

D E C C M A



DELtas, vulnerability and Climate Change; Migration and Adaptation (DECCMA)

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By: Robert J. Nicholls, Abiy Kebede, Craig W. Hutton, Frances E. Dunn (University of Southampton), Katharine Vincent (Kulima Integrated Development Solutions), Md Munsur Rahman, Mashfiqus Salehin, Md Anisur Rahman (Bangladesh University of Engineering and Technology), Tuhin Ghosh, Sumana Banerjee (Jadavpur University), Samuel N.A. Codjoe, Kwasi Appeaning-Addo, Gertrude Owusu (University of Ghana) and the DECCMA Consortium

Consortium Member Institutions:

University of Southampton (UK), Bangladesh University of Engineering and Technology (Bangladesh), University of Ghana (Ghana), Jadavpur University (India)

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Executive Summary

This report summarises the main outcomes and learning from management and delivery of the nearly 5-year “DELtas, vulnerability and Climate Change; Migration and Adaptation” (DECCMA) project within the “Collaborative Adaptation Research Initiative in Africa and Asia” (CARIAA) programme. DECCMA considered climate change and deltas with a strong focus on adaptation and migration within deltas, including migration as an adaptation. It was committed to being gender-sensitive in research approach, data collection, and analysis.

Globally deltas and their environs house 500 million (or 7 percent of global population) people on one percent of the land area, with a concentration of populated deltas at mid and low latitudes. Deltas are highly dynamic biophysically. This includes a high vulnerability to sea-level rise and climate change, and also subsidence (deltas sink), exacerbating global changes in sea level. Deltas are also socially dynamic, with changing land use, economies and strong trends of migration that have potential to be modified under future environmental and climate change.

Under DECCMA three representative deltas were analysed: (1) Ganges-Brahmaputra delta in Bangladesh and India (split into two study sites in each nation: coastal Bangladesh and the Indian Bengal Delta, India), (2) the Mahanadi delta, India, and (3) the Volta delta, Ghana. There were six academic work packages, (1) governance, (2) biophysical changes, (3) migration, (4) macro-economics, (5) integration, and (6) adaptation. These applied the same methods across all the deltas, making the results comparable. Major achievements include (1) comparative analysis of governance across the deltas, (2) development and application of methods to identify vulnerability hotspots in deltas (3) a major survey of sending and receiving areas across the four study sites that combined considers more than 7,500 households and individual migrants, including gender dimensions, (4) creation of macro-economic input-output models for each delta site, linked to the national economic models, and (5) creation of adaptation inventories across the deltas. The results show that there are established migration systems in each delta, and climate change will modify these systems rather than initiate fundamentally new migrant flows. The results are summarised in a new open access book to be published by Palgrave titled “Deltas in the Anthropocene” and a DECCMA in-house publication summarising research highlights for a non-academic audience “Climate change, migration and adaptation in deltas: Key findings from the DECCMA project”.

We can summarise our key findings as follows:

1. There are different levels of social vulnerability across India and Bangladesh within the transboundary Ganges-Brahmaputra-Meghna delta (comprising the Indian Bengal delta and coastal Bangladesh).
2. The extensive household survey conducted in more than 5000 households in sending areas for migrants (creating an unprecedented data set enabling sex-disaggregated comparison between deltas) highlights similarities and differences in household structure, livelihoods, economy, perceptions of environmental stress, and responses in terms of migration and adaptation across the DECCMA deltas.
3. Deltas play a key role in national economies, with services, trade and transportation comprising 50% of the economy in the Asian deltas and 40% in the Volta delta. The production and transformation of natural resources in the deltas means that climate and environmental change may affect national economies through impacts in the deltas.
4. Present mobility and migration from rural to urban areas is dominated by economic drivers which are exacerbated by environmental change. The nature of migration in deltas also often differs to perceived norms: e.g. in Ghana drought is the main environmental driver of migration across the delta, whereas conventional thinking is that it is floods and erosion that promote migration, but while dramatic this is more localised along the coast. In the Mahanadi, there is net out-migration from the delta, despite government perceptions that there is more in- than out-migration.
5. Structural and livelihood adaptations are already widespread in the deltas, and provided by governments, non-state actors and households themselves, but more will be required to reduce adverse

impacts of future climate change. Our findings show who is adapting and how, and highlight how to promote in situ adaptation as an alternative to migration.

6. There is a sub-optimal policy and implementation framework for migration and adaptation in deltas.

All other outputs are summarised at the end of this report.

1. Consortium Leadership and Institutions

This section summarises the lessons learned during the lifetime of the DECCMA project consortium leadership and partner institutions. This includes how the consortium was structured and organised (including the participants, management, and delivery of work) at the inception, how it evolved over time and how well it functioned. It also provides an outlook on what worked well and what didn't work as part of the consortium leadership in terms of good practices to retain and the lessons to do things differently in future collaborations.

1.1 Looking Back: Consortium Structure and Organisation

The DECCMA project is jointly funded by the International Development Research Council, Canada (IDRC) and the Department for International Development, UK (DFID) under the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) programme in which the DECCMA consortium sits in the 'Deltas' hotspot. CARIAA also funds three other consortia in the hotspots of 'semi-arid regions' and 'glacier-fed river basins'. The DECCMA consortium has a total of four 'Members', including one lead Northern partner and three lead institutes (Southern partners) within the three countries where the study sites are located. They are:

- **University of Southampton (Soton)**, United Kingdom – Project Lead
- **Bangladesh University of Engineering and Technology (BUET)**, Bangladesh
- **Jadavpur University (JU)**, India
- **University of Ghana (UoG)**, Ghana

Each Member is contracted directly to CARIAA (finances and reporting) and has joint responsibility for leading and reporting on one or more Work Packages. The lead individual at the Member is the Principle Investigator for that country. These are:

- Soton – Professor Robert J. Nicholls (Consortium PI)
- BUET – Professor Munsur Rahman
- JU – Dr Tuhin Ghosh
- UoG – Professor Samuel Nii Ardey Codjoe

The full list of DECCMA participants across all the member institutes and other project partners can be found in Appendix 4. Figure 1 summarise the consortium's overall governance structure.

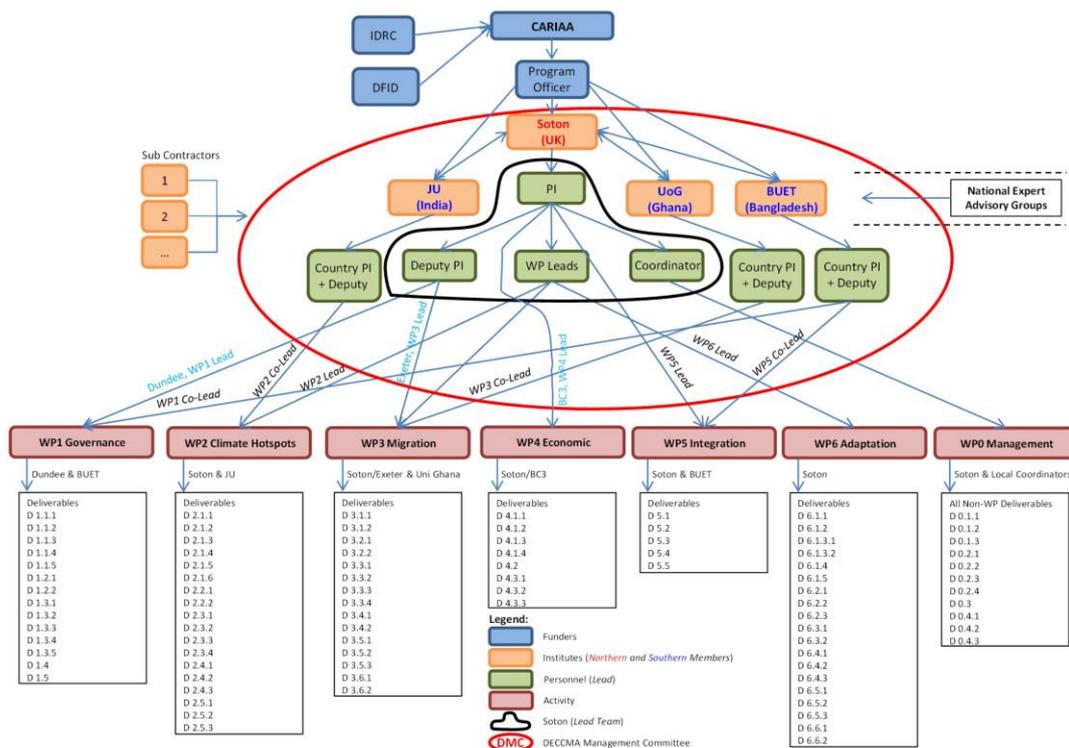


Figure 1: The DECCMA Project Governance and Consortium Management Structure.

The project has various deliverables split into six research-focused Work Packages (WP), along with WP0 (Management) with a set of additional deliverables (see Figure 1). As part of the governance structure, the Project Management Work Package (WP0) (see Figure 3 for details of the full WP structure), which encompasses all other research components, oversees all project management tasks. Most WPs are jointly led by the University of Southampton and one of the Southern Member institutes (as detailed below).

The Work Packages and leads within DECCMA are:

0. **Management** – Leads: Consortium Coordinator (Soton) (supported by the Local Coordinators in each Member country)
1. **Governance** – Technical Leads: University of Dundee (*Andrew Allan*) & BUET (*Professor Mashfiqus Salehin*); Management Lead: Soton (*Professor Craig Hutton*)
2. **Climate Hotspots** – Technical Leads: Soton (*Chris Hill*) and JU (*Tuhin Ghosh*); Management Lead: Soton (*Chris Hill*)
3. **Migration** – Technical Leads: University of Exeter (*Professor Neil Adger*) and UoG (*Professor Samuel Codjoe*); Management Lead: Soton (*Professor Emma Tompkins*)
4. **Economics** – Technical Lead: Basque Centre for Climate Change, BC3 (*Professors Anil Markandya and Inaki Arto*); Management Lead: Soton (*Professor Robert Nicholls*)
5. **Integration** – Technical Leads: Soton (*Professor Robert Nicholls and Dr Attila Lazar*) and BUET (*Professor Munsur Rahman*); Management Leads: Soton (*Professor Robert Nicholls*)
6. **Adaptation** – Technical Lead: Soton (*Professor Emma Tompkins*); Management Lead: Soton (*Professor Emma Tompkins*)

1.1.1 Communication mechanisms

Effective project communication and reporting throughout the lifetime of the project has been a critical part of the project management that ensured a truly cohesive and integrated consortium, effective and timely delivery of the project’s plans/outputs and overall success of the project. This was ensured through regular meetings and reporting at various management levels and time intervals. DECCMA has invested significantly in project coordination capacity within each country and the impacts of this investment have been evident as this capacity has improved with time. Figure 2 outlines DECCMA’s progress reporting and management structure.

The DECCMA Management Committee (DMC) meets once a month (via a 90 to 120 minute conference call) to oversee progress of the project, governance related issues, and management of operational risks. The DMC is constituted of all Work Package Leads (WPL), Leads of Member institutions (see above), and DMC UK. DMC UK is the Southampton leadership team, which meets weekly led by the PI (Professor Robert Nicholls). The WPL involve two technical leads (usually one from the Northern team and one from the Southern team) along with one Management Lead in the DMC UK. The National Management Committee (NMC) is represented by the Member Leads, and representation of national sub-contractors. The National Work Task Leaders (NWTL) report to the WPL/NMC. Each National Expert Advisory Committee (NEAG) provided oversight of the NMC at a national level.

As part of the consortium management, six monthly Consortium Meetings are held, to bring together the whole consortium. These were hosted on a rotating basis between member institutes and have been critical to the development of the consortium and evaluation and continuation of high quality research during the lifetime of the project. Consortium meetings also provided a forum for intellectual discussions, capacity building, training, sharing and critique of emerging research and robust and context specific planning of standardised research methods for Work Tasks that are undertaken in each study site. The interaction between WPs has also been key in good communication. Project member’s desire and willingness to step outside their traditional fields of study and embrace other areas of relevance to the DECCMA goals has meant that an integrative approach has been successfully implemented. The willingness and flexibility of team members has been a key success in the project.

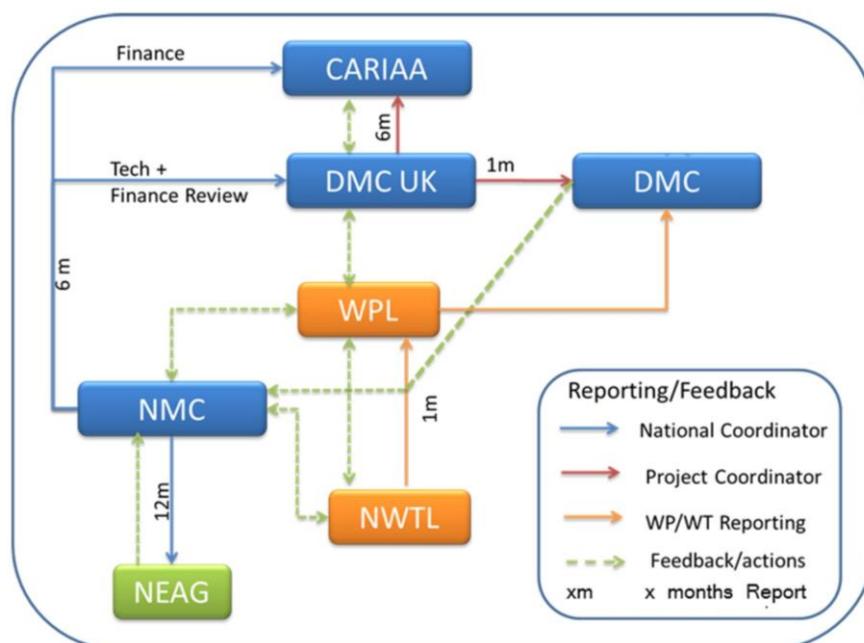


Figure 2: Structure of Project Progress Reporting and Management. Note: IEAG – International Expert Advisory Group; DMC – DECCMA Management Committee; WPL – Work Package Leaders; NMC – National Management Committee; NWTL – National Work Task Leaders; NEAG – National Expert Advisory Committee.

