

# TECHNICAL PROPOSAL

Selection 1259359

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Towards impact-based forecasting: upgrading InaSAFE and  
GeoSAFE to enable forecast-based action

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**KARTOZA**  
OPEN SOURCE GEOSPATIAL SOLUTIONS



**Climate  
Centre**

This proposal is a collaboration between the Red Cross Red Crescent Climate Centre (Climate Centre) and Kartoza Pty (Ltd.). Our offering combines our expertise in Forecast based Financing (via team members from the Climate Centre) and in the development of software for contingency planning (InaSAFE / Kartoza) to introduce important new functionality to InaSAFE that will allow disaster managers to generate reports that indicate where funding will need to be mobilised for early action in the event of a potential disaster based on forecast data and the vulnerability of people and infrastructure in potentially affected areas.

It is our pleasure to form this partnership for the purpose of participating in the Challenge Fund and we hope that this proposal shares our excitement at the prospect of developing innovative new tools to support the most vulnerable sectors of society in the event of a disaster.

With Kind Regards



Erin Coughlan de  
Perez



Catalina Jaime



Tim Sutton



Gavin Fleming

## Abstract

After years of implementing FbF pilots, the Red Cross Red Crescent Movement is taking FbF up to scale. A new [forecast-based funding mechanism](#) has been established to reach, in the window between a forecast and a likely disaster, the people most vulnerable to climate shocks globally. However, implementing FbF is often quite difficult, because when a hydrometeorological forecast arrives, it is not clear to humanitarians what kind of impacts to expect (Houses destroyed? Roads closed? Where?). Without information about potential impact, humanitarians do not know what early actions to take and where to implement them. To answer these questions, the Climate Centre and partners have adopted the concept of Impact-based Forecasting (IbF) an approach that combines the understanding of forecast skill, impact-hazard curves and risk analysis, to generate an intervention map that will inform when and where funds for early action should be deployed. Simply put, the goal of IbF is to support FbF.

The goal of IbF is to combine a weather or climate forecast of a hydro-meteorological hazards with information about people and places, to anticipate sector-specific and context-specific impacts. This can lead to the development of more efficient sectoral responses to mitigate those impacts. IbF breaks the silos of forecasting that exist between hydro-meteorologists and people who can take early action. By focusing on impacts and communicating these, it is expected that the population at risk and the responding professionals will have a better understanding of potential disruptions, which can be used to develop triggers to identify when and where to take appropriate early actions.

Recognizing that few (if any) tools exist to support people to do Impact-based Forecasting, this proposal will tackle the challenge of roll-out and sustainability of impact-based forecasting to enable forecast based financing. It will answer the following questions:

- Can an existing information management system such as GeoSAFE/InaSAFE that is already used for contingency planning be transformed into an IbF tool that integrates scientific triggers for early action?
- To enable automatic disbursement of funding for early action, decision makers need to use (and trust) the most reliable risk data and forecast information to be able to approve funding. How could a GeoSAFE/InaSAFE-like platform enable a trustful and effective decision-making process for early action?
- Can a GIS-based tool that is used by disaster managers and government planners foster interdisciplinary collaboration? Specifically, can it enable dialogue between the two groups and create an easy way to set triggers for early action?

InaSAFE is a mature project. The software is used in many countries with active projects in Indonesia, Fiji, countries of the South Pacific, India, Mozambique, Tanzania, Philippines and more. It is used by disaster managers and responders to understand the potential impacts of disasters through reports which tabulate the counts of people, humanitarian needs, and infrastructure such as roads and buildings. There is currently no support for FbF in InaSAFE to enable early action based on a weather or climate forecast. To do this, the primary work would be to (1) introduce support for more sophisticated impact analysis curves based on historical events and the impacts of those events, and (2) enable users to convert these to risk data in real time showing quantifiable potential impacts of the forecast event.

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## 1 Consultant's Organization

### 1.1 Kartoza



We are Free and Open Source GIS (FOSSGIS) Service providers, providing a global service to individuals, companies and governments around the world who are looking to leverage the power of the Free Software movement to solve geospatial problems. We have a proven track record in precision agriculture, disaster risk reduction, biodiversity information systems and many more. We offer the following core services:

**Training:** We provide corporate training in the use of FOSSGIS such as QGIS, PostgreSQL/PostGIS and GeoServer. We also develop training materials and provide educator training to foster the study of GIS and geospatial technology at schools and universities.

