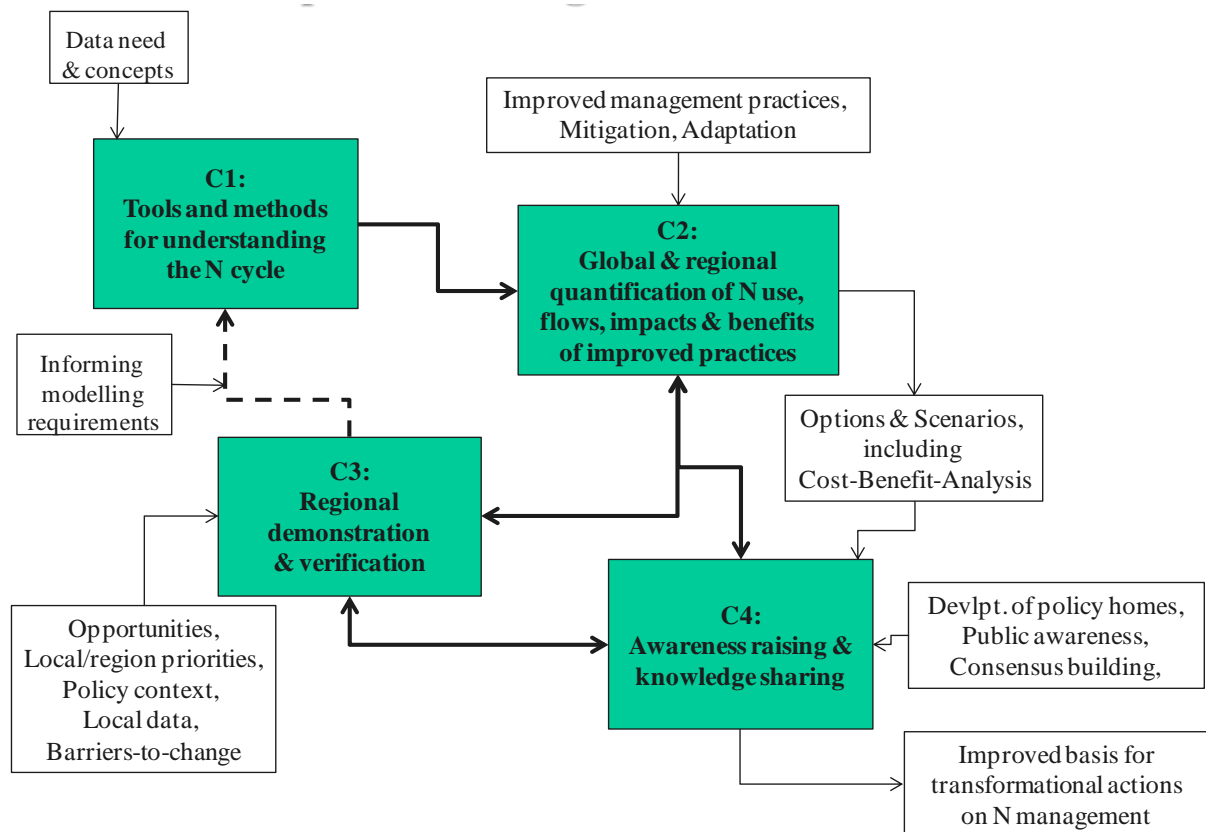
H) Review of current efforts including success stories of where progress is already being made and why. Understanding of barriers to change, and how they might be overcome, including where a joined up approach to the nitrogen cycle can help.

I) In principle, scenarios of future options could also be developed. But given the substantial programme of the above work, this may need to be limited to regional downscaling of global scenarios. However, critical for the project will be a mutual learning between the communities working at the regional scales and those working at the global scale: learning lessons from both which can inform each other.