The monthly reporting (usually planned on a time cycle to feed into the monthly DMC meetings) ensures effective project functioning as part of the project governance. These reports are short and

concise summary (e.g., bullet points) of progress in the previous month and plans for the next month (in terms of outlining progress towards active and future deliverables), as well as monitoring and evaluations of publications (e.g., peer-reviewed articles) and other dissemination (e.g., conferences, invited presentations, etc.), internal and external networking and impact activities, and identifying risks and issues (see Section 6).

1.1.2 Changes and change management

Planned change control and management processes were critical to avoid project derailment due to unforeseen issues. As in all large and multi-year projects, change and potential risks and issues of delivery are inevitable, for example, change in staff members, in research structure due to unforeseen circumstances, or delays in delivery of outputs due to any number of reasons. The following summary highlights examples of changes in the consortium structure and organisation and other related challenges and how they were managed and any residual implications over the five years period (see Section 6 for further details on risk management).

1.1.2.1 Changes in partners

- In addition to the four project partners (listed previously), the National Authority for Remote Sensing and Space Sciences (NARSS) (Egypt) was also initially part of the DECCMA consortium. However, due to internal issues within the institute, IDRC's MDC offer to NARSS was retracted (on 12 February 2015). DECCMA then proposed to partner the Climate Change Information Centre for Renewable Energy (CCICRE), which is part of the Ministry of Agriculture, to lead the Egypt team for the Nile delta case study. This proposal was also unsuccessful, despite DECCMA and IDRC's significant efforts, including a visit to Cairo from the PI. Consequently, the plan for an Egyptian-led analysis of the Nile delta was discontinued. The length of time that it took to resolve this issue (about 18 months of ambiguity as to whether to continue with or without the Egypt team) meant that it had significant implications in the overall planning of the project e.g. cross-study site planning of stakeholder workshop and household surveys were delayed. The loss of the Nile delta study site, which is one of the largest and most important and symbolic deltas in the world, left a gap within DECCMA that needed to be filled. The technical expertise that the Egyptian team brought to the consortium, and would have contributed to research across the four study sites, also needed to be replaced. Following a request from the CARIAA Executive Committee, the project plan was reviewed and developed as a way forward for redistributing the responsibilities and funding initially allocated to the Egypt team.
- During 2015 an issue over DECCMA-India's partner institute Indian Institute of Technology, Kanpur (IIT-K) arose which resulted in their request for withdrawal from DECCMA. The issue was regarding Financial Reporting sent by IITK for the period August 2014 to March 2015, where JU requested for justification of expenses as JU needs to justify the overall expenses incurred by the DECCMA-India team at its internal audits. The Management Committee at JU and University of Southampton had been in communication over this. Sorting of the financial queries raised by JU over IITK's financial reporting had been requested by JU. A revised Financial Report recording only actual expenses on permissible items was requested. This issue was resolved in the period April 2016 – March 2017 with all financial accounts being settled and the contract between IIT-K and JU being legally terminated.
- A new partner organisation - Sansristi from Odisha based at Bhubaneswar in the Mahanadi delta - was officially brought on board in January 2016. Sansristi worked with our existing partner, Chilika Development Authority in the Mahanadi. Their experience in gender research helped us carrying out our work better in the Mahanadi. Being from the delta itself they had the advantage of better communication with the communities as they speak the local language, Odia.

1.1.2.2 Creating a management work package

In the Inception Phase, we recognised that the original proposal had not sufficiently addressed the administration of the project. For example, there were a number of deliverables not associated with a Work Package. To address this we created Work Package 0, which was led by the Consortium Coordinator with the National Coordinators. This ensured that these activities were successfully completed. Further, the creation of WP0 gave a better focus on the administration of the project and provided a platform for regulation communication between coordinators and strengthening of DECCMA's administration throughout the life of the Project.

1.1.2.3 Abandoning the idea of an International Expert Advisory Group

Originally we proposed an International Expert Advisory Group for DECCMA. As CARIAA developed and initiated the set of Annual Learning Reviews (ALRs), it was decided to abandon the concept of an International Expert Advisory Group and rather focus on the ALRs where we could exchange with other CARIAA projects, and present our research at international conferences like the European Geosciences Union annual meeting in Vienna in 2017 and 2018.

The Ghana team still had a National Expert Advisory Group to ensure complementarity and application of research findings within relevant national academic and policy/practice debates.

1.1.2.4 Departure of key personnel

- The Consortium Coordinator (Mr Jon Lawn) left DECCMA in the final year for another job within the University of Southampton. This was managed through: (i) Jon's detailed handover plan for a smooth transfer and redistribution of coordination responsibilities to three existing DECCMA members, (ii) Jon's continued (limited) involvement during a transitional period, and (iii) continued communication between Jon and the new coordinators beyond the transitional period. This has led to an overall successful completion of the project with good coordination until the end.
- Dr Nilanjan Ghosh, of Observer Research Foundation, Kolkata, an economist, was engaged to co-lead WP4 from India. But the expertise of this consultant and the requirement of the WP4 were not the same and thus he discontinued his engagement with DECCMA.
- Ms Anchita Ghatak was engaged as DECCMA-India's gender consultant from end of 2014. However, after more than a year of working in this project, the team did not get any guidance from her in terms of incorporating gender and she had an activist mode while interacting with the community which was creating problems for our work. Following this, she discontinued her engagement with DECCMA.
- In March 2017, Dr Sanjib Pohit was contracted by the India team to help with the work in WP4. He has developed the Social Accounting Matrix (SAM) for both the deltas.
- Dr Asish K Ghosh had been battling throat cancer since mid-2015 and died in April 2018. In his absence and without any successors the Centre for Environment and Development (CED) shut down and thus JU had to cancel the contract with CED. The researchers who were with CED as a part of DECCMA continued to be funded by DECCMA through Jadavpur University's account. This decision was supported by Dr Michele Leone. (The DECCMA book will be dedicated to Dr Asish K Ghosh).
- WP6 Adaptation experienced a series of modification through changes in circumstances of staff involved with the work package requiring medium term replacement. This was managed internally and has not delayed outputs substantially.

1.1.2.5 Financial risks due to exchange rate fluctuations

The fluctuation in the value Canadian dollar (\$CAN) in which payments are made to each country and the change in currency exchange due to the decline in \$CAN affected all participating countries, particularly Ghana and Bangladesh. One example of this is a change in the initial plan for stakeholder

engagement with lower cost approaches being adopted. Further potential impact to the project was partly managed through a redistribution of fund between partners e.g. the India partner fortunately had a surplus, which was reallocated to Ghana and Bangladesh partners. The guidance from CARIAA in managing this risk could have developed earlier and been more strongly implemented. The initial advice was to spend as per the original budget in national currency with no consideration of changing exchange rates, while later we were told to keep to the available budget in Canadian dollars which was problematic for some partners.

1.1.2.6 Interdependency of work flows

The two critical paths were associated with links between: (i) WP2 and WP5 – delay in delivery of the climate scenario data (which also led to delay in delivery of other biophysical outputs such as flooding and fisheries modelling) had significant implications for WP5; and (ii) WP4 and WP5 – delay in delivery of country (BD) input data to the WP4 economic modelling team also had implications on progress in WP5 integrated modelling.

1.2 Issues, responses, and lessons learned

The DECCMA project is a substantial undertaking and there are important lessons that have been learned at an individual level right up to the management process within the broader CARIAA/IDRC context. There are also some critical lessons learned in terms of the practical management of the project and the following text focuses on how, if the project were to be repeated, some elements of the project might be better implemented. This draws upon key issues identified in the changes to workflow.

1.2.1 The inception period needs more structure

Issue: The inception period was too long and somewhat unmanaged, with a strong push from IDRC to talk about our research rather than start it. In DECCMA we had already developed clear plans in our proposal and it would have been better to start some of the tasks earlier than we did. The project tended to be idle when the partners knew what they wanted to do and could have started their work.

Response: Whilst a good idea in principle, the project inception phase should be reviewed with the PI and other project leaders, to assess each consortium's needs, rather than a standard format as seemed to be applied in CARIAA. DECCMA benefited from the inception phase as mentioned below in terms of the creation of WP0. However, a much shorter and more active inception process would have benefited DECCMA.

1.2.2 Ensuring a management work package is in place

Issue: Development of Work Package 0, Project Management occurred during the inception phase of the project rather than being in the original proposal. This work package was established in order to: (i) house a series of project-related administrative activities and deliverables such as reporting and (ii) allow for a clearly defined line of management across the project. Its development was highly effective in allowing for a strategic approach to management of a complex project and included the implementation of monthly on-line reporting and exchange between the country coordinators.

Response: The development of a Work Package 0 for management would be developed earlier in the process and clearer and prescriptive reporting requirements identified earlier. There was a potential for the project to lose focus in some areas until there was a clear monthly expectation or reporting on deliverables. This is allied with a 9 month period of project inception provided by CARIAA that was intended to allow for an adjustment of the work plan.

1.2.3 Early assurance of data accessibility

Issue: A key area of work plan development and modification came with delays in accessing and gathering household data. There were a series of data delays that caused substantive movements in

deliverables associated with WP2 (Hotspot and Vulnerability, Hazard and Risk), WP3 (Migration work), WP4 (Economic modelling), and WP5 which managed the development of the overall approach to integration and modelling. This required an extension of processes whilst delay in data access, processing and analysis occurred across a number of sectors.

Response: Data gathering is often the subject of delay. It might be a good idea to have a data audit and contracted provision that identifies what data the partnership will and can provide early on in the process. Often it is simply agreed that a government agency will provide data – it might be better to require that in writing in the development of the proposal phase or in the early phases of the implementation. This process would have been assisted by a contractual requirement to produce data promised associated with finances.

2. Research Problem, Design, and Outputs

2.1 Research Problem and Methods

The occurrence of large tracts of land at low elevation make deltas vulnerable to relative sea-level rise (due to climate change and/or subsidence), as well as other impacts of climate change. Deltas have some of the highest population densities in the world; in total with about 500 million people worldwide, often poor, rural inhabitants supported by subsistence livelihoods. This translates into 7 percent of the world's population living on one percent of the land. In the worst case, it is recognised that large numbers of people could be displaced from deltas by relative sea-level rise and climate change, raising the spectre of large numbers of forced “environmental refugees”. However, this is a gross simplification of the current situation as deltas are already highly dynamic places both biophysically and socially. For example, a range of temporary and permanent migration is already a widespread phenomenon in deltas, and this is an established household adaptation to cope with environmental and economic change. This migration can be both a successful form of adaptation, increasing the resilience of the migrant household, and unsuccessful in terms of adaptation, perpetuating vulnerability in a new location with differential impacts on men and women. At the same time, a range of other adaptive strategies are apparent for deltas residents (e.g., disaster risk reduction, land use management, or construction of polders) and the relative success of these strategies needs to be evaluated.

Most research on deltas and migration before DECCMA tended to focus on individual system elements and issues rather than taking a systems-level perspective of the problem. This fails to consider the wider consequences of climate change and the interdependence between these phenomena and people's behaviour. In contrast to previous research, the DECCMA project took a systemic and multi-scale analytical perspective to understand gendered vulnerability and adaptation in deltas under a changing climate including consideration of all other relevant stresses. This provides better evidence to policy makers about the possible futures of deltas, how adaptation can influence these futures and the potential role of migration as an adaptation approach. DECCMA addressed a set of common research questions by analysing three contrasting populous delta systems using the same approach in South Asia and West Africa where there is significant potential for migration: i) the Ganges-Brahmaputra-Meghna (GBM) delta (Bangladesh/India), (ii) the Mahanadi delta (India), and (iii) the Volta delta (Ghana). Our overall research aims were:

- (1) To assess migration as an adaptation in deltaic environments with a changing climate
- (2) To deliver policy support to create the conditions for sustainable, *gender-sensitive*, adaptation in deltas.

