Project Implementation Plan

Project SLAMDAM Pakistan

Technical Assistance for the selection and implementation of a low-cost, climate resilient, re-usable, easy replicable, scalable and mobile flood barrier as an effective solution to adapt to enhance resilience and reduce vulnerabilities caused by floods (climate change-induced seasonal melt water from glaciers) in one Gilgit-Baltistan, Pakistan.

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Document code:	
Version:	V0.1

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Introduction

This project implementation plan outlines the steps the project team will use to achieve the project goal and subsequent objectives. The plan covers all aspects of a project including approach, timeline and personnel.

This implementation plan is structured as follows:

- Objectives, requirements
- Scope assessment
- Project approach and methodology
- Project organization and stakeholders
- Work plan and project deliverables
- Project planning
- Project risks
- Monitoring and evaluation
- Information and communication plan

1. Project goal, objectives and requirements

1.1 Background and rationale

The visible and measurable effects of climate change across Pakistan have become more apparent over the last two decades. There is a direct linkage between climate change and the intensity and frequency of flooding. Pakistan can benefit greatly from innovative and effective solutions aimed to strengthen resilience to floods.

A Consortium of companies led by Zephyr Consulting, including Watersprint and Nelen & Schuurmans will implement a low-cost, climate resilient, re-usable, easy replicable, scalable and mobile flood barrier to prevent damage from flooding caused by seasonal melt water from glaciers Gilgit-Baltistan. The vulnerable communities in Gilgit-Baltistan are impacted by the negative consequences of these climate change-induced floods.

The Consortium will implement SLAMDAM to strengthen Pakistan's resilience to climate change. SLAMDAM is a climate resilient technology being water-filled flood barrier that can easily be deployed to prevent damage from flooding.

1.2 Project context

Pakistan has suffered from 21 major floods between 1950 and 2011—almost 1 flood every 3 years. These floods have killed a total of 8,887 people, damaged or destroyed 109,822 villages, and caused economic losses amounting to $19 billion. On average, the annual flood damage from 1960 to 2011 was about 1% of the mean annual GDP. The devastating 2010 flood caused the highest damage of all in terms of economic costs: about $10 billion.

According to the Damage and Needs Assessment (DNA) conducted by World Bank and Asian Development Bank, Pakistan had to bear with an estimated loss of more than 10 billion PKR to its national economy, through the direct and indirect consequence of the floods. The floods did not only wash away the development achievements of the past but also further aggravated the chronic poverty and inequality which exists among the vulnerable segments of society.

The Government of Pakistan has been relying on a traditional flood control approach based on structural measures, but the 2010 flood exposed the inherent weaknesses of this approach. A shift from traditional flood management to a contemporary holistic approach could more effectively mitigate the flood risks, and provide an additional source of freshwater for productive use.

While it is difficult to devise a strategy which could completely avoid floods and the damages that coincide with it, it is possible to minimize the damage of a flood by adopting appropriate measures and modern technologies.

Climate adaptation requires changes in behavior and appropriate technical interventions that provide protection to main sectors of the economy, (critical) infrastructure, people and the environment where the risk of storm surge and flooding is imminent.

The Intergovernmental Panel on Climate Change (IPCC) has predicted an intense increase in the natural calamities in coming years which would be due to complex weather patterns resulting from variations in ocean temperatures in the Equatorial Pacific that could affect the hydrological reserves. Pakistan in particular, would also be experiencing the brunt of climate change due to its hydrological reserves' shrinkage.

It is estimated that the temperature increase would rise from 0.9 to 1.5 °C by 2020 until 2050. This could lead to floods, droughts, warm temperatures, health-related problems, pest diseases etc. in the coming years.

1.3 Strategic alignment

Climate change adaptation is an important component of Pakistan's Nationally Determined Contribution (NDC) a central aspect of the Paris Agreement. The adaptation component in the Pakistan's NDC draws upon relevant national policies for adaptation, such as the National Adaptation Plan (NAP). The goals of this strategy are "to reduce vulnerabilities to climate impacts by creating comprehensive medium and long-term plans, including the integration of adaptation measures into national policy".

This project will implement innovative climate adaptive solutions in Pakistan being a mobile flood barrier and flood software solutions. These scalable solutions directly contribute to the realization of:

- The Sustainable Development Goals.
- The Adaptation and Climate Finance goals of the Paris Agreement.
- The UNFCCC long-term finance goal.
- Adaptation and resilience goals and needs of developing countries expressed in, amongst others, Nationally Determined Contributions, National Adaptation Plans, Technology Action Plans and Long-term strategies for resilient and sustainable development.

Article 6, paragraph 8 of the Paris Agreement:
Parties recognize the importance of integrated, holistic and balanced non-market approaches being available to Parties to assist in the implementation of their nationally determined contributions, in the context of sustainable development and poverty eradication, in a coordinated and effective manner, including through, inter alia, mitigation, adaptation, finance, technology transfer and capacity-building, as appropriate. These approaches shall aim to:

(a) Promote mitigation and adaptation ambition.
(b) Enhance public and private sector participation in the implementation of nationally determined contributions.
(c) Enable opportunities for coordination across instruments and relevant institutional arrangements.

1.4 Project goal and objectives

1.4.1 Project goal

The goal of this project is to demonstrate SLAMDAM, a mobile flood barrier, as an effective solution to adapt to climate change by enhancing resilience and reducing vulnerabilities to (climate change-induced) floods in Gilgit-Baltistan in Pakistan in accordance with the requirements specified in the TOR.

To realize this goal, we will implement the state-of-the-art solutions and by including experts in the project organization. With this project we ensure direct impact to reduce damage from flooding on the regional level. At the same time, we configure and test a scalable solution that will be ready for implementation on the national scale.

1.4.2 Project objectives

The overarching goal results in two key project objectives:

1. The first key objective is to reduce vulnerability and increase resilience to climate-induced flooding at Gilgit-Baltistan, Pakistan through the use of the SLAMDAM-technology.

   Desired outcome:
   Weather information service solutions in combination with a mobile flood barrier piloted or deployed to reduce climate-related flood risk and therewith enhance resilience

   Output 1.1.1: Physical and natural assets made more resilient to climate induced flooding
   Output 1.1.2: Livelihoods and sources of income of vulnerable populations diversified and strengthened

Output 1.1.3: The number of people who are warned in advance of climatic induced floods grows and the warning consistency and reliability is increased
Output 1.1.4: Vulnerable natural ecosystems strengthened in response to climate change impacts

2. The second key objective is to strengthen community resilience and local capacity building to increase prosperity at Gilgit-Baltistan, Pakistan

   Desired outcome:
   Institutional and human capacities strengthened to identify and implement adaptation measures

   Output 2.1.1: Active, skilled and materialized local flood and drought response team
   Output 2.1.2: Number of people trained and informed regarding climate change impacts and appropriate adaptation responses

1.5 Key requirements

In order to realize the project objectives, the project shall adhere to the following requirements:

- Prevent flood damages in line with the targets.
- Be operated by a dedicated flood response team independently.
- Show the ability for it to be deployed at various locations under different circumstances.
- Take little time to build up and dismantle.
- Take little effort for people to be trained on how to operate it.
- Be able to be reused after dismantling it.

1.6 Proposed solution

The proposed solution is to demonstrate SLAMDAM as an effective solution to prevent damages from flooding by deploying the technology in Gilgit-Baltistan in Pakistan when there is a real-life threat of flooding due to rising water levels caused by seasonal melting of the glaciers.

Flood risk analyses will be performed using state-of-the-art software to identify risks and to determine how best to manage these risks using the innovative flood barrier.

Duly note that we aim for the project team to consist of at least 30% women at every level of the project organization and at least 30% women will be involved in all workshops and trainings under this project. It is expected that women will benefit most from the measures taken to prevent flooding and drought, as flood and drought prevention measures will reduce the risks for health, safety to which women are particularly exposed during flooding and drought and secure the access to economic activities, education and health care.

Once the water-filled barrier has proven to be an effective climate-adaptive solution, we aim to promote the solution to further scale it up across Pakistan following an approved roadmap.

1.7 Project results and impact

The project will lead to many different results / deliverables, the most notable are:

- Flood risk assessment.
- Mobile flood barrier suitable for the pilot location.
- Well-trained flood response team and community.
- Successful demonstration of SLAMDAM.
- Various Reports (Inception, progress, closure etc.).
- M&E plan and report.
- Roadmap to scale-up SLAMDAM across Pakistan.

2. Project scope

2.1 Project scope statement

- SLAMDAM will be used to prevent damage from flooding.
- Demonstration when there is a real-life threat of flooding.
- Thorough flood risk assessment including development of flood risk maps and scenarios.
- Capacity building related to climate change and SLAMDAM.
- Plan to scale up SLAMDAM across Pakistan.

2.2 Project scope exclusions statement

- Implementation of an advanced flood early warning system
- Supply of transportation means to move SLAMDAM from storage facility to location of deployment
- Water treatment of stored water will not be done
- Usage of SLAMDAM for purpose other than flood prevention.

3. Project approach and methodology

3.1 Project approach

The project approach can be characterized as a data and technology driven approach. We will collect and use data to assess flood risks and to monitor the success of the project. We use technology to transfer that data into valuable information and insights (e.g., into hydrodynamic models) and to communicate these insights to stakeholders and support the capacity building and stakeholder management.

Directly after **(1) project inception**, we will execute a thorough **(2) flood risk assessment**. During this assessment we will seek understanding of the water system and its performance in extreme conditions. The outcome of the assessments will be used to determine where and when to deploy the flood barrier to realize the most adaptation benefits during flood conditions. The assessment results will also be used to determine the characteristics and dimensions of the flood barrier.

In parallel to the risk assessment, we will develop the **(3) Monitoring and Evaluation (M&E) plan** and framework. This plan outlines how the project concretely measures and monitors project results to determine whether the project objectives and subsequent outcomes have been realized successfully.