**Deployment and support:** We provide services to help organisations deploy and maintain FOSSGIS systems within your organisation. This includes PostgreSQL/PostGIS databases, Linux based servers, QGIS on desktops and servers, Mapserver, GeoServer, GeoNode and many others.

**Software development:** We provide bespoke services for the development of custom solutions to meet business needs. These include desktop, web and mobile application development using FOSSGIS. Our web application development services are focussed on applications that have a geospatial component where we use technologies such as GeoDjango, OpenLayers and PostGIS.

Kartoza has been instrumental in the development of various high profile Open Source geospatial projects. We contribute to, and provide project leadership in, QGIS (<http://qgis.org>), InaSAFE (<http://inasafe.org>) and a large number of different in-house developed Open Source projects as can be seen in our GitHub repository at <http://github.com/kartoza>.

We value diversity and our team is made up of developers and support staff from South Africa, Indonesia and France. Our offices are based in South Africa.



## 1.2 Red Cross Red Crescent Climate Centre



The Red Cross Red Crescent Climate Centre supports the Red Cross and Red Crescent Movement and its partners in reducing the impacts of climate change and extreme weather events on vulnerable people. The Climate Centre works at the interface of science, policy and practice, shaping research and international policy discussions on climate risk management. On the ground, they provide practical support to Red Cross Red Crescent Societies in 191 countries, collaborating with governments, multilaterals, universities and civil society. The Climate Centre has staff embedded in a range of leading academic institutions and publishes research on early warning systems.

The Climate Centre is pioneering a climate risk management strategy called Forecast-based Financing, which ensures humanitarian funding is available when there is a weather or climate forecast of a potential disaster. The Climate Centre has supported the launch of a new international fund for forecast-based action, and is developing programmes in more than 20 countries to automatically trigger humanitarian action when forecasts indicate high risk of extreme events. Positively received at the Third UN World Conference on Disaster Risk Reduction and multiple Conference of Parties to the United Nations Convention on Climate Change, the humanitarian sector has pledged to rapidly scale up its work on Forecast-based Financing during the World Humanitarian Summit in 2016.

The Climate Centre also supports the humanitarian and development sectors to address long term climate risk management, holding international roles as knowledge manager in the Building Resilience for Climate Extremes and Disasters (BRACED) programme, and climate risk partner in the Partners for Resilience Programme. This work includes the development of shock-responsive social protection systems, Reality of Resilience work around learning from climate extremes; a Climate and Weather Information Helpdesk; and facilitation of dialogue among scientists and disaster managers.

As part of their work on Forecast-based Financing, the Climate Centre has developed bespoke methods to combine forecasts with vulnerability and exposure information in different countries. For example, and recent triggering forecast for coldwaves and snowfall in the Peruvian Andes was combined with vulnerability information and maps of the location of alpaca farmers to distribute goods for cold protection. There is increasing demand for these methods to combine data.

## 2 Consultant's Experience

<b>Assignment name:</b>  The Implementation of Disaster Management Software (Indonesia) / Contract 73177	<b>Approx. value of the contract (in current US\$):</b>  \$355,000.00
<b>Country:</b> Indonesia <b>Location within country:</b> Jakarta	<b>Duration of assignment (months):</b> 18 months
<b>Name of Client:</b>  DFAT	<b>Total No. of staff-months of the assignment:</b>  37
<b>Contact Person, Title/Designation, Tel. No./Address:</b>	David Robinson InaSAFE Programme Manager <a href="mailto:David.Robinson@ga.gov.au">David.Robinson@ga.gov.au</a>
<b>Start date (month/year):</b> 1 February 2017 <b>Completion date (month/year):</b> 30 June 2018	<b>No. of professional staff-months provided by your consulting firm/organization or your sub consultants:</b>  37
Name of associated Consultants, if any:  Lutra Consulting.	<b>Name of senior professional staff of your consulting firm/organization involved and designation and/or functions performed (e.g. Project Director/Coordinator, Team Leader):</b>  Tim Sutton – Team Lead Gavin Fleming – Web Lead
<b>Description of Project:</b>  Indonesia is one of the most disaster-prone countries in the world due to its hazard profile and high population exposure. DMInnovation uses Australian and Indonesian science and technological innovation to strengthen the evidence base to support informed Indonesian disaster management. InaSAFE is a decision support tool designed to enhance the abilities of disaster managers to prepare for disasters and to reduce the impact of those disasters on the local population and infrastructure. It allows scientific hazard evidence to be combined with exposure information to inform disaster management. Despite its high risk profile, many disaster management decisions in Indonesia are not informed by adequate and/or best available information. This is because disaster managers are unable to access, understand or use the scientific information and spatial data that is necessary to underpin informed disaster management.  InaSAFE helps disaster managers to combine hazard and exposure information to run an impact analysis that produces an impact layer (map), impact summary (report) and action list. These products provide disaster managers with a better understanding of the potential	



disaster impact and a better ability to plan for and respond to disasters. It makes it easier for disaster managers to use scientific information to strengthen informed decision making. Indonesia has demonstrated a clear commitment to adopt InaSAFE as part of their work practice.