The research objectives were:

- (1) To understand the governance mechanisms that promote or hinder migration of men and women in deltas;
- (2) To identify climate change impact hotspots in deltas where vulnerability will grow and adaptation will be needed;

- (3) To understand the conditions that promote migration and its outcomes, as well as gender-specific adaptation options for trapped populations, via surveys
- (4) To understand how climate-change-driven global and national macro-economic processes impact on migration of men and women in deltas;
- (5) To produce an integrated systems-based bio-physical and socio-economic model to investigate potential future gendered migration under climate change;
- (6) To develop a decision-support process, underpinned by an information-management system, to support identification and implementation of gender-sensitive stakeholder-led adaptation policy choices

In DECCMA, the processes of migration are analysed using survey, participatory research and economic methods. The potential migration of both men and women is recognised and contrasted with other adaptation approaches using an integrated assessment approach. Figure 3 summarises DECCMA’s Work Packages structure, which consists of three key research themes: (i) governance and stakeholders (comprising WP1), (ii) baselines and scenarios (comprising WP2, WP3 and WP4), and (iii) simulations and options (comprising WP5 and WP6). WP1 provides an overall framework of stakeholder engagement, WP2, WP3 and WP4 providing datasets for the integrated modelling, and WP5 and WP6 use this information to test scenarios of adaptation. WP0 provides a framework for the overall management of the project.

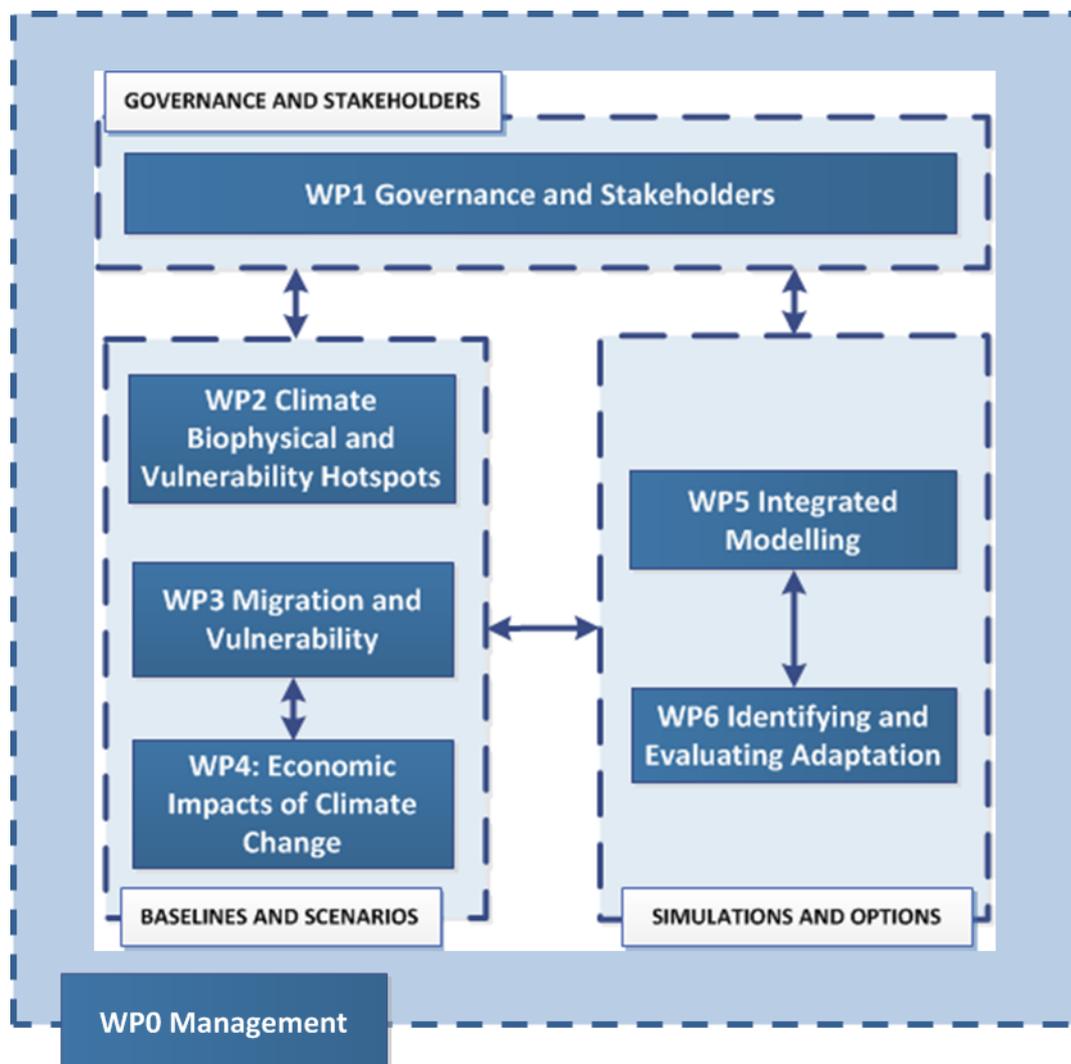


Figure 3: DECCMA Project Structure comprising seven Work Packages, including Work Package 0.

Each WP is split into a number of different Work Tasks (WT), and each WT has a number of deliverables. The Work Tasks are allocated a lead from each study site, who are responsible for

delivering the WT outputs on time and reporting on progress on the deliverables in the WT to the WP leader, who in turn reports to the DECCMA Management Committee (DMC). Table 1 summarises details of the various WPs and WT.

Table 1: Summary of DECCMA Work Plan – Work Packages and Work Tasks.

Work Package (WP)	Work Tasks (WT)
WP0: Management and Communication	<ul style="list-style-type: none"> ○ WT0.1: Governance ○ WT0.2: Monitoring and Evaluation ○ WT0.3: Cross-consortia engagement ○ WT0.4: Communication and dissemination
WP1: Governance, Stakeholder engagement and Scenarios	<ul style="list-style-type: none"> ○ WT1.1: Stakeholder engagement ○ WT1.2: Governance Analysis ○ WT1.3: Barriers to Law and Policy implementation ○ WT1.4: Knowledge sharing between stakeholders across deltas ○ WT1.5: Sustainability and legacy of project
WP2: Vulnerability, hazard and climate change hotspot mapping	<ul style="list-style-type: none"> ○ WT2.1: Develop a conceptual model of current climate change and environmental stress / risk ○ WT2.2: Develop scenarios of climate and socio-environmental change ○ WT2.3: Establish data management protocols and model/data standardizations across the project ○ WT2.4: Production and validation of hazard, vulnerability and risk maps for each delta: updated hotspot mapping ○ WT2.5: Combining bio-physical hazard and socio-economic vulnerability maps under change scenarios: hotspot mapping simulations
WP3: Migration as an outcome and determinant of vulnerability in deltaic populations	<ul style="list-style-type: none"> ○ WT3.1: Analysis of demographic change in the delta ○ WT3.2: Production of migration maps ○ WT3.3: Social survey of households in linked sending and receiving areas ○ WT3.4: Immobility-climate change hotspot mapping ○ WT3.5: History and political economy of resettlement, displacement and abandonment ○ WT3.6: Create rules for the conditions under which migration occurs successfully
WP4: Economic Modelling of the Impacts of Climate Change	<ul style="list-style-type: none"> ○ WT4.1: Construct and calibrate country input-output (IO) tables including the deltas ○ WT4.2: Construct of a global economic model including the delta areas ○ WT4.3: Model Integration for Economic Scenario Development
WP5: To produce an integrated model that assesses adaptation and migration in deltas	<ul style="list-style-type: none"> ○ WT5.1: A preliminary conceptual framework for assessing adaptation and migration in deltas (Fast Track) ○ WT5.2: Finalised conceptual framework for assessing adaptation and migration in deltas ○ WT5.3: Design and validate a prototype integrated model of adaptation and migration in deltas ○ WT5.4: Develop delta-specific integrated models ○ WT5.5: Generic lessons for integrated modelling and adaptation and migration analysis
WP6: Identifying and evaluating feasible and acceptable planned and autonomous adaptations	<ul style="list-style-type: none"> ○ WT6.1: Identify feasible and realistic planned adaptations ○ WT6.2: Social survey of autonomous adaptation at household level ○ WT6.3: Theorise interactions between autonomous household adaptation and planned adaptation ○ WT6.4: Develop criteria to evaluate successful adaptation ○ WT6.5: Evaluate the success of alternative adaptation options ○ WT6.6: Support the implementation of stakeholder-led adaptation policy choices

2.2 Datasets generated and legacy

A Delta Portal GeoNetwork (DPGN) has been established as a means of communicating and sharing spatial data outputs from the DECCMA project and other selected delta research projects. The intended audience comprises project partners, stakeholders and the broader research community, especially those with an interest in delta management around the world. The objective is to make the Delta Portal

available after the DECCMA project ends both as a legacy archive, but also to provide an active interface to research data and geospatial data on global deltas. Hence, this also provides a framework to support broader delta data management and research. As such the portal will be factored into future research projects to support its future development and maintenance, and we will consider adding third party data as available. Hence, the University of Southampton commits to maintain the Delta-Portal beyond the end of DECCMA into the long term.

The DPGN benefits all stakeholders involved in delta research as it links the latest spatial data outputs in a decentralised way. Metadata conforming to ISO standards is shared, and by linking together the appropriate research nodes in this way, unnecessary duplication of effort is avoided. The Delta-Portal can be accessed at: <http://www.delta-portal.net/geonetwork/>. The DPGN is a single node in the broader network of nodes developed and based in the DECCMA partner countries of Ghana, Bangladesh, and India, sharing and disseminating delta research outputs in a similar way. The DPGN is designed to regularly and automatically ‘harvest’ data directly with these other delta research nodes, thus providing a constantly up-to-date, de-centralised online repository of the latest delta research outputs. The DPGN contains relevant spatial data pertaining to DECCMA (Table 2), including the reference datasets (and their relevant standards-compliant metadata), together with details of their licensing and availability for download. Some large datasets will be maintained separately (and available via ftp), but will be referenced through the relevant metadata.

The DPGN is a living database which will continue to develop and evolve.

Table 2: Examples of key data produced by DECCMA that are available on the DPGN.

Data	Description
Delta study areas	Boundary files for the GBM, IBD, Mahanadi, and Volta delta study areas based on the DECCMA study area definition methods
Household surveys	Migrant sending and receiving area surveys for the GBM, IBD, Mahanadi, and Volta delta study areas
Land cover classifications and projections	Land cover classifications (LCCS) for the GBM, IBD, Mahanadi, and Volta delta study areas and projections using the CLUE model
National Agro-Ecological Zoning	National Agro-Ecological Zoning (NAEZ) for the GBM, IBD, Mahanadi, and Volta delta study areas
Climate projections	Climate parameters for the Asian domain of DECCMA
Sea-level rise scenarios	Sea level rise data for the GBM, IBD, Mahanadi, and Volta delta study areas
Mahanadi and Volta coastal engineering	Coastal protection structures identified from Google Earth in the Mahanadi and Volta delta study areas from Frances Dunn
Modelled hydrology	Global water and sediment discharge 1980-2099 at 0.5° resolution for 12 scenarios of environmental change modelled using WBMsed from Frances Dunn
Mahanadi agricultural shocks 2000-2016	Number of breaks in WDRVI’s time series computed from MODIS data, proxying the number of crop failures between 2000 and 2016 at a spatial resolution of 250m from Tristan Berchoux
Mahanadi and Devi catchments elevation change 2045, 2065, 2075	Modelled elevation change in the Mahanadi/Devi river catchment for the years 2045, 2065, and 2075 for one scenario using the CAESAR-LISFLOOD model from Sarah Spinney
Type and frequency of engineered interventions in five selected study deltas	An analysis of the different types of engineered interventions and their frequency was carried out in 5 mid-low populated deltas (Ganges-Brahmaputra-Meghna, Yangtze, Rhine-Meuse-Scheldt, Mekong and Nile) from Amy Welch
Cyclone shelters and cyclones in coastal Bangladesh	Between 1959 and 2010, the number of cyclone shelters and the scale of cyclonic events were correlated in order to observe a precautionary/response approach to protection from Amy Welch
Ranking of hazards within five study deltas	The severity, frequency and impact of hazardous events in five study deltas was analysed, in order to understand which hazards were the most important from (Ganges-Brahmaputra-Meghna, Yangtze, Rhine-Meuse-Scheldt, Mekong and Nile) Amy Welch

3. Contribution to Adaptation Research and Practice

DECCMA's major contribution is as follows:

- Knowledge on adaptation practice in deltas and adaptation needs in deltas (based on biophysical and impact modelling) – and hence where adaptation priorities should be.
- Development of large scale data sets on adaptation practices at the delta scale.
- First transboundary assessment of social vulnerability across the GBM delta (India and Bangladesh).
- Insights into the circumstances under which migration is employed as an adaptation (and for whom it is a sustainable adaptation).
- Knowledge on the policy framework for adaptation and implementation gaps, and spatial and social consequences of this.
- Methodological contributions, for example in a sex-disaggregated household data set that also meant that women and men were questioned separately in male-headed households.
- Large scale inventory approach as an analogue for documenting adaptation as required by the global stocktake under the Paris Agreement.
- Modelling approaches to determine the circumstances that lead to migration or adaptation under climate change in Bangladesh.
- Integrated a gender lens of analysis across diverse work streams – an innovation in adaptation research.
- Assessment of the future of deltas under different climate and socio-economic scenarios and adaptation policy directions.
- Lesser contribution to practice – but we have made contributions to adaptation policy (e.g. the stocktaking for the Bangladesh National Adaptation Plan, and the Odisha State Action Plan on Climate Change).