The mobile flood barrier will be **(4) developed** based on the outcome of the risk assessment. The characteristics of the flood barrier should meet the requirements to manage the flood risks as agreed. Once the flood barriers have been developed, they will be shipped to Pakistan where they will be stored at a strategically located facility.

Pivotal for the success of this project is to create awareness and enhance capabilities of citizens and professionals with regards to climate change and the implemented solutions. Following the risk assessment, the project will enhance stakeholders' awareness and capabilities by field visits and workshops. Next to these field visits and

stakeholder analyses we will use different technological solutions (3Di hydrodynamic models[1] and StoryMap) to communicate the assessment results, the urgency and value of the SLAMDAM and the project goals.

(5) Demonstrations will be scheduled once the mobile flood barrier is stored in Pakistan and the stakeholders' capabilities have been enhanced. The flood response team will demonstrate the workings of the SLAMDAM-technology during a dry run demonstration i.e., when there is no real-life threat of flooding. Stakeholders will be invited to attend the demonstration. The flood response team will also have to deploy the mobile flood barrier when there is a real-life threat of flooding; the results of which will be monitored using the M&E framework.

As part of the final phase of the project, **(6) roadmap and project closure**, the final M&E report will be made as well as the final roadmap. This roadmap stipulates where to scale up the SLAMDAM technology across Pakistan.

In total we distinguish five phases consisting of six work packages as demonstrated in figure 2.

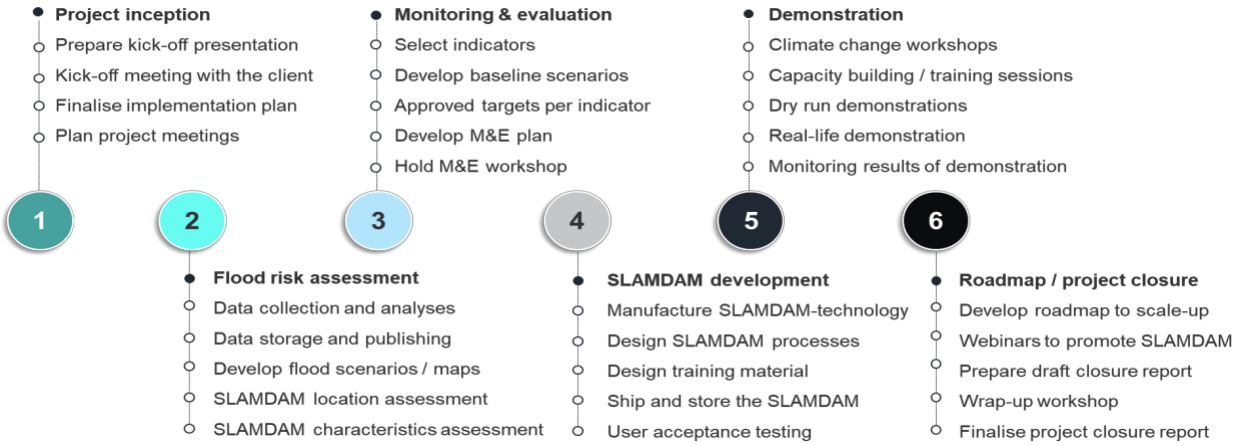


Figure 2: Project phases

The activities and deliverables pertaining to abovementioned project phases are specified in the Work Plan in Chapter 5.

3.2 Project methodology and limitations due to COVID-19

Considering the nature of the project we will adhere to a hybrid project methodology of Prince 2 project methodology and Agile Scrum. We believe this is the best approach to ensure the project will be completed within budget, in time and in accordance with the predefined quality level. COVID-19 has limited impact on the proposed project considering that local stakeholders are part of the project team. To ensure we limit the impact of COVID-19 to a bare minimum, we will identify COVID-19 as a project risk that we will discuss each steering committee meeting.

[1] Please see the movie how 3Di hydrodynamic modelling is used for understanding and stakeholder workshops: https://www.youtube.com/watch?v=BvS8ijgUvuc

4. Project organization and stakeholders

4.1 Project organization

Below figure depicts the project organization consisting of: (1) a Steering Committee, (2) Project Management and (3) a Delivery Team.

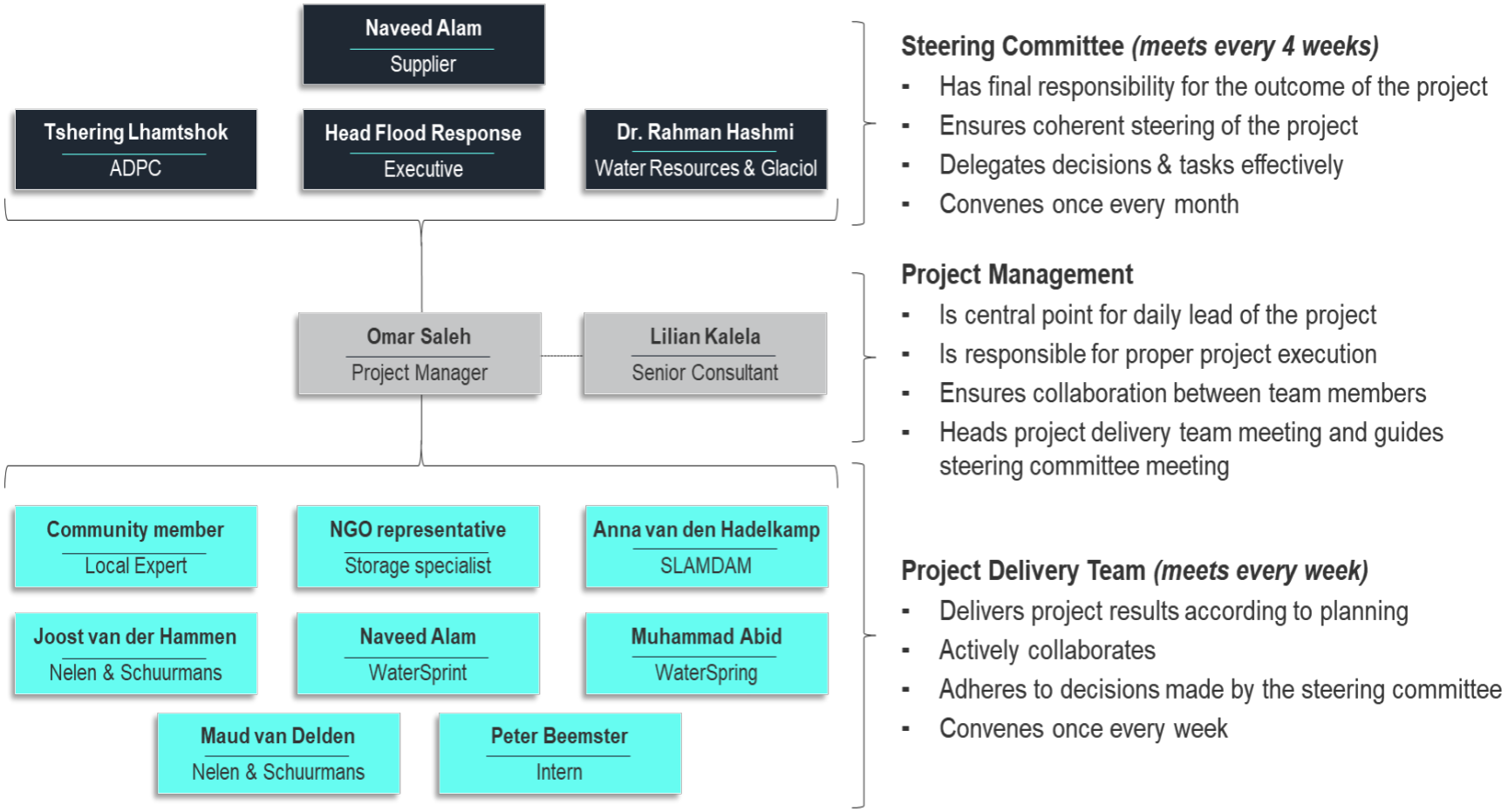


Figure 3: Organogram Project Organization

4.2 Roles and responsibilities

Each of the project organization's members has a specific role and responsibilities to fulfill throughout the project duration. The key responsibilities are demonstrated in figure 4 below.

Project Team's Roles & Responsibilities			
Project Team Member		**Role**	**Responsibilities**
1	Tshering Lhamtshok	Senior User	Represents ADPC and is responsible for specifying requirements of the outcome of the demonstration project to determine whether the project is successful or not.
2	Dr. Rahman Hashmi	User	Proposed requirements of the outcome of the demonstration project to determine whether the project is successful or not.
3	Naveed Alam	Senior Supplier	Is responsible for clear and timely communication with local authorities and companies and the coordination of locally performed activities.
4	Head Flood Response Team	Senior Executive	Is ultimately responsible for a successful outcome of the project and they have significant decision power – supported by the senior supplier and senior user.
5	Omar Saleh	Project Manager	Is central point for daily lead of the project and is authorised to execute the project on behalf of the steering committee.
6	Lilian Kalela	Senior Consultant	Is responsible for developing the M&E plan and report
7	Community representative	Project Team	Is responsible for deploying the flood barrier and collecting local data
8	NGO representative	Project Team	Is responsible for storage of the flood barrier
9	Maud van Delden	Project Team	Is responsible for hydrological data gathering and supporting software analyses
10	Joost van der Hammen	Project Team	Is responsible for overseeing data-driven flood risk assessment
11	Peter Beemster	Project Team	Is responsible for evaluating suitability of SLAMDAM for the pilot location
12	Anna van den Hadelkamp	Project Team	Is responsible for designing and manufacturing the SLAMDAM-technology
13	Muhammad Abid	Project Team	Is responsible for liaising with local people and support in data collection and hydrological modelling

Figure 4: Roles and responsibilities project team members

4.3 Stakeholder mapping

Below table is the outcome of the stakeholder mapping including local stakeholders who have an interest in the outcome of this technical assistance. The communication plan will describe when and how to communicate to the stakeholder included in below table.