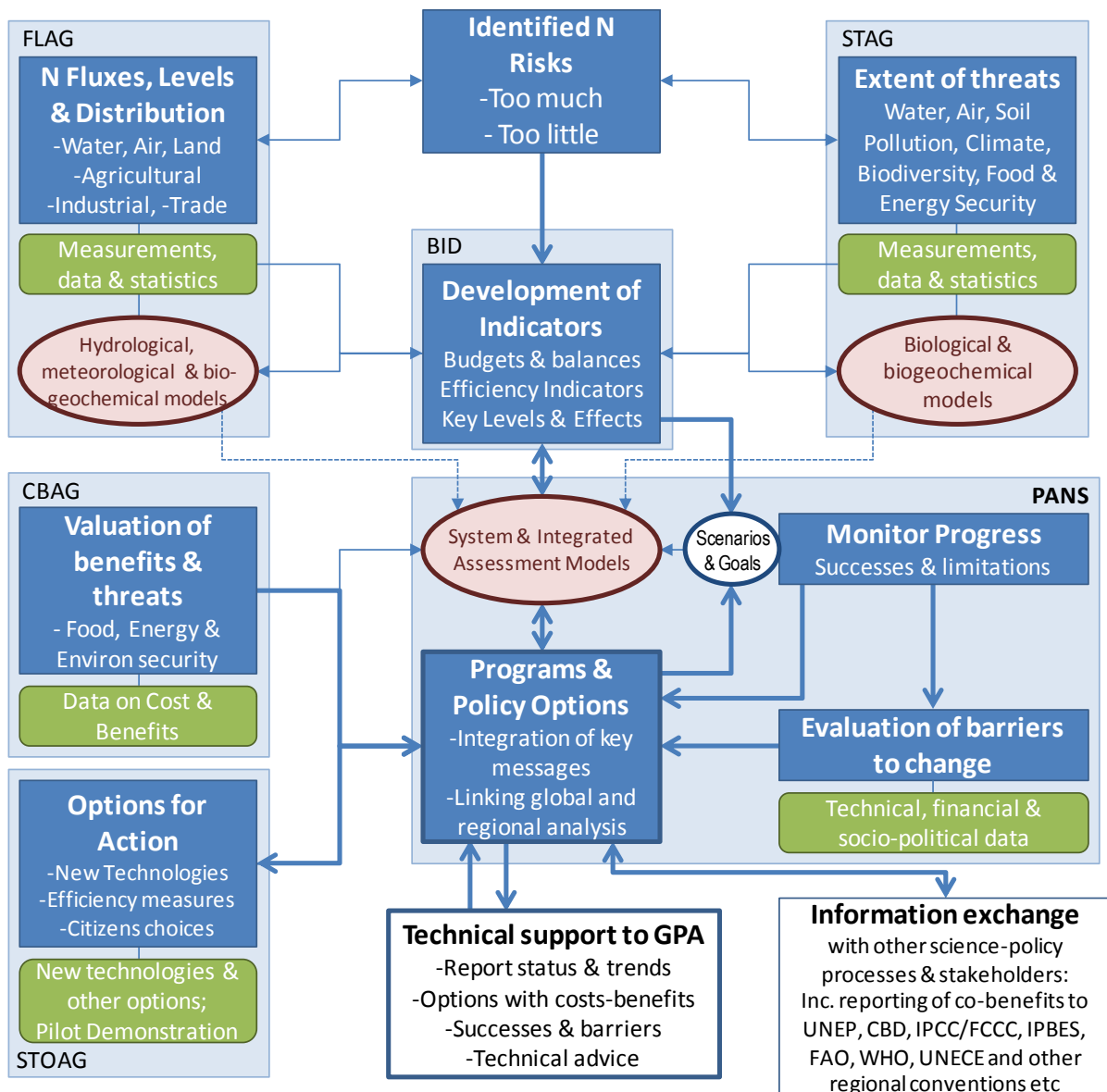
## Next steps

This sketch represents the developing concept. During this and subsequent workshops we will refine these concepts and approach as a basis for developing the project planning documents. In reality, we can expect that this is a gradual process of learning together and refinement of the approach over the next years.

## Supporting Diagrams



**Figure 1:** Project Component Structure for Towards INMS



**Figure 2:** Information flow of different potential workstreams of an eventual INMS. The illustration of input to GPA is shown, but this could equally apply to any inter-governmental body. This diagram provides a starter for further discussion of necessary INMS WGs during the meeting. (See next page for key).