4. Monitoring and Evaluation (M&E) Indicators and Summary

4.1 Research Generated

Key research findings are as follows:

1. There are different levels of social vulnerability across India and Bangladesh within the transboundary Ganges-Brahmaputra-Meghna delta (comprising the Indian Bengal delta and coastal Bangladesh).
2. The extensive household survey conducted in more than 5000 households in sending areas for migrants (creating an unprecedented data set enabling sex-disaggregated comparison between deltas) highlights similarities and differences in household structure, livelihoods, economy, perceptions of environmental stress, and responses in terms of migration and adaptation across the DECCMA deltas.
3. Deltas play a key role in national economies, with services, trade and transportation comprising 50% of the economy in the Asian deltas and 40% in the Volta delta. The production and transformation of natural resources in the deltas means that climate and environmental change may affect national economies through impacts in the deltas.
4. Present mobility and migration from rural to urban areas is dominated by economic drivers which are exacerbated by environmental change. The nature of migration in deltas also often differs to perceived norms: e.g. in Ghana drought is the main environmental driver of migration across the delta,

whereas conventional thinking is that it is floods and erosion that promote migration, but while dramatic this is more localised along the coast. In the Mahanadi, there is net out-migration from the delta, despite government perceptions that there is more in- than out-migration.

5. Structural and livelihood adaptations are already widespread in the deltas, and provided by governments, non-state actors and households themselves, but more will be required to reduce adverse impacts of future climate change. Our findings show who is adapting and how, and highlight how to promote in situ adaptation as an alternative to migration.

6. There is a sub-optimal policy and implementation framework for migration and adaptation in deltas. In addition, the Bangladesh team noted two key advances as relevant to their context:

- **Mapping climate change hotspots (risks):** Hazard, vulnerability, climate change hotspot (risk) mapping have been done to understand the magnitude and location of impacts and where vulnerability will grow, and adaptations will be required. Hazard maps have been conventionally used in analyzing the impacts of climatic or anthropogenic drivers on hazards (i.e. identifying areas most at risk from environmental change) and typically considered in adaptation studies. However, the importance of risk maps in adaptation studies has grown in Bangladesh and is now widely considered more useful in identifying current and future climate hotspots. In DECCMA study, we produced baseline hazard and risk maps and investigated how risks might change in the future. We calculated where risks will grow substantially in the future and analyzed adaptation deficiencies and adaptation measures that will be most effective in reducing components of risks for each hazard. These analyses have already been found very useful by key stakeholders.
- **Landcover mapping using FAO LCCS:** The Land cover mapping for DECCMA study area for the year 2015 was carried out in conjunction with FAO-BD land cover mapping for the whole country using FAO LCCS. The DECCMA Bangladesh Team worked in the National Land Representation System (NLRP) with the Department of Forestry and FAO Bangladesh. DECCMA conducted the analysis for the 19 districts of the coastal zone using 28 land classes, which made substantial contribution to the methodology, and a total 33 land classes used for the entire country. Besides, land cover change analysis was also done by DECCMA from 2005 to 2015. BUET and CEGIS worked as members of the Expert Committee and were resource persons in several training programmes and will continue to do so in future trainings as expert committee members.

4.2 Stakeholder Engagement

Table 4 summarises the various stakeholder engagements in DECCMA, including the total number of attendees (disaggregated by sex where possible) in each delta: the Volta, Ganges-Brahmaputra-Meghna (GBM), Indian Bengal Delta (IBD) and Mahanadi delta.

Table 3: Summary of the list of DECCMA stakeholder engagements.

Delta	Level	Round	Event	Date	Attendees	Male	Female
GBM	District		District Level Stakeholder Workshop: Khulna	31/08/2015	89	54	35
GBM	National		DECCMA and HI-AWARE Joint Stakeholder Workshop	09/01/2015	43		
GBM	National		1st National Stakeholder Workshop	10/05/2015	63		
GBM	National		DECCMA and HI-AWARE Joint Stakeholder Workshop	09/07/2015	45	38	7
GBM	District		District Level Stakeholders Workshop in Ramgoti, Lakshmipur, Bangladesh	18/11/2015	117	88	29

GBM	National		Workshop on Exchange of Interim Findings of DECCMA Research on Climate Change Adaptation and Migration	24/08/2016	52	48	4
GBM	National		National Stakeholders Workshop	07/02/2018	60	50	10
IBD	District		South 24 Parganas IBD	14/06/2017	17	12	5
IBD	District	2nd	Canning, South 24 Parganas	21/09/2015	30	n/a	n/a
IBD	national		Kolkata (both deltas)	29/11/2014	38		
IBD	District	1st	North 24 Parganas	22/01/2015	118		
IBD			IBD second round	10/11/2016	30	24	6
Mahanadi	District		Bhadrak, Mahanadi	12/09/2017	33	23	10
Mahanadi	District	2nd	Puri Mahanadi	03/03/2017	40	26	14
Mahanadi			Bhubaneswar Mahanadi	09/08/2016	35	30	5
Mahanadi	State		Bhubaneswar	07/02/2015	52	na	na
Mahanadi	District		District level stakeholder workshop, Kendrapara district, Mahanadi	01/09/2015	43		
Volta	District		Sogakope	14/09/2016	28	23	5
Volta	national		Accra	20/10/2016	34	24	10
Volta	District		Sogakope	28/05/2015	69	45	24
Volta	District		Ningo-Prampram	04/09/2015	23	14	9
Volta	national		Accra	06/05/2014	60		
Volta	District		Ketu North	11/09/2015	31		

The Ghana team noted the imperative of “Massive stakeholder engagement right from the beginning of the project through to the end of it. This has helped to create awareness among the research communities about the DECCMA project. Thus the project still maintains some level of relationship with stakeholders engaged.”

Throughout the lifespan of the project a number of key impacts have arisen through stakeholder engagement:

4.1.1 Raising the profile of delta residents with parliamentarians in Ghana

Rates of coastal erosion in the Gulf of Guinea are significant, and up to 8m per year in places. In areas where there is no structural adaptations in place, the rapidly eroding coastline creates pressures for delta residents whose houses and land are regularly flooded and ultimately lost. The DECCMA Ghana team, under the leadership of Professor Kwasi Appeaning Addo, has been using drones to monitor coastal erosion and flooding in the Volta delta. Residents of affected districts have long lobbied for coastal protection or resettlement options. The powerful visual imagery of flooding has been sufficient to motivate the Keta MP to take up this issue in the District Assembly, where options are currently being considered.

This work has given DECCMA international attention, and has been highlighted in features in Canadian Geographic, Scidev.net, and other international news agencies (e.g. foreignpolicy.net) and presented to the Forum of the Standing Committee on Finance of the UNFCCC in September 2016. It also catalysed the development of a handbook to be used by schools in Ghana on the use of drones.

4.1.2 Inputs to the Coastal Development Authority Bill, Ghana

Addo Parliamentarian Honourable Clement Humado is the chair of the DECCMA Ghana National Expert Advisory Group and a member of the Parliamentary Select Committee on Environment, Science and Technology.

The Bill seeks to establish a Coastal Development Authority to provide a framework for enhanced and coordinated economic and social development of the districts and communities within the coastal areas of Ghana, which includes the Volta delta.

In a submission, Honourable Humado noted that, since there are experts in coastal development and population studies in the tertiary institutions (specifically the University of Ghana), they should be included on the Authority's Board. 4(1)(i) of Act 961 (Coastal Development Authority), assented on January 2, 2018, states the requirement that "two persons with relevant expertise in coastal development should be nominated as members of the board".

4.1.3 Inputs to the Odisha State Action Plan on Climate Change 2018-23, India

As a result of engagement with the Chilika Development Authority, the DECCMA India team was invited to provide comments into the second Odisha State Action Plan on Climate Change 2018-23. Whilst gender was minimally considered in the original plan, as a result of DECCMA's inputs and research findings the revised plan now contains a separate chapter on gender.

Through its engagement with government, DECCMA has also provided inputs on climate change perspectives to the draft versions of the National Policy on Empowerment of Women 2016 and highlighted the importance of delta out-migration. Prior to DECCMA's research it was thought that migration was only taking place from the western drought-prone districts. Previously it was assumed that, since the delta is fertile land, it was attracting in-migration for agriculture which is an erroneous assumption.

4.1.4 Partnership with the State Department of Environment, West Bengal, India

As a result of liaison and interaction as part of the DECCMA India stakeholder engagement process, the West Bengal State Department of Environment was significantly convinced of the importance of vulnerability, migration and adaptation to jointly host a Stakeholder Workshop with DECCMA (and this brought increased attendance of other government departments).

4.1.5 Media interest in India

There was widespread media interest in DECCMA. Sahana Ghosh attended the first IBD stakeholder workshop in November 2014 and followed our work online through Twitter and the DECCMA website. In September 2018 she visited JU and expressed interest in writing a story on our research in IBD. She conducted interviews in the delta during late October and attended the final IBD stakeholder workshop on 2nd November 2018. Based on our research findings and her interviews in the delta, an article is likely to be published by the end of December 2018 as a part of Mongabay India. Thomson Reuters journalist Manipadma Jena also visited the IBD with the support of the DECCMA India team and wrote a piece "[As climate threats drive migration, Indian women find opportunities](#)" that was widely distributed through the Reuters newswire.

4.1.6 Adaptation inventory and input to the Bangladesh National Adaptation Plan

DECCMA Bangladesh has produced a national inventory of documented climate change adaptations in Bangladesh. A more detailed inventory of adaptations in the 19 coastal districts has also been prepared. The inventory provides structured information on the spatial distribution of adaptations, thematic sectors (Disaster Risk Reduction, Water Resource Management, Coastal Zone Management, agriculture, etc.), providers (GoB, NGOs, private sector, etc.), timing (e.g., reactive, anticipatory), shocks and stresses (e.g. cyclone and storm surges, flood, drought, salinity, erosion, etc.), the objectives of adaptation (e.g., disaster risk reduction, reduction of socio-economic vulnerability and building

ecosystem resilience), etc. The inventory is an important step towards aiding proper evaluation of practiced adaptations that may inspire policy makers to devise effective adaptation measures to combat climate change in Bangladesh. Such an inventory is useful for informed decision-making, drawing upon experiences from successful adaptations as well as considering barriers to adaptations; ensuring effectiveness and future contribution of small to large scale interventions; facilitating improvements and upscaling of adaptations in response to changing climatic threats and socio-economic pressures; and ensuring institutional coordination and better utilization of adaptation funds.

4.1.7 Informing revision of the Bangladesh Climate Change Strategic Action Plan

Engaging with the BCCSAP updating and NAP process: DECCMA Bangladesh Team has had a meeting with the chief consultant of the BCCSAP (which is the main guiding document for climate change developed in 2009) and shared all the important research documents (e.g. journal papers, working papers, Delta briefs, policy briefs, etc.). The DECCMA research has been highly appreciated and is expected to make concrete contributions to updating the BCCSAP. Engagement has also started with the NAP process in Bangladesh, which is set to kick off soon.

4.1.8 Engagement with the Bangladesh Planning Commission

DECCMA has further strengthened the engagement of BUET with the General Economics Division (GED) of the Planning Commission. Results of hazard simulation and appraisal of different interventions in terms of minimizing hazard and improving socio-economic outcomes have been shared with GED at the Planning Commission. An underlying objective has been to investigate how useful different policy measures envisioned in the Bangladesh Delta Plan (BDP 2100) will be in terms of their stated objectives. The relationship developed with the Planning Commission has opened opportunities for continued engagement beyond the life of DECCMA and making substantial impact on the national planning process.

4.1.9 DECCMA migration findings presented to the G7

Findings on stated reasons for migration were presented to the G7 in late 2017 by UNESCO World Water Assessment Programme in a meeting organized by the Italian Ministry of Foreign Affairs around climate change, fragilities and conflicts.

4.2 Capacity Building

DECCMA provided different types of funding for postgraduate students: full funding for PhD, part funding for PhD, full funding for Masters, part funding for Master e.g. funding for fieldwork component of studies. Ad hoc capacity building, for example in gender-sensitive methods and analysis, was also provided through our whole consortium workshops. Some of our capacity building highlights include:

- 17 women and 16 men registered for postgraduate degrees
 - In India, the long time period required to successfully register caused delays for some students, meaning that they were not able to finish their degrees within the lifetime of DECCMA
- Specialist training has been run under several themes, from land cover mapping (by FAO), to input-output economics (by the BC3 Basque Centre for Climate Change), and the development of Bayesian network models and integrated assessment models (by the University of Southampton). Exchange and field visits have also taken place among all the research teams
- Actively encouraged young researchers, for example through poster competitions at whole consortium workshops (with prizes of money to attend an international conference)
 - Over two thirds of conference papers by the DECCMA India team were presented by early career researchers.