N°	STAKEHOLDER	NAME OF CONTACT PERSON	TELEPHONE NUMBER	E-mail Address	ROLE
1	Regional/Local Government				
2	Regional/Local Government				
3	Ministry of Environment				
4	Ministry of Environment				
5	Asian Disaster Preparedness Center (ADPC)				
6	The Embassy of The Netherlands				
8	Flood response team representative				
10	Community representative				
11	Community representative				
13	Meterological/ hydrological department				
15	Environment Expert				
16	Gender Expert				
17	Hydrological Expert				
18	Communication Expert				

5. Work plan and project deliverables

We propose to follow below work plan those details activities, deliverables and timeline for this requirement and is in line with the ToR

	Activities	Deliverables	Timeline from Start Date
OBJECTIVE 1: Reduce vulnerability and increase resilience to climate-induced flooding at Gilgit-Baltistan, Pakistan through the use of the SLAMDAM-technology.			
Outcome 1.1: *Weather information service solutions in combination with a mobile flood barrier piloted or deployed to reduce climate-related flood risks and/or enhance resilience*			
Output 1.1.1: Physical and natural assets made more resilient to climate induced flooding Output 1.1.2: Livelihoods and sources of income of vulnerable populations diversified and strengthened Output 1.1.3: The number of people who are warned in advance of climatic induced floods and drought grows and the warning consistency and reliability is increased Output 1.1.4: Vulnerable natural ecosystems strengthened in response to climate change impacts	**Activity 1.1.1.1:** Develop pre-feasibility study	Feasibility study	Week 1
	Activity 1.1.1.2: Develop detailed Implementation plan	Implementation plan	Week 2
	Activity 1.1.1.3: Develop a monitoring and evaluation plan	A monitoring and evaluation plan	Week 2
	Activity 1.1.1.4: Develop impact description document	Impact Description document (initial and final version)	Week 4 / Week 32
	Activity 1.1.1.5: Map relevant stakeholders	Stakeholder mapping report containing a complete stakeholder list	Week 2
	Activity 1.1.1.6: Conduct an inception meeting	Inception meeting report including list of participants, agenda, conclusions	Week 4
	Activity 1.1.1.7: Comprehensive assessment of flood risks of selected area / region	Flood Risk Assessment and preliminary identification of sites for the pilot implementation	Week 9
	Sub-activity 1.1.1.7.1: Define damage assessment i.e., scope analysis by specifying limitations such as time limitation	Damage assessment statement	Week 5
	Sub-activity 1.1.1.7.2: Choose complexity of damage assessment	Statement on complexity of damage assessment	Week 5
	Sub-activity 1.1.1.7.3: Determine baseline calculations for all four baseline categories	Baseline calculations of all four baseline categories	Week 6
	Sub-activity 1.1.1.7.4: Develop and present a list of data requirements	List of data requirements for the flood and drought risk assessment	Week 5
	Sub-activity 1.1.1.7.5: Assign tasks to collect relevant flood and drought risk data	Assigned tasks for data collection	Week 5
	Sub-activity 1.1.1.7.6: Setup a data portal	A setup of the data portal for this project	Week 5
	Sub-activity 1.1.1.7.7: Collect and publish a set of open, global datasets as baseline data	Collection of open global data sets for risk assessment	Week 6
	Sub-activity 1.1.1.7.8: Hold field visits and use other methods to collect regional / local data	Collection of data sets enriched with local data	Week 7
	Sub-activity 1.1.1.7.9: Make recommendations for data improvements and describe possible limitations	Description data recommendations and limitations	Week 7
	Sub-activity 1.1.1.7.10: Develop the hydrological and modelling approach.	Hydrological and modelling approach	Week 7

	Activities	Deliverables	Timeline from Start Date
	Sub-activity 1.1.1.7.11: Prepare the data, and especially to prepare the digital terrain model	Prepared data for the risk assessment	Week 7
	Sub-activity 1.1.1.7.12: Build the 3Di hydrodynamic model and make it available online	3Di hydrodynamic model	Week 8
	Sub-activity 1.1.1.7.13: Calculate flood and drought scenarios for selected areas	Flood and drought scenarios	Week 9
	Sub-activity 1.1.1.7.14: Develop risk maps and add them in the data portal with maps	Risks maps uploaded in the portal	Week 9
	Activity 1.1.1.8: Technology identification for flood barrier and storage facility	Benchmarking of existing mobile flood barrier and prioritization of the most suitable model for area	Week 10
	Sub-activity 1.1.1.8.1: Hold field visits at the area to determine where to deploy the barrier	Field visit reports	Week 10
	Sub-activity 1.1.1.8.2: Prioritize protected areas	Priority list	Week 10
	Sub-activity 1.1.1.8.3: Design water-filled barrier solution best suited for the location	Report design water-filled barrier	Week 11
	Activity 1.1.1.9: Hold damage assessment	Damage assessment report	Week 11
	Activity 1.1.1.10: Calculate baseline and adaptation benefits per baseline category	Report with damage and benefits calculations	Week 11
	Activity 1.1.1.11: Selection of the technology and pilot area	Report of the meeting with the final selection of the mobile flood barrier to be deployed and identification of the pilot area	Week 11
	Activity 1.1.1.12: Site visit to the pilot area	Report on the visit on site to the pilot area with pictures, participants, conclusions	Week 12
	Activity 1.1.1.13: Stakeholders' workshop	Report of the stakeholder workshop including the detail of how the participants were invited, and how the participation of vulnerable groups was encouraged, list of participants disaggregated by gender, photos, PowerPoint presentations, questions asked etc.	Week 13
	Activity 1.1.1.14: Detailed implementation plan of the pilot project	Detailed implementation Plan	Week 14
	Activity 1.1.1.15: Organization of a meeting to discuss the logistics and implementation of the pilot	i) Report on the meeting to discuss the logistics and implementation of the pilot (ii) Final implementation plan including modifications requested by the restrictive working group	Week 15
OBJECTIVE 2: Strengthen community resilience and local capacity building to increase prosperity at Gilgit-Baltistan, Pakistan through the use of the SLAMDAM-technology			
Outcome 2.1: *Institutional and human capacities strengthened to identify and implement adaptation measures*			
Output 2.1.1: Active, skilled and materialized local	**Activity 2.1.1.1**: The technology is routed to the selected area	Report with pictures demonstrating that the technology has been routed to the pilot area.	Week 20

	Activities	Deliverables	Timeline from Start Date
flood and drought response team	**Activity 2.1.1.2:** Detailed manual on the use and maintenance of the technology	Detailed manual on the use and maintenance of the technology	Week 20
	Activity 2.1.1.3: Deployment of the technology by professionals	Report on the deployment of the technology by professionals with pictures	Week 22
	Activity 2.1.1.4: Learn by doing workshop	Report of the "learn by doing workshop" including the list of participants and persons trained, pictures, explanations given, main questions asked	Week 22
	Activity 2.1.1.5: Stakeholder's consultation to introduce the mobile flood barrier to stakeholders	Report on the stakeholder´s consultation workshop including the detail of how the participants were invited, and how the participation of vulnerable groups was encouraged, list of participants disaggregated by gender, photos, power point presentations, questions asked etc.	Week 23
Output 2.1.2: Number of people **trained and informed** regarding climate change impacts and appropriate adaptation responses	**Activity 2.1.2.1:** Definition of a Monitoring and Evaluation Framework	Draft M&E Report	Week 25
	Activities 2.1.2.2: Presentation of the M&E framework to the restrictive working group	Report of the meeting to present the M&E Report	Week 27
	Activities 2.1.2.3: Revision of the M&E report	Final M&E report describing and defining each indicator	Week 28
	Activities 2.1.2.4: Creation of an excel database to facilitate the M&E system	Editable M&E in excel format	Week 27

6. Project planning

Below Gantt Chart reflects the timeline by which the project is scheduled to be completed including the most key milestones throughout the project duration.

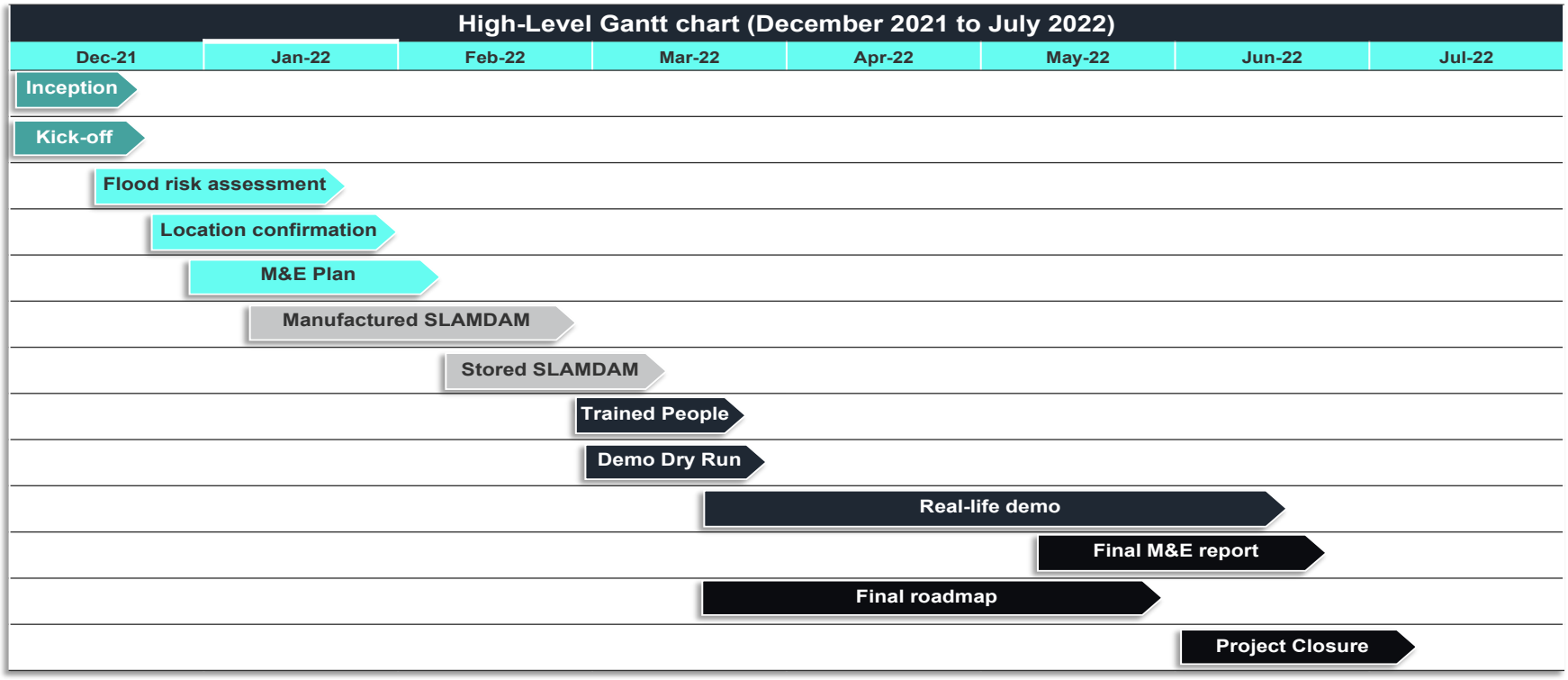


Figure 5: Project Gantt Chart

7. Project risk log

The project execution and project result risks are described in the table below. This table includes the ICSR risks in accordance with the OECD guidelines.

