




National greenhouse gas inventory capacity: An assessment of Asian developing countries

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Highlights

- 11 Asian developing countries had low GHG inventory development capacity over time.
- 9 improved their capacity, and 17 had high capacity from the first inventories.
- 7 exhibited established capacity as the top runners in the region.
- Improvement in basic technical capacity in countries will be essential.
- Unlike the current trend, low capacity countries need more international support.

Abstract

The transparency framework of the Paris Agreement (PA) will be elaborated from the existing arrangements under the UN Framework Convention on Climate Change (UNFCCC). Yet, the capacities of developing countries to regularly report national GHG inventories vary, and their needs for capacity building are closely linked with efforts and achievements of previous inventory preparation. The purpose of this study was to analyze the status and changes in the capacity of 37 developing countries in Asia by using a matrix of capacity-indicators. Indicators were composed for four assessment categories: (1) international engagement of a country in the GHG inventory-related process; (2) institutional capacity to produce a GHG inventory; (3) existing technical capacity available to develop a GHG inventory; and (4) actual technical capacity applied to produce a GHG inventory. The paper also analyzed the scale of international support and variations in meeting with capacity building needs. Eleven countries were identified as having low capacity over time, while 9 improved their capacity. Seventeen countries, including 7 countries with established capacity, continuously had relatively high capacity over time. International support was scarce in the majority of Asian developing countries with the most capacity building needs. Improvements in basic technical capacity available for GHG inventory preparation, such as statistics and the scientific expertise, were found to be a key necessity for countries to respond to the PA's enhanced transparency framework. Based on these findings, the study recommended increasing support for improvements in basic technical capacity, especially in countries where existing capacity is low and support is limited. Such capacity building efforts are also beneficial for countries to form and implement nationally determined contributions (NDCs) and other economic and development policies.

Introduction

At the 21st session of the Conference of Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC), held in Paris in December 2015, the Paris Agreement (PA) was adopted to strengthen global efforts to mitigate climate change. The core objective of the PA is that all Parties implement their nationally determined contributions (NDCs), which are expected to be progressive each time they are renewed in a five-year cycle. Parties track implementation of their NDCs in accordance with the PA's transparency framework in order to “build mutual trust and confidence and to promote the effective implementation of the PA” (UN, 2015). The PA's transparency framework consists of two information elements: a national inventory report of greenhouse gases (GHGs) and information necessary to track progress in implementing and achieving NDCs by a country. Parties are requested to regularly report on these information elements (UN, 2015).

Almost all Parties to the UNFCCC have reported GHG inventories for nearly 20 years. A national GHG inventory is a compilation of a country's estimated anthropogenic GHG emissions and removals and is prepared following the methods provided in the Intergovernmental Panel on Climate Change (IPCC) guidance and guidelines and the five reporting principles of transparency, accuracy, completeness, comparability and consistency (IPCC, 2006). Under the UNFCCC, developed countries are encouraged to support developing countries to prepare GHG inventories as part of national communications (NCs) and biennial update reports (BURs) (UNFCCC, 2002, UNFCCC, 2011).

The PA's transparency framework is yet to be elaborated, but will be built on and enhanced from the existing transparency arrangements (UNFCCC, 2015a, UNFCCC, 2015b). Prior to the PA, there are clear distinctions between Annex I (developed) and non-Annex I (developing) countries for the requirements of GHG inventory reporting (UN, 1992). One example of this differentiation is that while Annex I Parties were required to submit GHG inventories annually (UNFCCC, 1999, UNFCCC, 2013a), non-Annex I Parties were required to do so every three to four years as part of NCs and communicate updates on their inventories as part of BURs (UNFCCC, 2002, UNFCCC, 2011). Another example is that while Annex I Parties were encouraged to use most recent IPCC guidance and guidelines for inventory compilation, non-Annex I Parties could choose older guidance as references (UNFCCC, 2002, UNFCCC, 2013a). In this paper, we refer to Annex I Parties as developed countries and non-Annex I Parties as developing countries.