- DECCMA team members have won competitive funding to develop their research skills, either through full time studies, summer schools, or exchange visits. Mohammad Rashed Bhuiyan was awarded a Commonwealth Shared Scholarship to study for an MSc in Sustainable Development at the University of Exeter in the 2018-19 academic year. Shouvik Das was selected to participate in the Hugo Observatory EDGE Summer School on environmental changes and migration. DECCMA India coordinator Sumana Banerjee won an IDRC Climate Change Leaders Award and spent three weeks in the UK to develop her project management and research communication skills to impact climate change research in India.
- DECCMA PhD graduates are continuing their research careers: for example Dr Kwame Owusu Daaku is an assistant professor at the University of West Florida; Dr Gregory Cooper has a postdoctoral research position at the School of African and Oriental Studies, University of London; and Dr Yaw Atiglo has a postdoctoral research position at the University of Ghana working on the Building Research Capacity for Sustainable Water and Food Security in sub-Saharan Africa (BRECCIA).
- Mohammad Rashed Bhuiyan was awarded a Commonwealth Shared Scholarship to study for an MSc in Sustainable Development at the University of Exeter in session 2018-19 and said in an email “I am so grateful to you all for your encouragement and guidance during DECCMA study and this DECCMA research and other research experiences helped me a lot in gaining this award.”
- Follow on research findings builds on DECCMA research findings and partnerships:
 - “Role of new migrant populations in planning for safe and sustainable cities, focusing on Chattogram” (University of Exeter with University of Dhaka DECCMA partners and is funded by UK ESRC and DFID under their Development Frontiers programme). Further global research on the fundamental relationship between migration, mobility and sustainability is being funded by an international research programme on Transformations to Sustainability and involves partners from Exeter, Dhaka and Ghana with international partners in the US, Sweden, Netherlands and Belgium.

5. Intended and Actual Research Outcomes

5.1 Theory of Change (ToC)

The use of ToC within DECCMA was somewhat suboptimal. There was no ToC at proposal stage – instead it was developed following the programme-wide commitment at the first ALR in 2015. As a result, we did not have optimum opportunity to use it to shape our proposal. When the RiU team was in place later in the project’s lifespan the ToC was revised in 2016.

As a result of not having a ToC from the start of the project, we probably did not systematically take enough opportunities to monitor and reflect on the ToC and make course corrections. The RiU team referred to it, and implicitly used it and referred to it in whole consortium meetings through discussions that revisited some of the assumptions and pathways to impact, focusing on the desired outcomes of the ToC rather than the ToC itself. Ultimately we felt that to evaluate the extent to which it worked reflects not the ToC itself as much as the (late) adoption of a ToC within the project.

5.2 Project Objectives

This section outlines DECCMA’s objectives and the publications recording findings and evidence relating to them:

- **To understand the governance mechanisms that promote or hinder migration of men and women in deltas**
- **To identify climate change impact hotspots in deltas where vulnerability will grow and adaptation will be needed**

- What are the implications of sea-level rise for a 1.5°C, 2°C and 3°C rise in global mean temperatures in vulnerable deltas?
- Biophysical and socioeconomic state and links of deltaic areas vulnerable to climate change: Volta (Ghana), Mahanadi (India) and Ganges-Brahmaputra-Meghna (India and Bangladesh)
- Large-Scale Transdisciplinary Collaboration for Adaptation Research: Challenges and Insights
- **To understand the conditions that promote migration and its outcomes, as well as gender-specific adaptation options for trapped populations, via surveys**
- **To understand how climate-change-driven global and national macro-economic processes impact on migration of men and women in deltas**
- **To produce an integrated systems-based bio-physical and socio-economic model to investigate potential future gendered migration under climate change**
 - A Biophysical and Socioeconomic Review of the Volta Delta, Ghana
 - Resilience to hazards: rice farmers in the Mahanadi Delta, India
- **To conceptualise and evaluate migration within a wide suite of potential adaptation options at both the household and delta level**
 - Mobility, displacement and migration and their interactions with vulnerability and adaptation to environmental risks
- **To identify feasible and desirable adaptation options and support implementation of stakeholder led gender-sensitive adaptation policy choices**
 - Changes of shrimp farming in southwest coastal Bangladesh.

There were also new opportunities/changes that arose during the life of the project, which were not included within the original proposal/plan but that we managed to exploit. The following examples illustrate some of these opportunities:

- The adaptation WIREs Climate Change paper by the WP6 team which has emerged from one of our write-shops, put our DECCMA findings in the context of the Paris Agreement Global Stocktake, and is attracting significant interest.
- The Ghana team's participation and presentation of the Volta delta findings at the 'Regional Workshop on 'Migration and Rural Development' held in Ghana, 20-24 November. This workshop created an opportunity to share DECCMA Ghana project findings to FAO partners in Ghana and within the Africa region, which the team has hitherto not engaged with during the lifespan of the project.
- Scaling up of research in Mahanadi delta – With reallocation of Egypt's funds, the India team were able to scale up research under Work Packages 3, 4, 5 and 6 with additional manpower and resources. Besides this, District Level Stakeholder workshops and meetings with communities at the Block level could also be accomplished.
- Joint GBM Activity across Bangladesh and West Bengal, India – As part of the bid for Reallocation of Egypt's Funds, JU and BUET bid for funding of Joint-GBM activities. However, the funding was not approved. But the two country teams did not stop working just because it was not funded. Presentations were made at the European Geosciences Union (EGU 2017) and CARIAA's 3rd Annual Learning Review (2017) and a paper on assessment of levels of sub-district level social vulnerability in the transboundary Ganges-Brahmaputra-Meghna delta in Bangladesh and India is presently being finalised.

- Workshop on Introduction to Qualitative Research – Dr Colette Mortreux of University of Exeter had visited IBD for fieldwork in resettlement and facilitated a workshop on qualitative research at Jadavpur University on 26 February 2016. This workshop had 61.5% female participation and students from various departments attended it. Apart from discussing the various processes of Qualitative Workshop, this brought forth the benefits of cross-country collaboration.
- Fieldwork to the Mahanadi delta in June 2018 – Four students from the University of Southampton partnered with students from Jadavpur University in Kolkata to collect data for their dissertations as part of an MSc in Sustainability. This also provided opportunity for cultural exchange and sharpening of understanding of qualitative research.
- Quebec Science journalists' visit – Journalist Sarah R Champagne and photographer Michel Huneault visited IBD (both the sending and receiving areas) conducting interviews to gather a perception of migration in the delta. Their work has recently been published in Quebec Science. This visit was scheduled right after the fieldwork (mentioned above) which enabled them to interact with a wide group of researchers and also gave the local team with the opportunity to learn from the journalists' way of interviewing and work.

5.3 Consortium Workplan

The work plan was established early in the project development process based upon the initial interpretation of the key objectives of the DECCMA project. The work plan was initially developed to house a series of specified deliverables and associate these with a team and leadership. This process was intended to be flexible and it was the intention of the project that there would be modification and development of the process through the lifetime of the project. There were many minor modifications to the delivery timetable as might be expected. Below are listed the key modifications that resulted in changes in the critical pathway or overall management of the project

i) Development of Work package 0, Project Management. This work package was developed in order to (i) house a series of project related administrative activities and deliverables such as reporting (ii) To allow for a clearly line of management across the project. Its development was highly effective in allowing for a strategic approach to management of a complex project and included the implementation of monthly on-line reporting and work between the country coordinators

ii) A key area of work plan development and modification came with delays in accessing and gathering household data. There were a series of data delays that caused substantive movements in deliverables associated with WP2 (Hotspot and Vulnerability, Hazard and Risk), WP3, Migration work, WP4, Economic modelling and WP5 which managed the development of the overall approach to integration and modelling. This required an extension of processes whilst delay in data access, processing and analysis occurred across a number of sectors.

iii) The engagement with the stakeholders also experienced some delays across each of the countries for a diverse range of reasons. The process of writing up and analysing of the data was often delayed often by a need for greater capacity building in this field. Consequently there was a shift in the timings of the stakeholder engagement which was accommodated by the flexibility of the overall system and a final series of workshop had to be cancelled due to a lack of resource

5.4 Research-into-Use

Our approach to RiU was as follows:

- Targeted, tailored and timely communications of user-relevant information (enabled by an understanding of our stakeholder landscape – actors and interests)

- Targeted, tailored and timely communications are more likely to be put into practice than general information sharing (where it would be relying on the right person at the right time happening to have an interest in findings presented as we see them)
- Working with the subset of where it is possible/likely that we can have influence, within the set of where we could have influence
- An approach of “Strategic opportunism” - when members of the central RiU team have been able to identify open doors (and we have worked to identify those open doors, e.g. through increasing visibility, relationship building etc)
- Linked to the above, in addition to targeted efforts, trying to grow a presence as a key source of information on migration and adaptation in deltas (e.g. putting out accessible briefing notes of our academic publications; commenting on policy processes, strategy development etc)

A number of key elements stand out as important in making our RiU successful:

- Building new and cementing existing relationships (for example with GED in Bangladesh)
- Flexibility: keeping on top of opportunities, e.g. policy windows, public debates (increased visibility helps with this as people know to approach us when relevant, e.g. UNESCO WWAP where our findings were presented to a meeting of the G7)
- Effective communications: wide range of outputs, visually appealing outward-facing publications (e.g. delta briefs had excellent feedback), blogs and photo stories (regular posting and new website had 1000+ hits per month)

The challenges that characterise DECCMA’s RiU journey were as follows:

- “Late start” – DECCMA did not have RiU expertise in country early enough on to find these opportunities and build links, and being able to unpack “stakeholders” and identify who had real interest and influence (as opposed to who should have interest and influence) was a challenge.
- It is not always easy to find the right expertise – adverts in for positions in Southampton and Bangladesh generated few appropriate applicants, showing that it is difficult to find people with the right skill set for RiU.
- In such a big project it was very difficult to keep on top of who was doing what, and who had what findings. That meant it wasn’t always possible to effectively communicate findings to non-academic audiences. Coordination within remote teams is also always difficult
- There was difficulty in explaining what RiU is – we have the research inputs, but also require the stakeholder landscape and connections from within the team. They have been hard to elicit, not because they do not, but because our team members did not always identify them as inroads to RiU outcomes, so did not necessarily make us aware of them
- Lack of products in the early years. Once we had the delta briefs – so something with which to approach people, we were able to try individual approaches to key people who may have interest (from our stakeholder lists). Towards the end the outputs have come so thick and fast that it is difficult to make the most of communicating them.

Something that we have learned and will do differently in future projects is:

- With RiU expertise in place from the start, the team could have made more of an effort to identify core stakeholders and keep them updated (as in producing regular written updates) – we had a good set up to do this because we had a work package dedicated to stakeholder engagement but we didn’t start RiU from the beginning

6. Risk Assessment and Management

As a significant investment for our funders on the project, recognising early on that risks to delivery of project outputs are clearly assessed, evaluated, and managed was crucial. To do this, a clear procedure (through a dynamic risk register that is updated at least monthly) has been agreed and set-up at the start of the project for all Member institutes to be clear about how to identify, evaluate and manage risks to the success of DECCMA. Risk assessment and management were undertaken through three key elements:

- *Risk identification* – identify risks through monthly reports and 6 monthly meetings and reports registering risks.
- *Risk evaluation* – the Work Package Leads evaluate the impact of the risks on the project identified through the monthly reporting process. This risk evaluation is discussed at the monthly DMC meetings.
- *Risk management* – the DMC then identifies risk mitigation / remedial actions for the risk and communicates it through the WP Leads AND the country Member institute. Any risks that are considered unmanageable by the DECCMA consortia were escalated to our IDRC/CARIAA Programme Officer.

Central to the assessment and management of risks are the internal monthly reporting (see Section 1.1). As part of the reporting, risks and issues (e.g., related to funding, communication, staffing, partners, data, access to study site, etc.) are also registered monthly for each Work Task (using Google Forms), by asking each Work Task Leads to report on whether: (1) anything has occurred that risks delivery of project outputs or there is an issue that could develop into a risk in the future, (2) the risk or issue identified will affect timeline for delivery, and, (3) the change in timeline (time slippages and delays) is significant (i.e., greater than one month). Work Package leads will then compile all Work Task reports (under their Work Package) and reflect on any risks that would delay successful delivery of the WP/impact negatively on DECCMA. This is identified as soon as possible at the monthly DMC meetings to identify mitigation/remedial actions.

As part of this, change in staff or research are managed through identifying the extent of change and implementation of appropriate change management measures implemented throughout the lifetime of the project. These are summarised and illustrated as below.

- **Staff Change:** temporary or permanent change of staff (*due to change in jobs, moving location, retirement, redundancy, illness etc.*). This was managed through making sure that all departing staff leave a comprehensive summary of their progress to-date as an audit of their work, which allows a new member of staff to pick up from that point. Where possible, departing members of staff are also requested to be available to handover their role to the new incumbent, and work with them for a defined period of time to enable them to acclimatise. This has been dealt in two key areas:
 - *Key Staff:* identified as staffs with a high level of responsibility and leadership within the project (e.g., Key Staff at consortium level include: all who sit in the DMC; Work Task Leads; Consortium Coordinator). These are requested to identify a deputy who can temporarily replace them in their absence; and for any proposed change in key staff to be notified to the DMC at the very earliest possible, to enable a smooth change process to be considered; and such matters are treated as private and confidential within the DMC.
 - *Staff:* For staffs who occupy positions not listed above, any change in their working circumstances or ability are requested to be reported to their national lead at the earliest convenience. Such staff changes are also subject to the reporting, categorisation and management processes listed below.

