

MINUTES OF REVIEW MEETING ON 4th DELIVERABLE OF 'HYDRO-METEOROLOGICAL RESILIENT ACTION PLAN (HmRAP)' HELD ON 16.02.2022 AT 11:30 AM THROUGH VC IN OPS ROOM, NDMA BHAWAN, NEW DELHI.

A review meeting on '*Interim report on current and projected hydromet and climate data and impact scenarios for the selected cities and the potential for hydromet urban services; Map Viewer development for all analysis results*' (4th Deliverable) of the study 'Hydro-meteorological Resilient Action Plan (HmRAP)' was held through VC under the Chairmanship of Ms. Sreyasi Chaudhuri, JS (Admin) & Project Director, NCRMP, NDMA on 16th February, 2022 at 11:30 AM in Ops. Room, NDMA, New Delhi. The meeting was attended by officials from NDMA and the World Bank, Project Director (NCRMP-SPIU) of project States, nominated City Nodal Officers, Experts and Consultant (M/s Royal HaskoningDHV JV). The list of participants is attached at **Annexure-1**.

2. The meeting started with a welcome note from the JS (Admin) & Project Director, NCRMP, NDMA. A presentation was made by the Consultant Team on the 4th Deliverable under HmRAP.
3. The JS (Admin) & PD (NCRMP) sought clarity on consideration of the local factor while designing HmRAP for all project cities by giving reference to flooding and urbanization in Bidhannagar land reclaimed area. In response to that, key expert of consultancy agency stated that all the local factors were taken into account by physically visiting to the site.
4. Sh. Anup, World Bank suggested that educational kind of processes to understand the analysis carried out in designing of HmRAP is required to be done for the development agencies such as Drainage department, Municipal Corporation and Public Health department etc. Consultation meeting to be done for the various agencies to provide a proper visualization of the outcome of the HmRAP study and to make sure that the agencies are agreed to the analysis done by consultancy agency. It was suggested that internal discussion with NDMA & World Bank may be conducted for the linking of Web DCRA with the Synthetic track of cyclone and potential storm surge output that has been created for HmRAP.
5. Dy. Project Director informed that during one of the review meeting, it was agreed that the Air Pollution hazard will also be incorporated in the report but it has not been mentioned anywhere in the report. He has also suggested mentioning of the sources of each collected data in the report.
6. Sh. Prasoon Singh, Flood Management Specialist has sought clarification regarding ambient temperature for the assessment and the whether the night time temperature has been

considered for UHI effect. In response to that, the consultant apprised that there was no IMD station available in these cities and night time satellite imagery was not available for these cities, therefore, day time data has been used. For the flood part, Sh. Balaji informed that all decisions taken during the last QC meeting held on 15th December 2021 had been complied in the Deliverable 4.

7. After deliberation involving views/suggestions of participants, the following actions were agreed to:

- i. Consultant has to schedule a meeting with Team Leader and experts with City Nodal Officer of Bidhannagar and discuss the issues regarding the storm water drain modelling and other issues related to HmRAP.
 - ii. Consultant to provide the Username and Password of the HmRAP web portal to PMU which will be then forwarded to all the City Nodal Officer for their reference. Consultancy Agency to make sure that the data uploaded on Beta version of web portal are read-only and cannot be downloaded before the submission/approval of final deliverable of HmRAP.
 - iii. Consultant to incorporate Air Pollution hazard in the report as decided during the earlier review meeting.
 - iv. Natural drainage network to be included in the report.
 - v. Correlation of Projected temperature to be done for Sea level rise, Storm surge and track determination of Cyclones.
 - vi. Consultant to conduct Stakeholder workshop on Institutional Assessment for resilience action under Deliverable 6 in Ratnagiri, Bidhannagar and Porbandar city in the physical presence of Team Leader and all Key experts.
 - vii. All limitations to be listed out in the report.
8. Consultant to incorporate all points as mentioned above in this Deliverable 4, duly complied comments of World Bank which is placed in Annexure 2 and to re-submit the revised report at the earliest.
9. Meeting ended with thanks to the chair and all the participants.