Differences in reporting requirements between developed and developing countries will likely be smaller under the PA's transparency framework, because it ensures participation by all Parties. However, the existing capacity of developing countries for national reporting is highly variable (Damasa and Elsayed, 2013). Capacity for the purpose of this study refers to the ability of a country to conduct a GHG inventory in response to the international requirements under the UNFCCC. One illustration for varying capacities in developing countries is that, despite agreeing in COP17 that developing countries would submit their first BUR (BUR1) by December 2014, only nine met this deadline (UNFCCC, 2011). To date, only 34 countries have submitted their BUR1 (UNFCCC, 2016a, UNFCCC, 2016b, as of September 2016). A challenge for the majority of developing countries is to make reporting on a regular basis, in accordance with the IPCC guidance and guidelines.

Shortage in capacity can be due to a number of factors related to the political, institutional and technical aspects of national systems for preparing GHG inventories (NCSP, 2005, IPCC, 2006, NIES, 2006, Umemiya, 2006, Damasa and Elsayed, 2013, UNFCCC, 2013b, CGE, 2016, US-EPA, 2016). Therefore, capacity building is necessary for countries to prepare and communicate a GHG inventory. Yet, capacity building efforts vary substantially across countries. As we found in this paper, those efforts are closely linked with capacity building efforts and achievements of previous inventory preparation, including support from developed countries. To consider allocation of resources for future capacity building efforts, it is essential to investigate what progress has been made in terms of capacities for making national GHG inventories in developing countries and where and to what extent additional capacity building is needed (Dagnet et al., 2015, Umemiya et al., 2016).

This paper analyzes the change in capacity of developing countries across Asia to develop national GHG inventories by comparing the status of capacity at the time of submitting the first GHG inventory with the status of capacity at the time of submitting subsequent GHG inventories. We performed this assessment of GHG inventory capacities by using a matrix of capacity-indicators. Further, we analyzed the availability and scale of international support and compared it with capacity building needs we identify in each country.

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Data

This study focuses on 37 of 55 developing countries in Asia (UN, 2014). These countries were selected, because they have submitted their GHG inventories at least as part of NC1 and NC2 (seven also submitted BUR1) and also because their NCs and BURs were available on-line (UNFCCC, 2016a, UNFCCC, 2016b). Data were assembled from publicly available sources and integrated into a single database.

The main data source to assess the GHG inventory development capacities was the GHG inventory section and ...

Status and changes in GHG inventory development capacities

This study highlights variations in the status of Asian developing countries' (n=37) capacity to develop a GHG inventory and how capacity changed over time. Table 6 presents the changes of capacity status from NC1, NC2 then BUR1, if submitted. Fig. 1 shows the spatial distribution of capacity status for these countries at the time that they submitted NC1 and NC2.

Of the 37 countries assessed in Asia, 20 had limited to intermediate capacity and 17 had good to very good capacity at the time of ...

Varying capacity status and changes

Our analysis found varying capacity for producing a GHG inventory in 37 Asian developing countries and variations in changes of that capacity. Seven countries, including India, Indonesia, the Republic of Korea and Singapore, were found to be equipped with established capacities for preparing GHG inventories on a regular basis. These countries can be perceived as being closest to fully implement the PA's transparency framework and do not require much additional efforts for capacity building. ...

Conclusions

Among the 37 Asian developing countries assessed in this study, 20 countries had low capacity at the time of submitting GHG inventories as part of NC1. Among them, 11 countries remained as low capacity at the time of submitting NC2, while 9 improved their capacity. Seventeen Asian developing countries had relatively high capacity from the time of submitting NC1. They continued to exhibit high capacity for GHG inventories in NC2. Seven of them submitted quality GHG inventories as part of BUR1, ...

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...At present, many of these Parties do not yet have the necessary capacity in place. Ability to regularly report national GHG inventories varies among Parties and it is closely related to the efforts and achievements of previous inventory preparations (Umemiya et al., 2017). So far, 63 developing countries have submitted their first Biannual Update Report (BUR) under UNFCCC, 31 the second, 12 the third and only 2 the fourth one, with 91 countries that have not submitted any yet...

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...Therefore, new and alternative approaches would need to be explored. For example, some argue that looking at the co-benefits of transparency-related capacity building might be a meaningful way to incentivize developing countries with limited capacity to engage in the longer term and sustain the capacity that has been built over time, e.g. capacity building for national statistics that could be used for multiple policy purposes other than for GHG inventories alone (Umemiya et al., 2017). Others have suggested that focusing on universities could be a step towards building meaningful capacity (Khan et al., 2018)...

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