- **Research Change:**

- *Change Reporting and Categorisation:* All change (actual or expected) are reported through two main routes, either i) by Work Task Leads (or deputy) in the monthly reporting forms, or ii) by the WPL (or deputy) who are responsible for highlighting issues and passing them on to the DMC UK and if necessary the DMC. Any such change is expected to be flagged by the WPLs in their monthly reports. For reporting purposes, such changes are categorised into two:
 - *Minor:* e.g., partner falling behind by a couple of days, or changes to travel plan dates etc.
 - *Major:* e.g., partner failure/walk out, change of funding allocation due to major changes, major risk unfolding and causing significant delays
- *Change Management:* in the first instance the DMC UK will make a decision whether a change is a minor or major change:
 - For *minor* changes (i.e., causing a delay of <1 month): These will be discussed and actions minuted at the weekly DMC UK meetings and decisions reported to the monthly DMC for information. Further action can be recommended by the DMC if considered necessary at the monthly DMC meetings.
 - For *major* changes (i.e. causing a delay of >1 month, or missing a milestone): DMC UK will discuss impact on overall project progress and will categorise into high/med/low risk.
 - i) For *low* risk (e.g., no significant impact on the long-term delivery of the WP), it is dealt with by the DMC UK in collaboration with the WPL.
 - ii) For *medium* risk (e.g., possible disruption to delivery of milestones of >1 month), DMC UK instructs the appropriate Member to discuss with the WPL. This is immediately referred to the DMC to agree how to manage the situation and identify solutions.
 - iii) For *high* risk (i.e., jeopardising delivery of entire WP or delay by >3 months), the affected Member discusses with the WPL. The issue is communicated to the DMC UK, the DMC and the Member and WPL communicate with the IDRC/CARIAA Project Officer on how to address this risk.

Annexes

Annex 1: DECCMA Book

DOI will be available in January 2019

Annex 2: Climate change, migration and adaptation in deltas: Key findings from the DECCMA project

<https://generic.wordpress.soton.ac.uk/deccma/2018/10/29/new-release-climate-change-migration-and-adaptation-in-deltas-key-findings-from-the-deccma-project/>

Annex 3: DECCMA List of Publications

- Adger, W.N., Safra de Campos, R. and Mortreux, C. 2018. Mobility, displacement and migration and their interactions with vulnerability and adaptation to environmental risks. In McLeman, R and Gemenne, F. eds. *Routledge Handbook of Environmental Displacement and Migration*. Routledge, 438p.
- Adger, W. N. and Fortnam, M. 2018 Interactions of migration and population dynamics with ecosystem services. In Schreckenber, K., Mace, G. and Poudyal, M. (eds). [Ecosystem Services and Poverty Alleviation: Trade-offs and Governance](#). Routledge: London, 77-93.
- Ahsan, M.S., Islam, M.A., Rahman, M.M. and Rahman, M.R. 2017. [Shrimp farmers' competence and training needs on climate change adaptation. A case study from southwest coastal Bangladesh](#). Proceedings of the International Conference on Climate Change 1, 1-9.
- Akber, M.A., Islam, M.A., Ahmed, M., Rahman, M.M., and Rahman, M.R. 2017. [Changes of shrimp farming in southwest coastal Bangladesh](#). *Aquaculture International* 25(5), 1883-1889.
- Appeaning-Addo, K., Jayson-Quashigah, P-N., Codjoe, S.N.A. and Martey, F. 2018. [Drone as a tool for coastal flood monitoring in the Volta Delta, Ghana](#). *Geoenvironmental Disasters* 5, 17.
- Appeaning-Addo, K., Nicholls, R.J., Codjoe, S.N.A. and Abu, M. 2018. [A Biophysical and Socioeconomic Review of the Volta Delta, Ghana](#). *Journal of Coastal Research* 34(5), 1216-1226.
- Arto, I., García-Muros, X. Cazcarro, I., González-Eguino, M., Markandya, A. and Hazra, S. 2019. [The socioeconomic future of deltas in a changing environment](#). *Science of the Total Environment* 648, 1284-1296.
- Barnett, J. and Adger, W.N. 2018. [Mobile worlds: Choice at the intersection of demographic and environmental change](#). *Annual Review of Environment and Resources* 43, 245–65.
- Brown S., Nicholls R.J, Lázár A., Sugata H., Appeaning Addo K., Hornby D.D., Hill C., Haque A., Caesar J. and Tompkins E., 2018. [What are the implications of sea-level rise for a 1.5°C, 2°C and 3°C rise in global mean temperatures in vulnerable deltas?](#) *Regional Environmental Change* 18(6), 1829-1842.
- Cazcarro, I., Arto, I., Hazra, S., Bhattacharya, R.N., Adjei, P.O-W., Ofori-Danson, P.K., Asenso, J.K., Amponsah, S.K., Khondker, B., Reihan, S. and Hosser, Z. 2018. [Biophysical and socioeconomic state and links of deltaic areas vulnerable to climate change: Volta \(Ghana\), Mahanadi \(India\) and Ganges-Brahmaputra-Meghna \(India and Bangladesh\)](#). *Sustainability* 10(3), 893.
- Cooper, G., and Dearing, J., 2018. [Modelling future safe and just operating spaces in regional social-ecological systems](#), *Science of the Total Environment*.
- Cundill, G., Harvey, B., Tebboth, M., Cochrane, L., Currie-Alder, B., Vincent, K., Lawn, J., Nicholls, R.J., Scodanibbio, L., Prakash, A., New, M., Wester, P., Leone, M., Morchain, D., Ludi, E., DeMaria-Kinney, J., Khan, A. and Landry, M.E., 2018. [Large-Scale Transdisciplinary Collaboration for Adaptation Research: Challenges and Insights](#). *Global Challenges*.
- Duncan, J. M., E. L. Tompkins, J. Dash, and B. Tripathy. 2017. [Resilience to hazards: rice farmers in the Mahanadi Delta, India](#). *Ecology and Society* 22(4), 3.
- Dunn, F.E., Nicholls, R.J., Darby, S.E., Cohen, S., Zarfl, C. and Fekete, B.M. 2018. [Projections of historical and 21st century fluvial sediment delivery to the Ganges-Brahmaputra-Meghna, Mahanadi and Volta delta](#). *Science of the Total Environment* 642, 105-116.
- Fernandes, J.A., 2018. [Chapter 13: Climate change impacts, vulnerabilities and adaptations: Southern Asian fisheries in the Arabian Sea, Bay of Bengal and East Indian Ocean](#). In Barange, M., Bahri, T., Beveridge, M., Cochrane, K., Funge-Smith, S., Poulain, F. (Eds.). *Impacts of Climate Change on fisheries and aquaculture: Synthesis of current knowledge, adaptation and mitigation options*. *FAO Fisheries Technical Paper* 627. Rome, FAO.

- Ghosh, A.K., Banerjee, S and Naaz, F. 2018. [Adapting to climate change-induced migration. Women in the Indian Bengal delta](#). Economic and Political Weekly 53(17).
- Hossain, M.A.R., Ahmed, M., Ojea, E. and Fernandes, J.A. 2018. [Impacts and responses to environmental change in coastal livelihoods of south-west Bangladesh](#). Science of the Total Environment 637-638, 954-970.
- Hossain, M.A.R., Das, I., Genevier, L., Hazra, S., Rahman, M., Barange, M. and Fernandes, J.A. 2018. [Biology and fisheries of Hilsa shad in Bay of Bengal](#). Science of the Total Environment 651(2), 1720-1734.
- Islam, M.A., Akber, M.A., Ahmed, M., Rahman, M.M. and Rahman, M.R. 2018. [Climate change adaptations of shrimp farmers: a case study from southwest coastal Bangladesh](#), Climate and Development.
- Janes, T., MacGrath, F., Macadam, I. and Jones, R. 2019. [High-resolution climate projections for South Asia to inform climate impacts and adaptation studies in the Ganges-Brahmaputra-Meghna and Mahanadi deltas](#). Science of the Total Environment 650(1), 1499-1520.
- Kebede, A.S., Nicholls, R.J., Allan, A., Arto, I., Cazcarro, I., Hill, C.T., Hutton, C.W., Kay, S., Lázár, A.N., Macadam, I., Fernandes, J.A., Palmer, M., Suckall, N., Tompkins, E.L., Vincent, K. and Whitehead, P.W., 2018. [Applying the global RCP-SSP-SPA scenario framework at sub-national scale: A multi-scale and participatory scenario approach](#). Science of the Total Environment 635, 659-672.
- Khan, S., Sinha, R., Whitehead, P., Sarkar, S. Li, J. and Futter, M.N. 2018. [Flows and sediment dynamics in the Ganga River under present and future climate scenarios](#). Hydrological Sciences Journal 63(5), 763-782.
- Khan, M.W.R., Akber, M.A., Islam, M.A., Rahman, M.M. and Rahman, M.R. 2018. Assessment of ecosystem service value in southwest Bangladesh. In Selim, S.S., Saha, S.K., Sultana, R. and Roberts, C (eds). The Environmental Sustainable Development Goals in Bangladesh, Routledge.
- Lauria, V., Das, I., Hazra, S., Cazcarro, I., Arto, I., Kay, S., Ofori-Danson, P., Ahmed, M., Hossain, A.R., Barange, M. and Fernandes, J.A. 2018. [Importance of fisheries for food security across three climate change vulnerable deltas](#). Science of the Total Environment 640-641, 1566-1577.
- Li, J., Whitehead, P.G., Appeaning-Addo, K., Amisigo, B., Macadam, I., Janes, T., Crossman, J., Nicholls, R.J., McCartney, M. and Rodda, H.J.E. 2018. [Modeling future flows of the Volta River system: Impacts of climate change and socio-economic changes](#). Science of the Total Environment 637-638, 1069-1080.
- Li, J., Whitehead, P.G., Rodda, H., Macadam, I. and Sarkar, S. 2018. [Simulating climate change and socio-economic change impacts on flows and water quality in the Mahanadi river system, India](#). Science of the Total Environment 637-638, 907-917.
- Morchain, D., Prati, G., Kelsey, F. and Ravon, L. 2015. [What if gender became an essential. standard element of Vulnerability Assessments?](#) Gender and Development 23(3), 481-496.
- Mortreux, C., Safra de Campos, R., Adger, W.N., Ghosh, T., Das, S., Adams, H. and Hazra, S. 2018. [Political economy of planned relocation: A model of action and inaction in government responses](#). Global Environmental Change 50, 123-132.
- Mukhopadhyay, A., Ghosh, P., Chanda, A., Ghosh, A., Ghosh, S., Das, S. Ghosh, T. and Hazra, S. 2018. [Threats to coastal communities of Mahanadi delta due to imminent consequences of erosion-Present and near future](#). Science of the Total Environment 637-638, 717-729.
- Nicholls, R.J., Hutton, C.W., Adger, W.N. and Hanson, S.E. (eds) 2019. Deltas in the Anthropocene. Palgrave.

- Owusu-Daaku, K.N. 2018. [\(Mal\)Adaptation opportunism: when other interests take over stated or unintended climate change adaptation objectives \(and their unintended effects\)](#). *Local Environment. The International Journal of Justice and Sustainability* 23(9), 934-951.
- Pathak, D., Whitehead, P.G., Futter, M.N. and Sinha, R. 2018. [Water quality assessment and catchment-scale nutrient flux modeling in the Ramganga River Basin in north India: An application of INCA model](#). *Science of the Total Environment* 637-638, 201-215.
- Rao, N. and Hans, A. 2018. [Gender and climate change. Emergent issues for research, policy and practice](#). *Economic and Political Weekly* 53(17).
- Rahman, M., Dustegir, M., Karim, R., Haque, A., Nicholls, R.J., Darby, S.E., Nakagawa, H., Hossain, M., Dunn, F.E. and Akter, M. 2018. [Recent sediment flux to the Ganges-Brahmaputra-Meghna delta system](#). *Science of the Total Environment* 643, 1054-1064.
- Rahman Khan, M.W., Akber, M.A., Islam, M.A., Rahman, M.M. and Rahman, M.R. 2018. Assessment of Ecosystem Service Value in Southwest Coastal Bangladesh. In Selim, S.S., Saha, S.K., Sultana, R. and Roberts, C. eds. [The Environmental Sustainable Development Goals in Bangladesh](#). Routledge.
- Saha, D., Hossain, M.S.S., Mondal, M.S. and Rahman, R. 2016. [Agricultural Adaptation Practices in Coastal Bangladesh: Response to Climate Change Impacts](#), *Journal of Modern Science and Technology* 4(1), 63-74.
- Suckall, N., Tompkins, E.L., Nicholls, R.J., Kebede, A.S., Lázár, A.N., Vincent, K., Allan, A., Chapman, A., Rahman, R., Ghosh, T., Hutton, C. and Mensah, A. 2018. [A framework for identifying and selecting long term adaptation policy directions for deltas](#). *Science of the Total Environment* 633, 946-957.
- Tompkins, E.L., Vincent, K., Nicholls, R.J. and Suckall, N. 2018. [Documenting the state of adaptation for the global stocktake of the Paris Agreement](#). *WIREs Climate Change* c545.
- Welch, A.C, Nicholls, R.J. and Lázár, A.N. 2017. [Evolving deltas: Coevolution with engineered interventions](#). *Elementa* 5, 49.
- Whitehead, P.G., Jin, L., Macadam, I., Janes, T., Sarkar, S., Rodda, H.J.E., Sinha, R. and Nicholls, R.J. 2018. [Modelling impacts of climate change and socio-economic change on the Ganga, Brahmaputra, Meghna, Hooghly and Mahanadi river systems in India and Bangladesh](#). *Science of the Total Environment* 636, 1362-1372.
- Whitehead, P., Bussi, G., Hossain, M.A., Dolk, M., Das, P., Comber, S., Peters, R., Charles, K.J., Hope, R., and Hossain, R. 2018. [Restoring water quality in the polluted Turag-Tongi-Balu river system, Dhaka: Modelling nutrient and total coliform intervention strategies](#), *Science of the Total Environment* 633, 946-957.