(Rajeev Sharma)
Project Manager
NCRMP, NDMA

| Sl. No. | Name of Officials with Designation | Organization |
|---------|------------------------------------|---|
| 1 | Sh. Samir Kumar | Deputy Project Director, NCRMP, NDMA |
| 2 | Sh. Rajeev Sharma | Project Manager, NCRMP, NDMA |
| 3 | Dr. Sanjay Sharma | Environment Specialist, NCRMP, NDMA |
| 4 | Sh. Mehul Padharia | Technical Specialist, NCRMP, NDMA |
| 5 | Sh. Vijay Sharma | IT Manager, NCRMP, NDMA |
| 6 | Sh. Prasoon Singh | Flood consultant, NDMA |
| 7 | Sh. Ajay Katuri | Vulnerability Specialist, NDMA |
| 8 | Dr. Brijendra Mishra | GIS Expert, NDMA |
| 9 | Sh. Anup Karanth | The World Bank |
| 10 | Sh. Pramod Badami | Project Director, NCRMP, SPIU-Goa |
| 11 | Sh. Mehul Joshi | Resident Additional Collector, Porbandar |
| 12 | Sh. Ajay Suryavanshi | District Disaster Management Office, Ratnagiri |
| 13 | Sh. Shibu | District Development Commissioner, Kochi |
| 14 | Sh. Bhaskar | Deputy Commissioner, MCC |
| 15 | Sh. Satyajit Sen | Special Secretary, Disaster Management, West Bengal |
| 16 | Dr. Vajja Hari Prasad | RHDHV |
| 17 | Consultant team | RHDHV |

Comments of the World Bank on Deliverable 4

Main Report

General Observation

- i) Each chapter should start with explaining what is present in it and how this links to the overarching objective/other "modules"/chapters/deliverables.
- ii) The goal of the "methodology" section in each chapter is unclear as it provides very little information and following sections provide the bulk of "methodology". The structure needs to be revisited for easy read by the reviewer and stakeholders.
- iii) There is a lack of references to guide the reader in order to find relevant information. E.g. on the data sets used for each city- deliverable 1 should indicate that details can be found in annex 1 of the city level reports.
- iv) The structure of the chapters differs quite a bit. For instance, chapter 7 is short and has a very long annex which includes details about the 6 cities which other chapters don't include. It may consider sticking as closely as possible to one structure to capture a better follow.

Executive summary:

- i) As executive summary this section is incomplete since it should summarize all parts of the document (including the findings) and not only the methodology. At first glance it is rather a short introduction and provides the context of this document.

1. Introduction: The different chapters/sections are all connected through the overarching objective, however, this info is not clearly provided. E.g. the hazard profiles seem to be the justification for which hazards are analyzed in each city. However, this is not explained to the reader. The introduction could explain the overarching concept of how all the chapters are linked (currently it is only listing all the chapters). It is strongly recommended to add the overarching conceptual framework in the introduction section.
2. Hazard profiles of project cities:
 - i) An introductory sentence of what this sections aims at doing would be good before entering the city summaries in 2.1.
 - ii) It would be very useful to either make a reference to figure 9.1 (map showing locations of the cities) or move this map up.
 - iii) It may be useful to add a table with all cities and all hazards, indicating which hazard is of minor and which of major relevance in each city. This table can include a disclaimer that the classification of hazards into major/minor is somewhat subjective but would be useful to get a quick overview.
3. In the introductory sentences of this chapter, an explanation of the link of this part of the report needs to be provided to the overall objective.
4. This section requires significant work. 3.1.1 to 3.1.7 would benefit from a clearer structure and flow - currently it is hard to follow for the reader. Here are some more specific observations:
 - 3.1.1 Objectives: The title and the content of this section don't seem to match – the content is not describing objectives.
 - 3.1.2 to 3.1.4 are written in telegram style and not providing relevant information.
 - 3.1.6 is supposedly providing the methodology overview after 3.1.3 providing the methodology. 3.1.2 speaks to data collection and 3.1.6.1 to "data used".

3.2: Urban growth analysis

- 3.2.1 – The clear communication of the purpose of this section right in the beginning is helpful. However, It would be useful to explain how this will link to the other modules – as already

mentioned above, it would be critical to present that overarching methodology in the beginning and subsequently explain the specific links at the beginning of each chapter.