1. KEY RISKS						
#	**RISK DESCRIPTION**	**CHANCE**	**IMPACT**	**MITIGATION**	**PTA**	**DUE DATE**
R1	- Risk that the selected pilot location is not suitable for the SLAMDAM-technology	**M**	**C**	- Urgently collect flood data to assess whether SLAMDAM is a suitable measure and use SLAMDAM suitability matrix. - Find other suitable locations in case the initial location is deemed not suitable.	T.b.d.	T.b.d.
R2	- Risk that there is no flood during the demonstration	**M**	**H**	- Ensure we have the best location to do the demonstration i.e., **highest chance of flood** - Have close conversations with local stakeholders to help select the proper location - Plan an option to simulate a flood event	T.b.d.	T.b.d.
R3	- Risk that SLAMDAM works but doesn't save a lot of houses / people to meet the targets	**M**	**H**	- Ensure we have the best location to do the demonstration i.e., **highest estimated damages**	T.b.d.	T.b.d.
R4	- Risk that we don't see the floods ahead of time	**M**	**H**	- Ensure adequate flood forecasting is in place	T.b.d.	T.b.d.
R5	- Risk that staff locally cannot operate the SLAMDAM units timely and adequately	**M**	**H**	- Have a training program for authorities (incl. NGO) that need to act in case of floods and train staff accordingly - Create processes / manuals / procedure / working instructions and visual aids	T.b.d.	T.b.d.

R6	- Risk that SLAMDAM doesn't work effectively to help against the flood	M	H	- Make a detailed description of the problem situation (previous floods, surroundings, houses, people etc.) - Ensure SLAMDAM is designed to help with the anticipated flood situation	T.b.d.	T.b.d.
R7	- Risk there is insufficient financing for the project	M	H	- Budget the costs for this project - Get co-financing from other parties	T.b.d.	T.b.d.
R8	- Risk that there is not enough water available to fill the dams	M	H	- See mitigation R1	T.b.d.	T.b.d.
R9	- Risk that there is no appropriate infrastructure and equipment to position the dams in case of a flood	M	H	- See mitigation R1	T.b.d.	T.b.d.
R10	- Risk there is a significant delay due to obstructions when transporting flood barrier to Pakistan caused by excessive bureaucracy	H	H	- Plan the shipment well in advance and identify all requirements to transport and clear the goods - Manufacture and ship the goods as early as possible by not waiting till the final outcome of the risk assessment. Instead, start manufacturing when we already have a certain degree of certainty of the length and height of the barrier.	T.b.d.	T.b.d.

8. Monitoring and Evaluation

The M&E system encompasses all key building blocks required for the effective monitoring and evaluation. The term 'monitoring' refers to the continuous process of periodical performance reporting to stakeholders such as the donor and the Global Change Impact Studies Centre (GCISC). 'Evaluation' refers to the periodic formative and final assessments (evaluations after activities and/or funding have ended) of CIC / World Bank supported actions.
The M&E system will enable the CIC / World Bank to monitor and evaluate the effectiveness of the piloted technology as well as the capabilities of the responsible people to execute M&E activities.
The M&E system comprises of (1) a theory of change and (2) a logical framework. The logical framework contains objectives, outcomes and outputs. Each output has indicators defined that have to be monitored as part of the M&E framework. The logical framework. With each indicator it is explained what the metrics are (source and how to measure). This logical framework has to be completed each time a flood event has occurred.
There will be a process in place describing the roles and responsibilities and the dissemination of the outcome of the M&E activities.
With a local partner who has a presence near the pilot location, there is little need for traveling seeing as most activities can be done remotely / online. Weekly meetings will be done online using Zoom or MS Teams. Our local partner will coordinate activities executed in Pakistan. Because we have frequent project team meetings, we ensure progress, risks, issues and budget exceptions are monitored openly and closely.
Training will be done online and possibly onsite. Onsite is not always necessary seeing as it is very straightforward on how to use the mobile flood barrier. However, it does add value if 2 members based in The Netherlands can travel to Pakistan to visit the site, give trainings and demonstrations. Onsite training can also be done by our local partner in case travel between both countries is not allowed.

The detailed M&E Plan will be included in a separate document; below is a summary of the M&E framework.

8.1 Theory of change

8.1.1 Hypotheses of change

Theories of change are the ideas and hypotheses ('theories') people and organizations have about how change happens. These theories can be conscious or unconscious and are based on personal beliefs, assumptions and a necessarily limited, personal perception of reality. Hypotheses are viewed as assumptions that are believable yet unproven.

- By using a proven effective financing mechanism, Pakistan's government and communities are able to rapidly mobilize funds in order to scale up the flood-resilient solutions across the country.
- Through improving knowledge and capabilities related to climate change of communities and government staff, Pakistan's society can enhance its resilience against climate-induced flooding
- If communities and government staff have access to weather data and information, they are better able to implement climate resilient solutions and respond to threats of flooding
- If Pakistan's communities can effectively prevent flooding, they can improve their socio-economic wellbeing and realize their Sustainable Development Goals (SDGs) such as reducing the gender and class gap, improving food security and decreasing poverty, improving job security and businesses, reducing conflicts and improving access to transport and infrastructure.
- If Pakistan's communities are able to effectively prevent flooding, then they will be less likely to migrate or be displaced.
- If Pakistan's communities can effectively enhance their resilient to flooding, the public health will likely improve due to decrease in diseases, injuries and deaths and an improved access to healthcare facilities.

- If Pakistan is better able to prevent flooding, they will likely experience less financial loss caused by damage to housing, infrastructure and agriculture.
- If Pakistan's communities can better prevent climate-induced flooding, they can protect the environment and prevent deterioration of its biodiversity.
- If members in and between communities interact more frequently around common goals of flood prevention, then their distrust of the other ethnic group will decrease and peaceful relations will develop.

8.1.2 Assumptions

Our thinking about development and change is based on multiple assumptions about what triggers change. We make assumptions about how change processes 'work', about the context in which it takes place and about what will happen as a result of interventions. An assumption is a belief or feeling that something is true or that something will happen, an assertion about the world we do not always question or check. Assumptions stem from and represent values, beliefs, norms and ideological perspectives that inform our interpretation and understanding of reality, and our expectations of what will happen. Below assumptions were applied for the ToC development of this project.

- The impact of floods impacts women more than men
- Pakistan is highly dependent on public and private donors to fund climate adaptation solutions
- There is support from the highest public officials to implement flood resilient solutions
- Pakistan's institutions and communities are willing to cooperate with each other in order to implement flood resilient solutions
- Stored water in the flood barrier can be used for other purposes at a different time or location
- The realized benefits can be monitored with an acceptable level of reliability
- People and staff are able to commit their time to support the implementation and execution of flood resilient solutions
- Possible changes in governments will not affect the implementation and execution of flood resilient solutions
- People are less likely to migrate once they have job and food security
- Floods have a higher impact on people or communities that are less wealthy compared to others
- A threat of flooding will take place before the end of the project during which we can test the mobile flood barrier
- Software tooling is available before the end of the project to support the MRV-process
- Software tooling is developed before the end of the project to calculate the realized benefits from preventing a flooding