Working papers

- Adjei , P. O-W., Cazcarro, I., Arto, I., Ofori-Danson, P.K., Asenso, J.K., Codjoe, S.N., Appeaning Addo, K. and Amponsah, S.K., 2018. [Biophysical and Socioeconomic State of the Volta Delta Region of Ghana from the Perspectives of Gender and Spatial Relations](#).
- Allan, A., Hissen, N.F., Ghosh, A., Samling, C.L., Tagoe, C. A., Nelson, W., Mensah, A., Salehin, M., Mondal, Md. S., Spray, C. 2015. [WPI – Stakeholder Mapping Consolidated Fast Track](#).
- Atiglo, Y. and Codjoe, S. 2015. [Migration in the Volta Delta: a review of the literature](#).
- Cazcarro, I. and Arto, I. 2016. [Hybrid \(survey and non-survey\) methods for the construction of subnational/regional IO tables with insights for their construction for Deltaic environments](#).

- Begum, A. 2017. [Review of migration and resettlement in Bangladesh: effects of climate change and its impact on gender roles.](#)
- Bhuiyan, M.R.A and Siddiqui, T. 2015. [Migration in the Ganga-Meghna-Brahmaputra Delta: a review of the literature.](#)
- Chapman, A., Tompkins, E.L., Vincent, K., Day, S. 2016. [A framework for the design and evaluation of adaptation pathways in large river deltas.](#)
- Dey, S., Ghosh, A.K. and Hazra, S. 2016. [Review of West Bengal State Adaptation Policies, Indian Bengal Delta.](#)
- Ghosh, A.K., Hazra, S. and Dey, S. 2016. [Review of national adaptation policies, India.](#)
- Haq, I., Omar, M.A.T., Zahra, Q.A. and Jahan, I., 2018. [Evaluation of Adaptation Policies in GBM Delta of Bangladesh.](#)
- Hazra, S., Cazcarro, I., Arto, I., Bhattacharya, R. 2016. [Biophysical and Socioeconomic State of the Mahanadi Delta Region of India from the Perspectives of Gender and Spatial Relations.](#)
- Hazra, S., Dey, S. and Ghosh, A.K. 2016. [Review of Odisha State Adaptation Policies, Mahanadi Delta.](#)
- Hazra, S., Cazcarro, I., Arto, I. and Bhattacharya, R.N., 2018. [Biophysical and Socioeconomic State of the Indian Bengal Delta Region of India from the Perspectives of Gender and Spatial Relations.](#)
- Hissen, N.F., Allan, A.A., Ghosh, A.K., Salehin, M., Nelson, W. and Mensah, A. 2015: [Report on the 1st Round of Stakeholder Engagement.](#)
- Janes, T. and Macadam, I. 2017. [Selection of climate model simulations for the DECCMA project.](#)
- Khondker, B., Reihan, S., Cazcarro, I., Arto, I. and Hossen, Z., 2016. [Biophysical and socioeconomic state of the Ganges-Brahmaputra-Meghna \(GBM\) region of Bangladesh from the perspectives of gender and spatial relations.](#)
- Lázár, A.N., Nicholls, R.J., Payo, A., Adams, H., Mortreux, C., Suckall, N., Vincent, K., Hazra, S., Amisigo, B.S., Rahman, M., Haque, A., Adger, W.N., Hill, C. 2015. [A method to assess migration and adaptation in deltas: A preliminary fast track assessment.](#)
- Macadam, I. and Janes, T. 2017. [Validation of Regional Climate Model simulations for the DECCMA project.](#)
- Mensah, A., Anderson, K., & Nelson, W. 2016. [Review of Adaptation Related Policies in Ghana.](#)
- Mortreux, C. and Adams, H. 2015. [Setting the scene: national and deltaic migration trends in India, Bangladesh and Ghana.](#)
- Mortreux, C. and Adams, H. 2015. [Setting the scene: climate change and resettlement in context.](#)
- Ncube, S., Hissen, N., Sayan, R.C., Allan, A., Spray, C., Tompkins, E., Suckall, N., Vincent, K., Salehin, M., Ghosh, A.K., Tagoe, C.A., and Nelson, W. 2018. Barriers to climate change adaptation policy implementation.
- Nicholls, R.J., Kebede, A.S., Allan, A.A., Arto, I., Cazcarro, I., Fernandes, J.A., Hill, C.T., Hutton, C.W., Kay, S., Lauria, V., Lawn, J., Lázár, A.N., Macadam, I., Palmer, M., Suckall, N., Tompkins, E.L., Vincent, K. and Whitehead, P. 2017. [The DECCMA Integrated Scenario Framework: A Multi-Scale and Participatory Approach to Explore Migration and Adaptation in Deltas.](#)
- Samling, C.L., Ghosh, A.K., Hazra, S. 2015a. [Resettlement and Rehabilitation: Indian Scenario.](#)
- Samling, C.L., Das, S. and Hazra, S. 2015b. [Migration in the Indian Bengal Delta and the Mahanadi Delta: a review of the literature.](#)

- Suckall, N., Tompkins, E.L., Hutton, C., Lázár, A., Kebede, A.S., Nicholls, R., Vincent, K., Allan, A., Chapman, A, Rahman, R., and Ghosh, T. 2017. [Designing adaptation policy trajectories](#).
- Tompkins, E.L., Suckall, N., Vincent, K., Rahman, R., Mensah, A., Ghosh, T, and Hazra, S. 2017. [Observed adaptation in deltas](#).
- Tompkins, E.L., Suckall, N., Vincent, K., Rahman, R., Mensah, A., Ghosh, T, and Hazra, S. 2017. [Adaptation Inventory](#).
- Vincent, K. 2017. [Transformational adaptation: A review of examples from 4 deltas to inform the design of DECCMA's Adaptation Policy Trajectories](#).
- Vincent, K. and Cull, T. 2015. [DECCMA's approach to the incorporation of gender](#).
- Vincent, K and Cull, T. 2015. [Scoping report on adaptation finance initiatives in Bangladesh, Ghana and India](#).
- Briefs**
- DECCMA, 2018. [Challenges of Governance System in Addressing Climate Change Adaptation Measures in Bangladesh: Gaps, Strengths and Opportunities](#)
- DECCMA, 2018. [Mapping current and future salinity risks. A prerequisite for defining adaptation requirements](#).
- DECCMA, 2018. [Emerging Challenges and Impact of Climate Change and Migration: through the Gender Lens in Bangladesh](#)
- DECCMA, 2018. [The Status of GBM Bangladesh Delta and Future Change in the Economy](#).
- DECCMA, 2018. [Adaptations to Climate Change in Bangladesh: Development of a National Inventory](#)
- DECCMA, 2018. [New insights: climate change, migration and adaptation in the Mahanadi delta](#).
- DECCMA, 2018. [New insights: climate change, migration and adaptation in the Indian Bengal delta](#).
- DECCMA, ASSAR and HI AWARE, 2018. [Understanding migration in India](#).
- DECCMA, 2017. [The Ganges Brahmaputra Meghna Delta: Understanding the Present State of Climate Change, Adaptation and Migration](#)
- DECCMA, 2017. [The Volta Delta: Understanding the Present State of Climate Change, Adaptation and Migration](#)
- DECCMA, 2017. [The Mahanadi Delta: Understanding the Present State of Climate Change, Adaptation and Migration](#)
- DECCMA, 2017. [The Indian Bengal Delta: Understanding the Present State of Climate Change, Adaptation and Migration](#)
- DECCMA and ASSAR, 2017. [Migration: An Opportunity or Threat to Adaptation?](#) PRUNE Research Brief no 1.
- DECCMA, 2016. [Examples of Adaptation in the GBM Delta, Bangladesh](#)
- DECCMA, 2016. [Examples of Adaptation in the Indian Bengal Delta, GBM, India](#)
- DECCMA, 2016. [Examples of Adaptation in the Mahanadi Delta, India](#)
- DECCMA, 2016. [Examples of Adaptation in the Volta Delta, Ghana](#)
- Hazra, S., Cazcarro, I., Arto, I., Bhattacharya, R. 2016. Hazra, S., Cazcarro, I., Arto, I., Bhattacharya, R. 2016. [The economy of the Indian Bengal Delta \(IBD\) Delta](#).

Hazra, S., Cazcarro, I., Arto, I., Bhattacharya, R. 2016. [The economy of the Mahanadi Delta.](#)

Photostories

Ava, S.K., Uddin, M.S., Rahman, A., Hossain, D., Kumar, S., Mira, S.S. and Haque, M.M.E. 2017. [“Life is cruel here”. Stories from forced migrants in Chittagong, Bangladesh.](#)

Banerjee, S., Banerjee, S., Samal, R.N. and Ghosh, T. 2018. ["We need to give our citizens a safe place to stay". How government is relocating coastal communities affected by loss of land in the Mahanadi delta, India.](#)

Banerjee, S., Ghosh, T. and Thakur, S. 2018. [Beekeeping and crab fattening. Alternative livelihoods in the Indian Bengal delta.](#)

Naaz, F., Das, S. and Ghosh, T. 2017. [Living with change. Adapting to climate change in the Indian Bengal delta.](#)

Vincent, K. and Adiku, P. 2017. [To migrate or not to migrate? That is the question. A case of the Volta delta.](#)

Vincent, K. and Banerjee, S. 2018. [The aftermath of Aila. The lingering effects of a tropical cyclone in the Indian Bengal delta.](#)

Vincent, K. 2018. [Masters research in the Indian Bengal delta. Reflections on capacity building opportunities within a collaborative international research project.](#)

Video clips

DECCMA, 2018. [Unpacking resettlement: A journey from Satavaya to Bagapatia](#)

DECCMA, 2018. [Investigating migration and adaptation in the Indian Bengal delta](#)

DECCMA, 2018. [Experiences of working in a consortium](#)

DECCMA, 2018. [Crab-fattening in the Indian Bengal delta](#)

DECCMA, 2017. [Bee-keeping for livelihoods in the Indian Bengal delta](#)

DECCMA, 2017. [Sustainable livelihoods in the Volta delta, Ghana](#)

DECCMA, 2017. [Economic modelling in Bangladesh](#)

DECCMA, 2017. [Winfred Nelson on stakeholder influence and interest in Ghana](#)

DECCMA, 2016. [Out-migration and effects on women in the Mahanadi delta](#)

DECCMA, 2016. [Characteristics of migration in Satjalia Island in the Indian Bengal delta](#)

DECCMA, 2016. [Taking a gender-sensitive approach to research on migration and adaptation](#)

DECCMA, 2016. [Adaptation in Bangladesh and how DECCMA is informing policy processes](#)

DECCMA, 2016. [Coastal monitoring in Ghana with UAVs](#)

DECCMA, 2016. [Volta coastal flooding drone footage \(February 2016\)](#)

DECCMA, 2016. [Working as part of a multi-disciplinary research consortium: DECCMA experiences](#)

DECCMA, 2016. [How DECCMA is investigating climate change and adaptation in Bangladesh](#)

DECCMA, 2015. [DECCMA fieldtrip in the Volta delta, Ghana](#)

DECCMA, 2014. [Deltas in distress \(India\)](#)

DECCMA, 2014. [Climate change impact in the Volta delta](#)

DECCMA, 2014. [Climate change in the GBM delta, Bangladesh](#)

Infographics

DECCMA, 2018. [Gendered migration patterns and effects in the Indian Bengal delta](#)

DECCMA, 2018. [Deltas: Present and Future](#)

Other

[Delta Portal: Data, Information and Knowledge for Deltas](#)

DECCMA, 2018. [Climate change, migration and adaptation in deltas. Key findings from the DECCMA project.](#)

Annex 4: List of DECCMA Participants and Post-Project Destinations

The following tables summarise the list of participants in DECCMA throughout the lifetime of the project and where they went to post-DECCMA.