- 3.2.2 – This section is confusing as it uses FUGA without introduction, explains expected outputs that go beyond the urban growth analysis into the use of the analysis for hazard assessments, and is presented prior to the presentation of the methodology. It can be considered to eliminate this section and just adding to the objectives that the resulting urban growth scenarios would serve as inputs for x, y, z.
- Section 3.2.3 and 3.2.4 can be merged and it is unclear why a framework needs to be explained separately from the methodology. Some of the text seems to be repetitive.
- Scope and limitations. Scope is usually something that is presented at the beginning, close to the objective. Here in the document it is coming quite late. The scope and limitations can be separated and present the scope earlier while keeping limitations where they are.
- 3.2.6 downstream use of FUGA outputs to be included into the objective as this analysis is not done for its own sake. Where it is presented currently it comes across as an afterthought and not as the reason for doing these analytics.

4. Hazard and risk assessment

- Not counting the annex, this chapter has one single page. The annex can just be part of the chapter itself.
- Annex: the last line of each table says “interim report” – this, however, is not an analytical step in the hazard assessment framework and rather confusing
- Names to be added for each column
- C speaks about cyclone including three hazards, however wind is hardly addressed. D is dedicated to cyclonic wind speed. It may make things clearer if wind was taken out of C. As wind is the defining characteristic of cyclones, the team may consider switching the order of the two, to first speak about cyclone wind speed and subsequently about other cyclone related hazards
- The text under the table in E seems to be addressing the reader and may better be taken out! If those instructions are directed towards the reader, it may be better to reformulate.

5. Urban flooding: The description of the methodology followed is very confusing and needs to be revisited. There are pieces of general information, descriptions of modeling software and analysis approaches intertwined throughout the chapter making it very hard to follow. Some specific comments:

- 5.2 the objective could be strengthened by adding further details – currently it is very generic.
- 5.4 the methodology description is too short
- 5.5. refers to the selection of modeling software. The logical sequence would, however, be to first describe the objective and related available data as a result of which a certain approach is being chosen. Only after that, the specific model is mentioned as it is just a package that helps implement the chosen approach.
- 5.5.1.1 and 5.5.1.2 describe software characteristics. It is recommended to focus on the modeling done for this study (using the software) rather than providing software details.
- 5.5.1.3 is making the link to the climate change and urban development scenarios, however, in a very limited way. As mentioned above – these connection points are critical as the overall assessment has so many steps and links.
- 5.5.2.2 needs to be part of the overall methodology. The current flow is confusing and needs rewriting.
- 5.5.4.4 Please revisit the title “working”.

6. Drought

- 6.3 data collection – at first sight this section is far too short – however, the info on the data sets is provided in reports 2-7 in annex 1. This needs to be mentioned
- 6.4 Methodology. This is a list of bullet points and is hard to follow for the reader. Please rewrite so a comprehensive explanation of the methodology is provided.
- 6.4.1.2 and 6.4.1.3 – calculation vs. SPI calculation for project cities – the titles and the content are confusing. The structure and flow need to be revisited
- 6.4.2 – bullet points without explanations
- 6.4.3 – why was it done this way? Some background would be good

7. Cyclone and storm surge hazard

- The description of the methodology is very short, the structure of the chapter again different and the annex repetitive in the introduction

The references starting page 271 may need to be moved to the end of the report

After chapter 8 the reports ends very abruptly. Some kind of conclusion and reference to the six city reports would be helpful.

Other deliverables (representative 2 of 7 has been used as a case)

- The report starts without any introduction. As these are stand-alone report, brief intro on the city, objective of the report and reference to the report describing the analytics (linking to main deliverable) needs to be provided.
- Table 1.1 could well go into the annex – there is no reference in the text indicating that there is no point being made based on the data in the table. Similarly Table 1.2. GENERAL NOTE: No figure nor table should be presented in the report that is not cited in the text! This does not mean that in the text there should be a listing of the tables/figures but that there should be an interpretation of findings from the figure/table or a highlight of something the reader should extract from them.
- 1.2.3 pages of maps are presented without any interpretation or analytics of the results. No comparisons between current and future scenarios (increases) etc. The maps have very little value to the reader as they are currently presented.
- Pages 65-67 – in line with the above comment: what is the key observation the reader should take away from each of the maps?
- There is no closing chapter – the report just ends

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