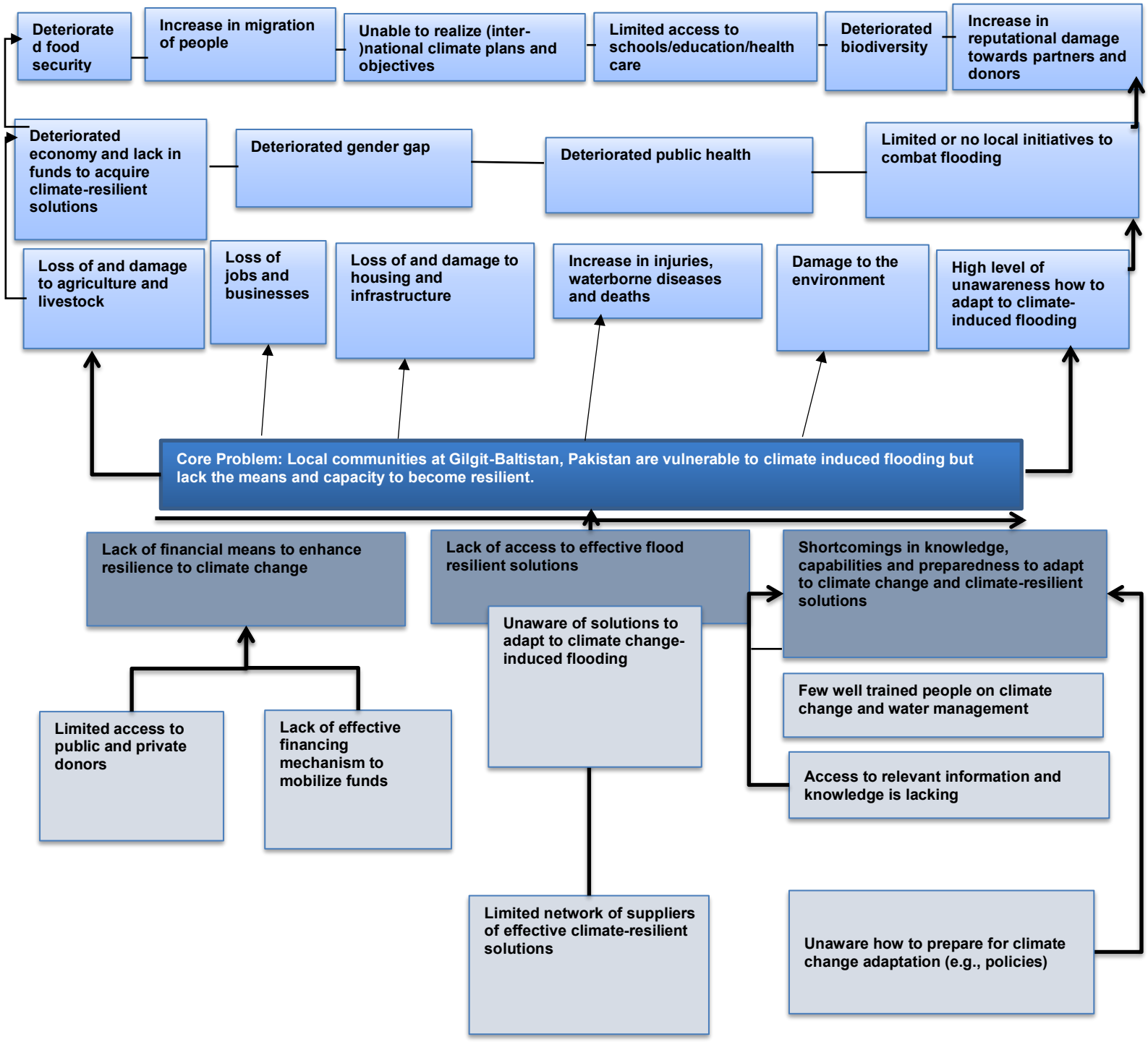
8.1.3 Enablers

- If suppliers in The Netherlands (N&S & SLAMDAM) are notified when there is a flood warning, they can guide the flood response on how to deploy the flood barrier
- A serious threat of flooding is needed to realize significant credited benefits from the deployment of the mobile flood barrier
- There is a greater chance of success if public and private donors have funds allocated for climate adaptation projects
- Collaboration in and between communities and state institutions is needed to coordinate effective deployment of the flood barrier when there is a threat of flooding

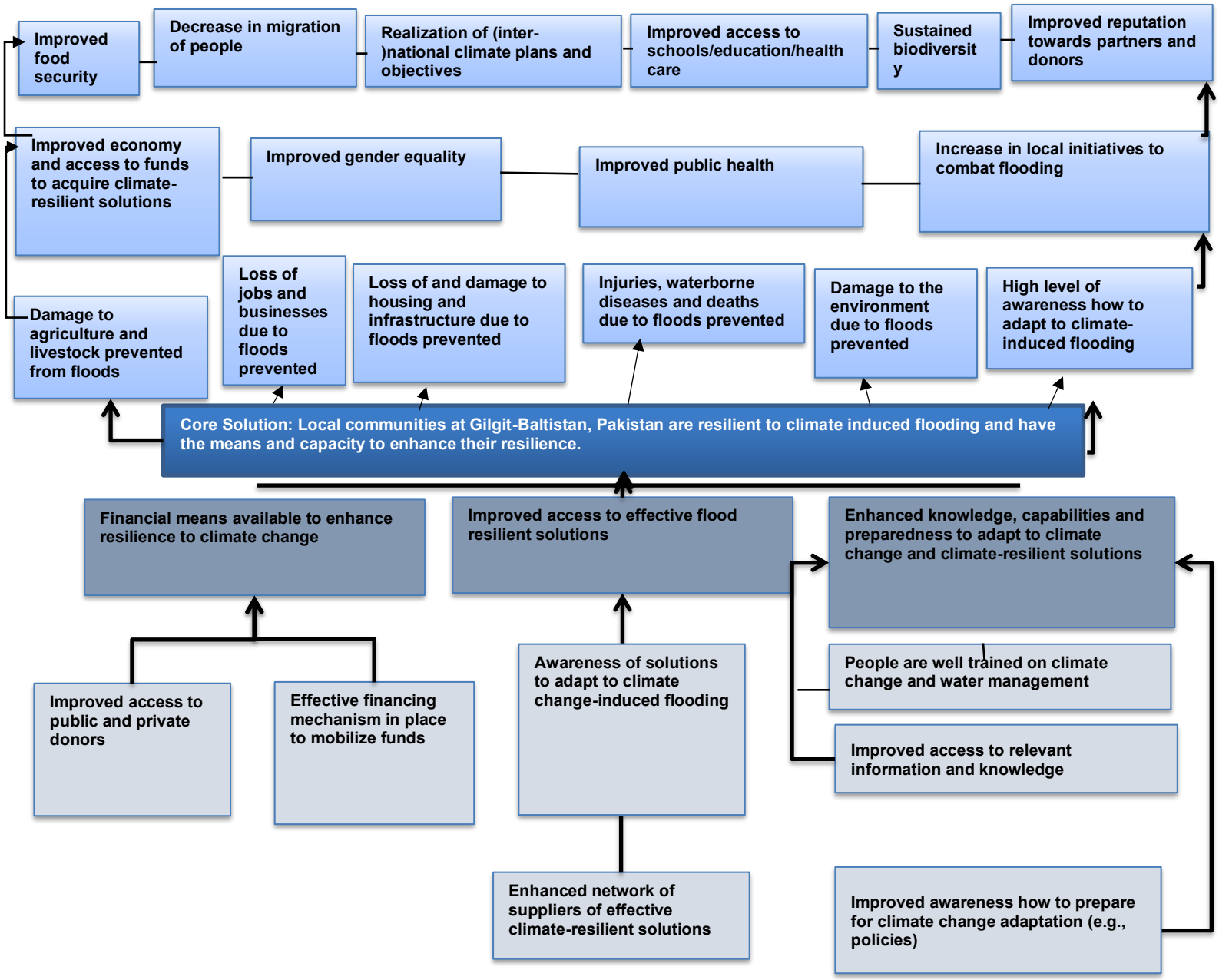
8.1.4 Measurement and evaluation of theory of change

We have developed a Logical Framework Approach, which is a management instrument widely used in the development sector for planning, monitoring and evaluation. The Logical Framework is aligned with the ToC.

8.1.5 Theory of change problem tree



8.1.6 Theory of change solution tree



8.2 Logical Framework

We couple the SLAMDAM technology to the Theory of Change which eventually leads to contribution to the SDG's. Here we portray our hypotheses of change which form the baseline for the M&E framework. We subdivide the M&E framework in two main objectives with multiple outputs and criteria. The two main objectives are:

1. Reduce vulnerability and increase resilience to climate-induced flooding through innovation and technology transfer for climate change adaptation
2. Strengthen community resilience and local capacity building to increase prosperity

The first objective consists of 4 outputs and the second objective of 2 outputs which directly link to our hypotheses of change. Below we introduce the outputs with their corresponding hypotheses.

Objective 1: Reduce vulnerability and increase resilience to climate-induced flooding in Gilgit-Balitstan, Pakistan through the use of the SLAMDAM-technology.

Output 1: Physical and natural assets made more resilient to climate induced flooding
If Pakistan is better able to prevent flooding, they will likely experience less financial loss caused by damage to housing, infrastructure and agriculture. The changing climate is increasing the probability and severity of flooding. Decreasing the potential damage of flooding and drought is therefore becoming more important.

If Pakistan's communities can effectively prevent flooding, they can improve their socio-economic wellbeing. This is an important condition to realize their Sustainable Development Goals (SDGs) such as reducing the gender and class gap, improving food security and decreasing poverty, improving job security and businesses, reducing conflicts and improving access to transport and infrastructure.

Output 2: Livelihoods and sources of income of vulnerable populations diversified and strengthened
If Pakistan's communities are able to effectively prevent flooding, then they will be less likely to migrate or be displaced. If Pakistan's communities can effectively enhance their resilience to flooding, the public health will likely improve due to decrease in diseases, injuries and deaths and an improved access to healthcare facilities.

Output 3: The number of people who are warned in advance of climatic induced floods grows and the warning consistency and reliability is increased
If communities and government staff have access to weather data and information, they are better able to implement climate resilient solutions and respond to threats of flooding. If an early warning system is used more often, increasing numbers of people will become aware of its existence and the system will improve due to increasing feedback

Output 4: Vulnerable natural ecosystems strengthened in response to climate change impacts
If Pakistan's communities can better prevent climate-induced flooding, they can protect the environment and prevent deterioration of its biodiversity.

Objective 2: Strengthen community resilience and local capacity building to increase prosperity at Gilgit-Baltistan, Pakistan

Output 1: Active, skilled and materialized local flood response team
Through improving knowledge and capabilities related to climate change of communities and government staff, represented in and around the flood response teams, Pakistan's society can enhance its resilience against climate-induced flooding.

Output 2: Number of people trained and informed regarding climate change impacts and appropriate adaptation responses
If members in and between communities interact more frequently around common goals of flood prevention, communities become stronger and ultimately existing distrusts between ethnic groups will decrease and peaceful relations will develop.