Northern Team			
	Named Individual	Former Host Institution	Where (Post-DECCMA)
1	Professor Robert Nicholls	University of Southampton	
2	Jonathan Lawn	University of Southampton	BRECCIA Project Manager (Soton)
3	Carolyn Bothe-Tews	University of Southampton	Project Officer (GIZ GmbH)
4	Professor Craig Hutton	University of Southampton	
5	Professor Emma Tompkins	University of Southampton	
6	Dr Natalie Suckall	University of Southampton	
7	Dr Chris Hill	University of Southampton	
8	Dr Fiifi Amoako Johnson	University of Southampton	
9	Professor Steve Darby	University of Southampton	
10	Professor John Dearing	University of Southampton	
11	Professor Sabu Padmadas	University of Southampton	
12	Jason Sadler	University of Southampton	
13	Dr Attila Lazar	University of Southampton	Scientific Director WorldPop/Flowminder (Soton)
14	Dr Sally Brown	University of Southampton	
15	Dr Abiy S. Kebede	University of Southampton	Lecturer (Brunel University London)
16	Dr Frances Dunn	University of Southampton	Postdoc (Utrecht University)
17	Duncan Hornby	University of Southampton	
18	Andrew Harfoot	University of Southampton	
19	Dr Gregory Cooper	University of Southampton	Research Fellow (SOAS University of London)
20	Sarah Jane Spinney	University of Southampton	
21	Dr Tristan Berchoux	University of Southampton	
22	Giorgia Prati	University of Southampton	FAO, Rome
23	Margherita Fanchiotti	University of Southampton	
24	Amy Welch	University of Southampton	
25	Kashif Salik	University of Southampton	

26	Professor Neil Adger	University of Exeter	
27	Dr Ricardo Safra de Campos	University of Exeter	Postdoctoral researcher (University of Exeter)
28	Dr Helen Adams	Kings College, London	
29	Professor Paul Whitehead	University of Oxford	
30	Manuel Barange	FAO (previously PML)	
31	Professor Icarus Allen	Plymouth Marine Labs	
32	Dr Susan Kay	Plymouth Marine Labs	
33	Dr Jose Fernandes	Plymouth Marine Labs	Senior Scientist (AZTI)
34	Professor Anil Markandya	Basque Centre for Climate Change	
35	Dr Inaki Arto	Basque Centre for Climate Change	
36	Dr Ignacio Cazcarro	Basque Centre for Climate Change	
37	Mikel Gonzalez-Eguino	Basque Centre for Climate Change	
38	Dr Jason Lowe	MET Office	
39	Dr Richard Jones	MET Office	
40	Tamara Janes	MET Office	
41	Dr Matt Palmer	MET Office	
42	Dr Chris Roberts	MET Office	
43	Andrew Allan	University of Dundee	
44	Professor Christopher Spray	University of Dundee	
45	Selvaraju Ramasamy	FAO	
46	Dr Eddy De Paw	FAO	
47	Dr Ilaria Rosati	FAO	
48	Mario Bloise	FAO	
49	Craig Beech	FAO	
50	Dr Christelle Vancutsem	FAO	
51	Ane Gaudert	FAO	
52	Gianluca Franceschini	FAO	
53	Dr Katharine Vincent	Kulima Integrated Development Solutions	
54	Professor Ed Carr	Clark University	
55	Dr Kwame Ntiri Owusu-Daaku	University of South Carolina	Assistant Professor (University of West Florida)

Bangladesh Team			
	Named Individual	Host Institution	Where (Post-DECCMA)
1	Professor Md. Munsur Rahman	Bangladesh University of Engineering and Technology (BUET)	Staying with BUET
2	Professor Mashfiqus Salehin	Bangladesh University of Engineering and Technology (BUET)	Staying with BUET
3	Md. Anisur Rahman Majumdar	Bangladesh University of Engineering and Technology (BUET)	
4	Professor Rezaur Rahman	Bangladesh University of Engineering and Technology (BUET)	Staying with BUET
5	Professor Anisul Haque	Bangladesh University of Engineering and Technology (BUET)	Staying with BUET
6	Professor A. Fazal M. Saleh	Bangladesh University of Engineering and Technology (BUET)	Staying with BUET
7	Professor Shahjahan Mondal	Bangladesh University of Engineering and Technology (BUET)	Staying with BUET
8	Mohammed Abed Hossain	Bangladesh University of Engineering and Technology (BUET)	Staying with BUET
9	Rashedul Islam	Bangladesh University of Engineering and Technology (BUET)	Staying with BUET

10	Momtaaz Jahan	Bangladesh University of Engineering and Technology (BUET)	PhD, Virginia Tech University, USA
11	Rubaiya Kabir	Bangladesh University of Engineering and Technology (BUET)	PhD, Australia, University of New South Wales
12	Debanjali Saha	Bangladesh University of Engineering and Technology (BUET)	Staying with BUET
13	Muhammad Shahriar Shafayet Hossain	Bangladesh University of Engineering and Technology (BUET)	Manger R&D, VCube Software
14	Mashrekur Rahman	Bangladesh University of Engineering and Technology (BUET)	PhD, University of Alabama, USA
15	Rabeya Akter	Bangladesh University of Engineering and Technology (BUET)	PhD, University of Ohio, USA
16	Shanjida Noor	Bangladesh University of Engineering and Technology (BUET)	Will sit for BCS exam
17	Meer Ahemed Tariqul Omar	Bangladesh University of Engineering and Technology (BUET)	Senior Assistant Chief, GED
18	Arif Chowdhury	Bangladesh University of Engineering and Technology (BUET)	Will sit for BCS exam
19	Shamrita Zaman	Bangladesh University of Engineering and Technology (BUET)	Moved to UK for Higher Studies
20	Manjurul Hussain Shourov	Bangladesh University of Engineering and Technology (BUET)	Will sit for BCS exam
21	Delowar Hossain	Bangladesh University of Engineering and Technology (BUET)	Will Sit for BCS Exam
22	Mahmida Tul Urmi	Bangladesh University of Engineering and Technology (BUET)	Joining at WARPO project, IWF, BUET
23	Md Aminul Islam Khan	Bangladesh University of Engineering and Technology (BUET)	Continue MSC
24	Anika Tahsin	Bangladesh University of Engineering and Technology (BUET)	RESCUE Project
25	Faisal Mahmood	Bangladesh University of Engineering and Technology (BUET)	Will Sit for BCS Exam
26	Sadmina Razzaque	Bangladesh University of Engineering and Technology (BUET)	RESCUE Project
27	Imtiaz Hossain	Bangladesh University of Engineering and Technology (BUET)	Will Sit for BCS Exam
28	Tansir Zaman Asik	Bangladesh University of Engineering and Technology (BUET)	Continue MSC
29	Dewan Sadia Karim	Bangladesh University of Engineering and Technology (BUET)	Will sit for BCS Exam
30	Nishat Tasnim Priyanka	Bangladesh University of Engineering and Technology (BUET)	Continue MSC
31	Professor Tasneem Siddiqui	Refugee and Migratory Movements Research Unit (RMMRU)	Staying with RMMRU & DU
32	Mohammad Rashed Bhuiyan	Refugee and Migratory Movements Research Unit (RMMRU)	Staying with RMMRU & DU
33	Dr Gobinda Chakraborty	Refugee and Migratory Movements Research Unit (RMMRU)	Staying with RMMRU & DU
34	Mahmudol Hasan Rocky	Refugee and Migratory Movements Research Unit (RMMRU)	Staying with RMMRU
35	Prodip Kumar Das	Refugee and Migratory Movements Research Unit (RMMRU)	Joined BRAC
36	Mohammad Shahidul Islam	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS
37	Mohammad Abdur Rashid	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS
38	Md Waji Ullah	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS
39	Malik Fida A Khan	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS

40	Dr Dilruba Ahmed	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS
41	Dr Maminul Haque Sarker	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS
42	Mr Anil Chandra Aich	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS
43	Mr Abul Kashem Md. Hasan	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS
44	Nasrat Jahan	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS
45	Mir Fahim Shaunak	Center for Environmental and Geographic Information Services (CEGIS)	Staying with CEGIS
46	Dr Nabiul Islam	Bangladesh Institute of Development Studies (BIDS)	Consultant
47	Dr Anwara Begum	Bangladesh Institute of Development Studies (BIDS)	Staying with BIDS
48	Dr Munir Ahmed	Technological Assistance for Rural Development (TARA)	Staying with TARA
49	Dr Hafizur Rahman	Bangladesh Space Research and Remote Sensing Organisation (SPARRSO)	Staying with SPARRSO
50	Mr Zahedul Islam	Bangladesh Space Research and Remote Sensing Organisation (SPARRSO)	Staying with SPARRSO
51	ATM Zakir Hossain	Jagrata Juba Shangha (JJS)	Staying with JJS
52	Dr Selim Raihan	South Asian Network on Economic Modelling (SANEM)	Staying with SANEM
53	Dr Bazlul Haque Khondker	South Asian Network on Economic Modelling (SANEM)	Staying with SANEM
54	Zubayer Hossen	South Asian Network on Economic Modelling (SANEM)	Staying with SANEM
55	Mr Saiful Alam	Water Resources Planning Organization (WARPO)	Joined with IWM
56	Anwar Hossen	Dhaka University	Staying with DU

Ghana Team:

	Named Individual	Former Host Institution	Where (Post-DECCMA)
1	Professor Samuel Nii Ardey Codjoe	Regional Institute for Population Studies (RIPS), University of Ghana	Associate Professor, Regional Institute for Population Studies, UoG
2	Dr Kwasi Appeaning Addo	Department of Marine and Fisheries Sciences, University of Ghana	Director, Institute for Environmental and Sanitation Studies, UoG
3	Gertrude Domfeh (Frimpomaa OWUSU)	University of Ghana	Coordinator, Cities & Climate Change Project, RIPS, UoG. Stakeholder Coordinator, BRECCIA Project
4	Dr Clifford Amoako	Department of Planning, Kwame Nkrumah University of Science and Technology	Lecturer at the Department of Planning, KNUST- Kumasi,
5	Dr Cynthia Addoquaye Tagoe	Institute of Statistical, Social and Economic Research (ISSER), University of Ghana	Research Fellow, Institute of Statistical, Social and Economic Research (ISSER) at the University of Ghana Legon
6	Prosper Adiku	University of Ghana	
7	Dr Barnabas Amisigo	Water Research Institute of the Council for Scientific & Industrial Research (WRI - CSIR)	Senior Research Scientist, CSIR Water Research Institute
8	Dr Benjamin Kofi Nyarko	Department of Geography & Regional Planning, University of Cape Coast (UCC)	Lecturer, Regional Institute for Population Studies, UoG
9	Dr Emmanuel Ekow Asmah	Department of Economics, University of Cape Coast (UCC)	Director, Institute for Oil and Gas Studies

10	Dr Prince Osei-Wusu Adjei	Department of Geography & Rural Development, Kwame Nkrumah University of Science & Technology (KNUST)	Head of Department, Economics Department, University of Cape Coast
11	Dr Joseph Kwadwo Asenso	Ministry of Finance & Economic Planning (MOFEP)	Senior Researcher at Nordic Africa Institute, Uppsala, Sweden.
12	Mrs Francisca Martey	Ghana Meteorological Services Department	Head of Energy, Oil & Gas Unit of the Real Sector of the Ministry of Finance
13	Mr Winfred Nelson	National Development Planning Commission (NDPC)	Senior Meteorologist and Researcher in the Research Department of the Ghana Meteorological Agency
14	Dr Adelina Mensah	Institute for Environmental and Sanitation Studies (IESS)	PhD student at Kwame Nkrumah University of Science and Technology (KNUST)
15	Professor Ofori-Danson Patrick Kwabena	Department of Marine and Fisheries, University of Ghana	Research Fellow at the Institute for Environment and Sanitation Studies (IESS), University of Ghana
16	Mr Philip-Neri Jayson Quashigah	University of Ghana	Associate Professor (Contract) Department of Marine and Fisheries Sciences, UoG
17	Mr Donatus Atiglo	University of Ghana	Final Year PhD Student, UoG
18	Mr Kirk Anderson	University of Ghana	Postdoctoral Position on the BRECCIA Project
19	Jennifer Ayamga	University of Ghana	Final Year PhD Student, UoG
20	Dr Mumuni Abu	RIPS, University of Ghana	PhD Student UoG
21	Mrs Gwendolene Asare-Konadu	RIPS, University of Ghana	Private Practice
22	Ruth Quaye	Institute of Statistical, Social and Economic Research (ISSER), University of Ghana	Private Practice

India Team:

	Named Individual	Former Host Institution	Where (Post-DECCMA)
1	Professor Sugata Hazra	School of Oceanographic Studies, Jadavpur University	
2	Dr Tuhin Ghosh	School of Oceanographic Studies, Jadavpur University	
3	Ms. Sumana Banerjee	School of Oceanographic Studies, Jadavpur University	
4	Professor R. N. Bhattacharya	School of Oceanographic Studies, Jadavpur University	
5	Subhas Acharyya	School of Oceanographic Studies, Jadavpur University	
6	Dr Anirban Mukhopadhyay	School of Oceanographic Studies, Jadavpur University	Working in another project at School of Oceanographic Studies since July 2018
7	Dr Somnath Hazra	School of Oceanographic Studies, Jadavpur University	
8	Amit Ghosh	School of Oceanographic Studies, Jadavpur University	
9	Shouvik Das	School of Oceanographic Studies, Jadavpur University	
10	Subhajit Ghosh	School of Oceanographic Studies, Jadavpur University	Working at Asian Institute of Technology, Bangkok as

			technical staff (research) since April 2018
11	Dr P. G. Diwakar	National Remote Sensing Centre, Dept. of Space, Hyderabad	
12	Dr P. V. Raju	National Remote Sensing Centre, Dept. of Space, Hyderabad	
13	Sunil S Kulkarni	National Remote Sensing Centre, Dept. of Space, Hyderabad	
14	Dr Asish Kumar Ghosh	Centre for Environment and Development, Kolkata	
15	Sukanya Banerjee	Centre for Environment and Development, Kolkata	
16	Farha Naaz	Centre for Environment and Development, Kolkata	
17	Dr Ajit Kumar Pattnaik	Previously Chief Executive of Chilika. Remaining with DECCMA	
18	Sri Susanta Nanda, IFS	Chilika Development Authority, Bhubaneswar	
19	Dr Rabindro Nath Samal	Chilika Development Authority, Bhubaneswar	
20	Sumanta Banerjee	Chilika Development Authority, Bhubaneswar	Will start working on a different project under Chilika Development Authority.
21	Prof Asha Hans	Sansristi	
22	Dr Amrita Patel	Sansristi	
23	Jasmine Giri	Sansristi	