8.2 Logical Framework

	Indicators	Unit	Situation before SLAMDAM (Baseline)	Target Project
OBJECTIVE 1: Reduce vulnerability and increase resilience to climate-induced flooding and drought at Gilgit-Baltistan, Pakistan through innovation and technology transfer for climate change adaptation				
Outcome 1.1: *Weather information service solutions in combination with a mobile flood barrier piloted or deployed to reduce climate-related flood risks and/or enhance resilience*				
Output 1.1.1: Physical and natural assets made more resilient to climate induced flooding	Total area directly benefiting from more resilient physical and natural assets	(Potential) damage reduced (dollars) / (acres)		
	Agricultural landscape protected from flood damage	(Potential) damage reduced (dollars) / (acres)		
	Urban landscape protected from flood damage	(Potential) damage reduced (dollars) / (acres)		
	Rural landscape protected from flood damage	(Potential) damage reduced (dollars) / (acres)		
	Residential houses protected from flood damage	(Potentially) vulnerable buildings protected (dollars) / (number)		
	Public buildings protected from flood damage	(Potential) damage avoided (dollars) / (number)		
	Industrial or commercial units protected from flood damage	(Potential) damage avoided (dollars) / (number)		
	Small businesses / shops protected from flood damage	(Potential) damage avoided (dollars) / (number)		
	Irrigation or water structures protected from flood damage	Number of irrigation structures protected		
	Ports or landing sites protected from flood damage	Damage (dollars) prevented		
		Indirect financial damage (dollars) avoided		
	Airports protected from flood damage	Damage (dollars) prevented		
		Indirect financial damage (dollars) avoided		
	Roads protected from flood damage	Repair costs (dollar) avoided		
		Affected individuals prevented		

	Indicators	Unit	Situation before SLAMDAM (Baseline)	Target Project
	km rail networks protected from flood damage	Repair costs (dollar) avoided		
		Affected individuals prevented		
	Other			
Output 1.1.2: Livelihoods and sources of income of vulnerable populations diversified and strengthened	Total no. of direct beneficiaries with diversified and strengthened livelihoods and sources of income	number		
		number		
		number		
	Male	number		
	Female	number		
	Reduction in No. people displaced / migrated	number		
	Reduction in No. injuries and deaths	number		
	Reduction in No. jobs lost	number		
	Other			
Output 1.1.3: The number of people who are warned in advance of climatic induced floods and drought grows and the warning consistency and reliability is increased	Total no. of direct beneficiaries from the new/improved climate information systems	number		
		number		
		number		
	No. of Climate hazards addressed compared to before	number		
	No. of people who are warned for climate risks in advance	number		
	Increase in percentage of uptime of weather information system	percentage uptime		
	No. of correct warnings issued	percentage		
	No. of people who have become more aware of their climate risks	number		
	Hours between warning issue and climate disaster (leadtime)	hours		
	No. of platforms to disseminate climate warnings has increased	number		

	Indicators	Unit	Situation before SLAMDAM (Baseline)	Target Project
Output 1.1.4: Vulnerable natural ecosystems strengthened in response to climate change impacts	Vulnerable ecosystem protected	Protected area (ha)		
OBJECTIVE 2: Strengthen community resilience and local capacity building to increase prosperity at Gilgit-Baltistan, Pakistan				
Outcome 2.1: *Institutional and human capacities strengthened to identify and implement adaptation measures*				
Output 2.1.1: Active, skilled and materialized local flood and drought response team	Total no. of direct beneficiaries from more resilient physical and natural assets	number of people		
		number of people		
		number of people		
	Km mobile flood barrier	Kms		
	Liters of water that can be stored in the mobile barrier	Liters		
	People trained on how to operate and maintain the flood barrier	number of people		
	Strategically located storage facilities	number		
Output 2.1.2: Number of people trained and informed regarding climate change impacts and appropriate adaptation responses	People are trained and informed regarding climate change impacts	number of people		
		number of people		
		number of people		
	People at line ministries are trained and informed regarding climate change impacts	number of people		
		number of people		
		number of people		
	Community / association members trained and informed regarding climate change impacts	number of people		
		number of people		
		number of people		
	Extension service officers trained and informed regarding climate change impacts	number of people		
		number of people		

	Indicators	Unit	Situation before SLAMDAM (Baseline)	Target Project
		number of people		
	Hydromet and disaster risk management agency staff trained and informed regarding climate change impacts	number of people		
		number of people		
		number of people		
	Small private business owners trained and informed regarding climate change impacts	number of people		
		number of people		
		number of people		
	Schoolchildren, university students or teachers trained and informed regarding climate change impacts	number of people		
		number of people		
		number of people		
	Other (specify)	number of people		

9. Communication plan

The communication plan is under development.

OUTPUT REPORT

Project: ***CIC 359: SLAMDAM (water-filled flood barrier)***
Resilience to floods is strengthened by deploying SLAMDAM to prevent damages caused by flooding. Capabilities to manage risk of floods is enhanced to ensure that local people and institutions are able to enhance resilience independently using flood resilient measures.

Output reports are used to reflect and monitor the progress of each this project. In addition, this report is used to communicate completion of specific project outputs as agreed to initiate tranche payments.

Project phase	Project output indicator	Evidence examples	Remarks
Phase 1: Project inception	Inception meeting and report	- Kick-off / inception presentation - Implementation plan i.e. inception report	- Project kick-off / inception meetings was successful and attendees by the project organisation including the ADPC representative. - Comments from the inception meeting have been incorporated in the implementation plan, which is therefore also the inception report.

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Project “Esmark”* Kick-off Presentation

Climate Innovation Challenge (CIC) project, led by Zephyr Consulting, to demonstrate "SLAMDAM (water-filled flood barrier)” as an effective climate adaptive solution under the CARE for South Asia that is being implemented by ADPC with funding support from the World Bank.

Author: Omar Saleh
Amsterdam – The Netherlands, 25 Jan. 2022

* Proposed project title refers to first scientist who studied glaciers

Agenda

1. Project Overview
2. Project Approach
3. Project Deliverables
4. Project Planning
5. Project Organisation
6. Project Risks

Annex I: ICR Risks

Annex II: Location Selection Matrix

1. Project Overview (1/2)

1. Background & Introduction

The visible and measurable effects of climate change across Pakistan have become more apparent over the last two decades. There is a direct linkage between climate change and the intensity and frequency of flooding. Pakistan can benefit greatly from innovative and effective solutions aimed to strengthen resilience to floods.

A Consortium of companies led by Zephyr Consulting, including Watersprint and Nelen & Schuurmans will implement a low-cost, climate resilient, re-usable, easy replicable, scalable and mobile flood barrier to prevent damage from flooding caused by seasonal melt water from glaciers Gilgit-Baltistan. The vulnerable communities in Gilgit-Baltistan are impacted by the negative consequences of these climate change-induced floods.

The Consortium will implement SLAMDAM to strengthen Pakistan's resilience to climate change. SLAMDAM is a climate resilient technology being water-filled flood barrier that can easily be deployed to prevent damage from flooding.

2. Project Objectives

The key objective is to demonstrate SLAMDAM, a mobile flood barrier, as an effective solution to adapt to climate change by enhancing resilience and reducing vulnerabilities to (climate change-induced) floods in Gilgit-Baltistan in Pakistan.

3. Scope

In scope of this project

- SLAMDAM will be used to prevent damage from flooding.
- Demonstration when there is a real-life threat of flooding.
- Thorough flood risk assessment including development of flood risk maps and scenarios.
- Capacity building related to climate change and SLAMDAM.
- Plan to scale up SLAMDAM across Pakistan.

Out of scope of this project

- Implementation of an advanced flood early warning system.
- Usage of SLAMDAM for purpose other than flood prevention.
- Providing equipment to transport SLAMDAM from the storage facility to location of deployment.

1. Project Overview (2/2)

4. Key Requirements

In order to showcase SLAMDAM as an effective technology for climate change adaptation that can be scaled-up across Pakistan, the technology should:

- Prevent flood damages in line with the targets.
- Be operated by a dedicated flood response team independently.
- Show the ability for it to be deployed at various locations under different circumstances.
- Take little time to build up and dismantle.
- Take little effort for people to be trained on how to operate it.
- Be able to be reused after dismantling it.

5. Proposed Solution

- The proposed solution is to demonstrate SLAMDAM as an effective solution to prevent damages from flooding by deploying the technology in Gilgit-Baltistan in Pakistan when there is a real-life threat of flooding due to rising water levels caused by seasonal melting of the glaciers.

6. Key Project Deliverables

- Flood risk assessment.
- Mobile flood barrier suitable for the pilot location.
- Well-trained flood response team and community.
- Successful demonstration of SLAMDAM.
- Various Reports (Inception, progress, closure etc.).
- M&E plan and report.
- Roadmap to scale-up SLAMDAM across Pakistan.

7. Impact Project Result

Key benefits

- Prevented (in)direct / (in)tangible damages caused by flooding.
- Enhanced capabilities of flood response team and community.
- Enhanced resilience to floods.

Co-benefits

- Improved access to the road network in Gilgit-Baltistan.
- Reduced gender and class gaps.
- Improved sustainable behaviours and job creation.

2. Project Approach*

1 Project inception

- Prepare kick-off presentation
- Kick-off meeting with the client
- Finalise implementation plan
- Plan project meetings

2 Flood risk assessment

- Data collection and analyses
- Data storage and publishing
- Develop flood scenarios / maps
- SLAMDAM location assessment
- SLAMDAM characteristics assessment

3 Monitoring & evaluation

- Select indicators
- Develop baseline scenarios
- Approved targets per indicator
- Develop M&E plan
- Hold M&E workshop

4 SLAMDAM development

- Manufacture SLAMDAM-technology
- Design SLAMDAM processes
- Design training material
- Ship and store the SLAMDAM
- User acceptance testing

5 Demonstration

- Climate change workshops
- Capacity building / training sessions
- Dry run demonstrations
- Real-life demonstration
- Monitoring results of demonstration

6 Roadmap / project closure

- Develop roadmap to scale-up
- Webinars to promote SLAMDAM
- Prepare draft closure report
- Wrap-up workshop
- Finalise project closure report

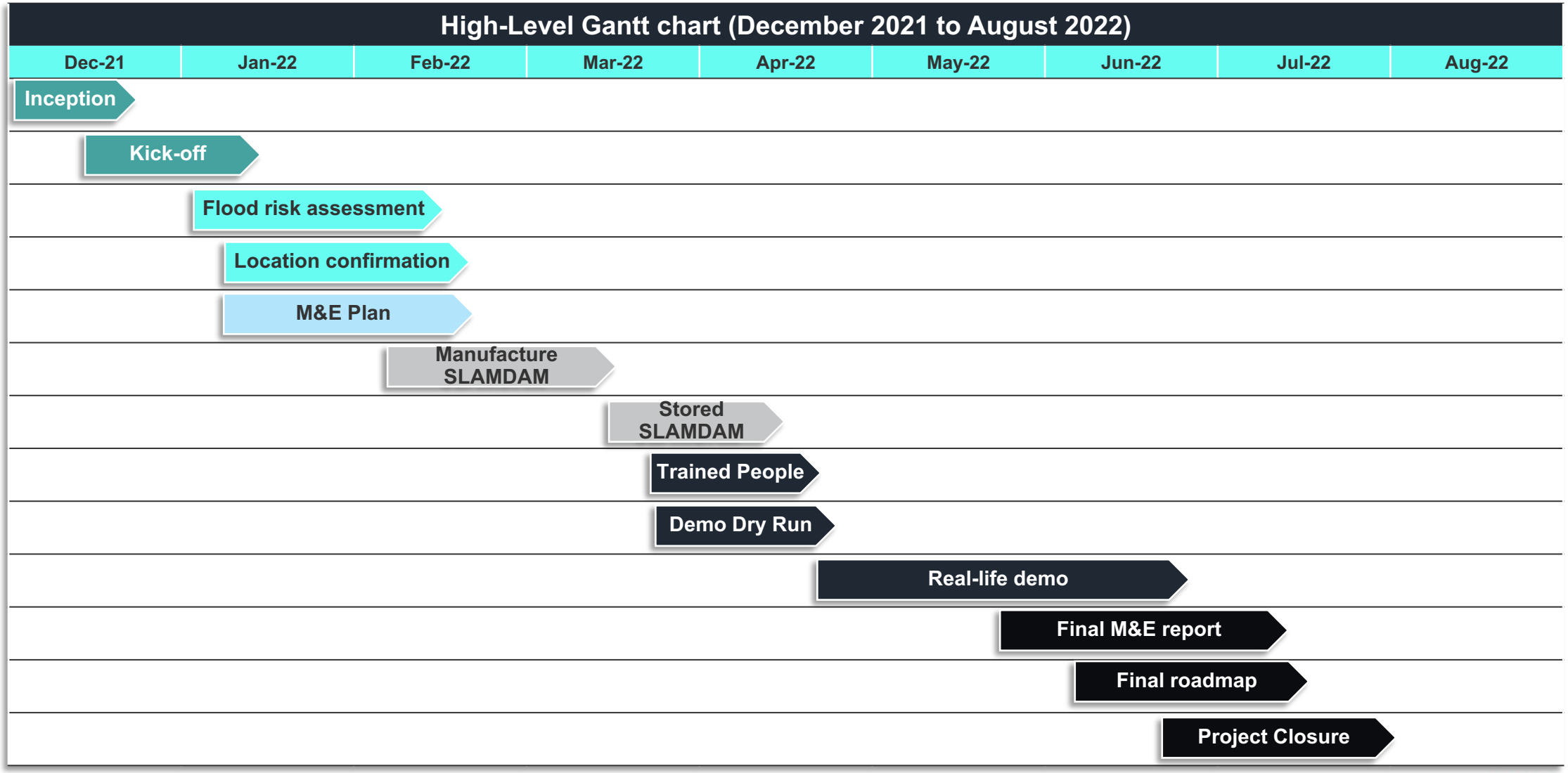
* The project approach comprises of six phases / work packages

3. Key Project Deliverables

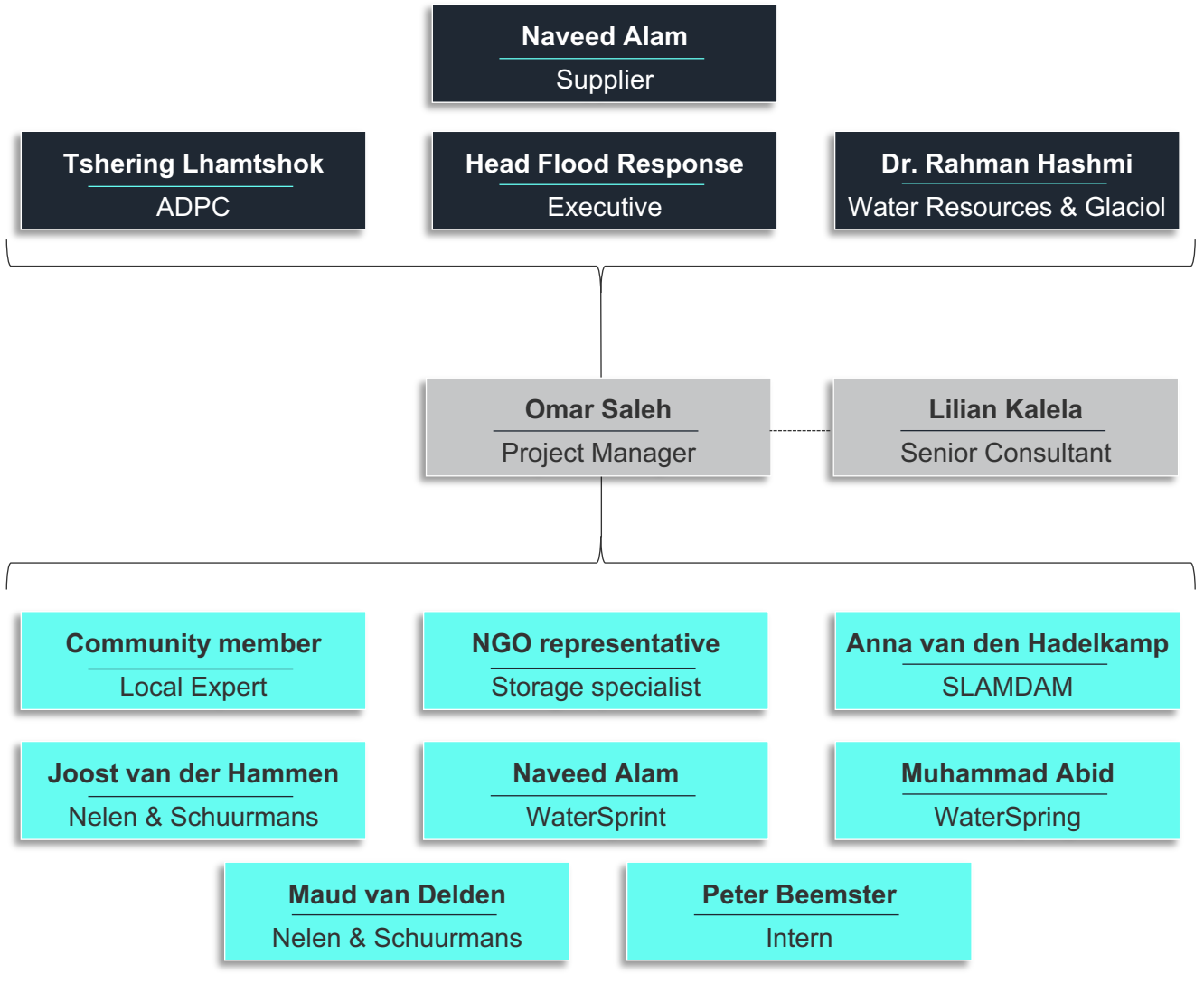
TASK	DELIVERABLE	TIMELINE
PHASE 1 – PROJECT INCEPTION		
Prepare implementation	Project implementation plan	Week 4
Kick-off meeting	Kick-off presentation	Week 4
Prepare M&E plan	M&E plan	Week 5
Stakeholder mapping	A complete stakeholder list	Week 5
PHASE 2 – FLOOD RISK ASSESSMENT		
Data exploration	Collected data & recommendations	Week 8
Store and publish data	Enriched data stored in a portal	Week 9
Develop flood scenarios	Flood scenarios and flood risk maps	Week 10
Flood risk assessment	Workshop and final risk assessment	Week 11
Flood barrier design	Assessment barrier design and location	Week 11
Local implement. plan	Implementation workshop and final plan	Week 13
PHASE 3 – MONITORING AND EVALUATION		
Develop M&E plan	M&E plan: logical framework, ToC etc.	Week 6
Baseline setting	Baseline scenarios	Week 11
Prelim. target setting	Completed logical framework	Week 11
Communication strategy	Communication plan	Week 8

TASK	DELIVERABLE	TIMELINE
PHASE 4 – SLAMDAM DEVELOPMENT		
Manufacture SLAMDAM	SLAMDAM barriers and accessories	Week 12
Ship & store SLAMDAM	SLAMDAM stored in Pakistan	Week 17
Design training material	Training material (manual / procedures)	Week 15
PHASE 5 – DEMONSTRATION		
Climate change workshop	Report outcome workshops	Week 16
Training flood resp. team	Training sessions & sign-off document	Week 18
Dry run demonstrations	Report deployment SLAMDAM	Week 18
Stakeholder consultation	Stakeholder workshop and report	Week 18
Real-life demonstration	Recording / report of demonstration	Week 26
PHASE 6 – ROADMAP AND PROJECT CLOSURE		
Make draft M&E report	Draft M&E report	Week 27
Finalise M&E report	Workshop and final M&E report	Week 28
Prepare roadmap	Draft roadmap to scale-up in Pakistan	Week 28
Finalise roadmap	Workshop and final roadmap	Week 29
Project completion	Closure report and lessons learned	Week 30

4. Project Planning



5. Project Organisation (1/2)



Steering Committee *(meets every 4 weeks)*
- Has final responsibility for the outcome of the project
- Ensures coherent steering of the project
- Delegates decisions & tasks effectively
- Convenes once every month

Project Management
- Is central point for daily lead of the project
- Is responsible for proper project execution
- Ensures collaboration between team members
- Heads project delivery team meeting and guides steering committee meeting

Project Delivery Team *(meets every week)*
- Delivers project results according to planning
- Actively collaborates
- Adheres to decisions made by the steering committee
- Convenes once every week

5. Project Organisation (2/2)

Project Team's Roles & Responsibilities			
Project Team Member		**Role**	**Responsibilities**
1	Tshering Lhamtshok	Senior User	Represents ADPC and is responsible for specifying requirements of the outcome of the demonstration project to determine whether the project is successful or not.
2	Dr. Rahman Hashmi	User	Proposed requirements of the outcome of the demonstration project to determine whether the project is successful or not.
3	Naveed Alam	Senior Supplier	Is responsible for clear and timely communication with local authorities and companies and the coordination of locally performed activities.
4	Head Flood Response Team	Senior Executive	Is ultimately responsible for a successful outcome of the project and they have significant decision power – supported by the senior supplier and senior user.
5	Omar Saleh	Project Manager	Is central point for daily lead of the project and is authorised to execute the project on behalf of the steering committee.
6	Lilian Kalela	Senior Consultant	Is responsible for developing the M&E plan and report
7	Community representative	Project Team	Is responsible for deploying the flood barrier and collecting local data
8	NGO representative	Project Team	Is responsible for storage of the flood barrier
9	Maud van Delden	Project Team	Is responsible for hydrological data gathering and supporting software analyses
10	Joost van der Hammen	Project Team	Is responsible for overseeing data-driven flood risk assessment
11	Peter Beemster	Project Team	Is responsible for evaluating suitability of SLAMDAM for the pilot location
12	Anna van den Hadelkamp	Project Team	Is responsible for designing and manufacturing the SLAMDAM-technology
13	Muhammad Abid	Project Team	Is responsible for liaising with local people and support in data collection and hydrological modeling

6. Project Risks (1/2)

1. KEY RISKS						
#	RISK DESCRIPTION	CHANCE	IMPACT	MITIGATION	PTA	DUE DATE
R1	- Risk that the selected pilot location is not suitable for the SLAMDAM-technology	M	C	- Urgently collect flood data to assess whether SLAMDAM is a suitable measure and use SLAMDAM suitability matrix. - Find other suitable locations in case the initial location is deemed not suitable.	T.b.d.	T.b.d.
R2	- Risk that there is no flood during the demonstration	M	H	- Ensure we have the best location to do the demonstration i.e. **highest chance of flood** - Have close conversations with local stakeholders to help select the proper location - Plan an option to simulate a flood event	T.b.d.	T.b.d.
R3	- Risk that SLAMDAM works but doesn't save a lot of houses / people to meet the targets	M	H	- Ensure we have the best location to do the demonstration i.e. **highest estimated damages**	T.b.d.	T.b.d.
R4	- Risk that we don't see the floods ahead of time	M	H	- Ensure adequate flood forecasting is in place	T.b.d.	T.b.d.
R5	- Risk that staff locally cannot operate the SLAMDAM units timely and adequately	M	H	- Have a training program for authorities (incl. NGO) that need to act in case of floods and train staff accordingly - Create processes / manuals / procedure / working instructions and visual aids	T.b.d.	T.b.d.
R6	- Risk that SLAMDAM doesn't work effectively to help against the flood	M	H	- Make a detailed description of the problem situation (previous floods, surroundings, houses, people etc.) - Ensure SLAMDAM is designed to help with the anticipated flood situation	T.b.d.	T.b.d.

6. Project Risks (2/2)

1. KEY RISKS						
#	RISK DESCRIPTION	CHANCE	IMPACT	MITIGATION	PTA	DUE DATE
R7	- Risk there is insufficient financing for the project	M	H	- Budget the costs for this project - Get co-financing from The Netherlands and other parties	T.b.d.	T.b.d.
R8	- Risk that there is not enough water available to fill the dams	M	H	- See mitigation R1	T.b.d.	T.b.d.
R9	- Risk that there is no appropriate infrastructure and equipment to position the dams in case of a flood	M	H	- See mitigation R1	T.b.d.	T.b.d.
R10	- Risk there is a significant delay due to obstructions when transporting flood barrier to Pakistan caused by excessive bureaucracy	H	H	- Plan the shipment well in advance and identify all requirements to transport and clear the goods - Manufacture and ship the goods as early as possible by not waiting till the final outcome of the risk assessment. Instead, start manufacturing when we already have a certain degree of certainty of the length and height of the barrier.	T.b.d.	T.b.d.

7. Next Steps

Moving forward we need to take the following steps on the short-term:

- Complete project organisation (incl. community and NGO member)
- Complete stakeholder mapping
- Finalise implementation plan
- Plan project team and steering committee meetings
- Open data portal
- Collect relevant flood data

Appendices

Annex I: *ICR Risks (1/2)*

1. ICR RISKS PAKISTAN						
#	RISK DESCRIPTION	CHANCE	IMPACT	MITIGATION	PTA	DUE DATE
R11	- Risk that Pakistan is used as a tax haven during the project	L	H	- SLAMDAM to pay extra attention to its tax and transfer pricing policy and that of its suppliers.	T.b.d.	T.b.d.
R12	- Risk that we encounter bribery and other corrupt practices	M	H	- Send the the recommendations of the OECD guidelines to the project team incl. staff and instruct full adherence - Have procedure on what to do in case of corruption attempt - Involve the Dutch embassy in the project - Screen our partners and suppliers	T.b.d.	T.b.d.
R13	- Risk that anyone involved in the project encounters extrajudicial executions, enforced disappearances, torture and other ill-treatment by the Pakistani army.	L	H	- Do not engage in corruption and bribery (see also R2) - Use the doing business with respect guidance tool	T.b.d.	T.b.d.
R14	- Risk that there is inadequate supply of infrastructure, corruption, and access to financing to support the the project.	M	H	- See also mitigation R1 - Arrange appropriate infrastructure and water supply with the local government / flood response team	T.b.d.	T.b.d.
R15	- Civil liberties of anyone involved in the project are impeded because of the regime	L	H	- See also mitigation R2 & R3 - Involve the Dutch embassy / government in the project	T.b.d.	T.b.d.
R16	- Political risks, such as conflicts leading to a cancelation or postponed of the project	M	H	- See also mitigation R2 - R5 - Actively keep track of any developments in political risks throughout the project	T.b.d.	T.b.d.

Annex I: *ICR Risks (2/2)*

1. ICR RISKS PAKISTAN						
#	RISK DESCRIPTION	CHANCE	IMPACT	MITIGATION	PTA	DUE DATE
R17	- Risk that we encounter terrorism attack	L	H	- Follow the recommendations of the UN Global Compact initiative (chapter 3, from p. 18).	T.b.d.	T.b.d.
R18	- Risk that we are involved in or enable land grabbing	L	L	- Stay in contact with the local community to monitor whether land grabbing takes place and have reps. in the project team	T.b.d.	T.b.d.
R19	- Risk that our project leads to damage to the environment and forced displacement of children as a result of land acquisition.	L	M	- See also R8 - Monitor and quantify the benefits of our project	T.b.d.	T.b.d.
R20	- Risk that union / workers' rights are violated	L	L	- Follow the following recommendations of CNV International (chapter 3). - Screen out partners and suppliers	T.b.d.	T.b.d.
R21	- Risk that are project is involved in or enables forced labor or human trafficking	L	H	- Project team to follow the e-learning courses offered by Verité on forced labour and human trafficking.	T.b.d.	T.b.d.
R22	- Risk that the project is involved in or enables child labor	L	H	- Follow these practical ILO steps and follow the Ethical Trade Initiative guide	T.b.d.	T.b.d.
R23	- Risk that this project is involved in or enables gender / religious discrimination	L	H	- Involve women's organizations in the project - Keep contact with the local community incl. religious groups - Ensure women are represented throughout the project		
R24	- Risk that our project leads to damage to the environment such as deforestation	L	M	- Have our local partner Watersprint oversee any possible damages to the environment.		

Annex II: *Location Selection Matrix (1/2)*

SLAMDAM LOCATION SELECTION MATRIX – FLOOD ADAPTATION			
CRITERIUM / ASSUMPTION		**PRIORITY**	**EXPLANATION**
1	Region / institution frequently suffers significant damages caused by floods	**Critical**	Potential benefits have to outweigh the investment
2	Floods are caused by overflowing water bodies such as lakes, the sea or rivers	**High**	Pluvial floods are also a possibility but more difficult
3	The surface area is not too steep to position bunds such as valleys	**Critical**	
4	There are sources of water available to fill the bunds and build up a barrier	**Critical**	
5	There is a facility where the SLAMDAM-technology can be stored	**Critical**	
6	The infrastructure allows for transport from the facility to the selected area	**Critical**	
7	SLAMDAM is not meant to stop flash floods	**Critical**	
8	There is a flood response team available	**Medium**	If not, we need to setup a flood response team
9	The region / institution is ready to adapt to climate change (policies, knowledge)	**Medium**	If not, we should close the readiness gaps
10	The ground surface doesn't have sharp objects	**High**	Sharp objects should be removed or use extra layer EPDM
11	There is appropriate local support to implement SLAMDAM	**Critical**	
12	The positioning of the flood barrier should not lead to (excessive) damages elsewhere	**Critical**	
13	Flow velocity and pressure should not exceed the limits of the SLAMDAM-technology	**Critical**	

Annex II: *Location Selection Matrix (2/2)*

SLAMDAM LOCATION SELECTION MATRIX – DROUGHT ADAPTATION			
CRITERIUM / ASSUMPTION		**PRIORITY**	**EXPLANATION**
1	Region / institution frequently suffers significant damages caused by drought	**Critical**	
2	Water-filled bunds can be stored somewhere for later usage	**High**	E.g. a water treatment plant
3	The water-filled bunds can be transported from storage facility to destination	**High**	Alternatively there could be piping for transport
4	Water can be used for other purposes such as drinking water or agriculture	**Critical**	
5	Stored water can be treated nearby to make it usable for other purposes	**Medium**	Water might need to be treated depending on the purpose