It is therefore the long-term aim of the project to institutionalise InaSAFE in disaster management activities in Indonesia. The purpose of this contract is to implement and to support the institutionalisation of InaSAFE software within Government of Indonesia through capacity building; community engagement and strengthened project governance while also continuing to further enhance the software. Through this contract, the contractor under the direction of DMInnovation collaborate with Indonesia's National Disaster Management Agency (BNPB), Regional and District Disaster Management Agencies (BPBDs), Government of Indonesia (001) science agencies, universities, and the community.

The result of this work programme has been the delivery of a number of components:

- A number of training courses provided to colleagues at BNPB
- The development of training materials
- The development (in conjunction with DMI) and iterative release of a number of versions of InaSAFE Desktop
- The development of a new version of InaSAFE Realtime
- Ongoing updates and maintenance of the websites associated with InaSAFE

In summary, the operative InaSAFE Desktop and InaSAFE Realtime software products have been massively updated and improved upon, with a special focus on meeting the needs of Indonesian users and institutionalisation of the InaSAFE software so that it can be a sustainable and ongoing component in the Disaster Risk Reduction programme in Indonesia.

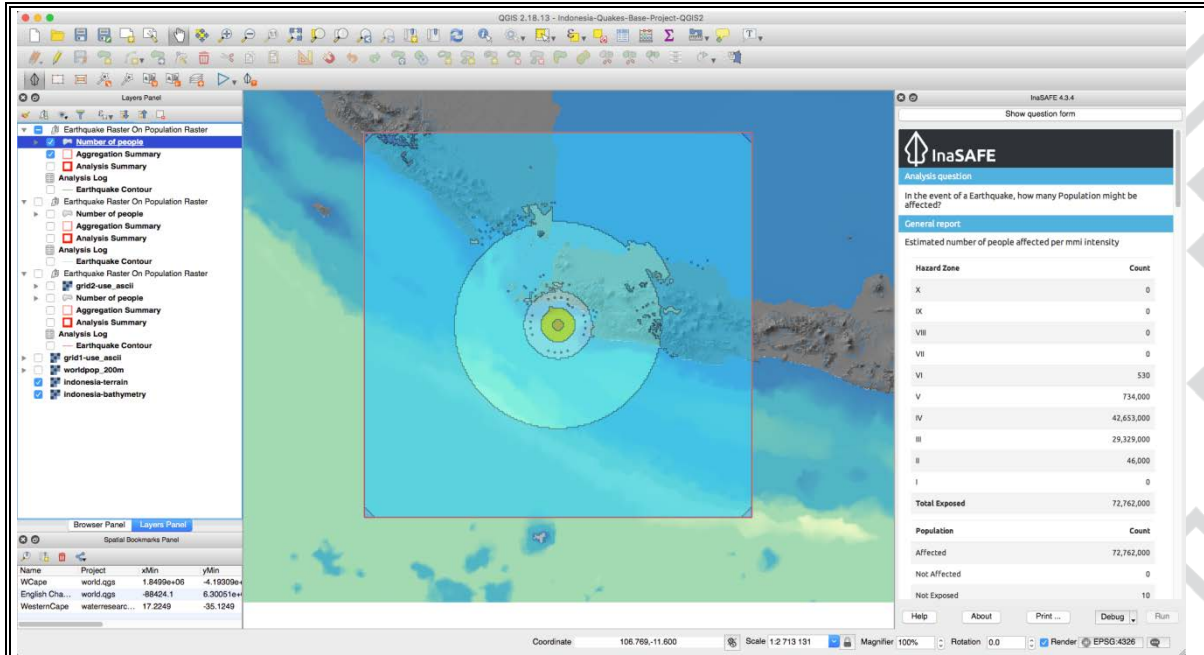


Figure 1: Screenshot of InaSAFE version 4.3.4 running on QGIS 2.18

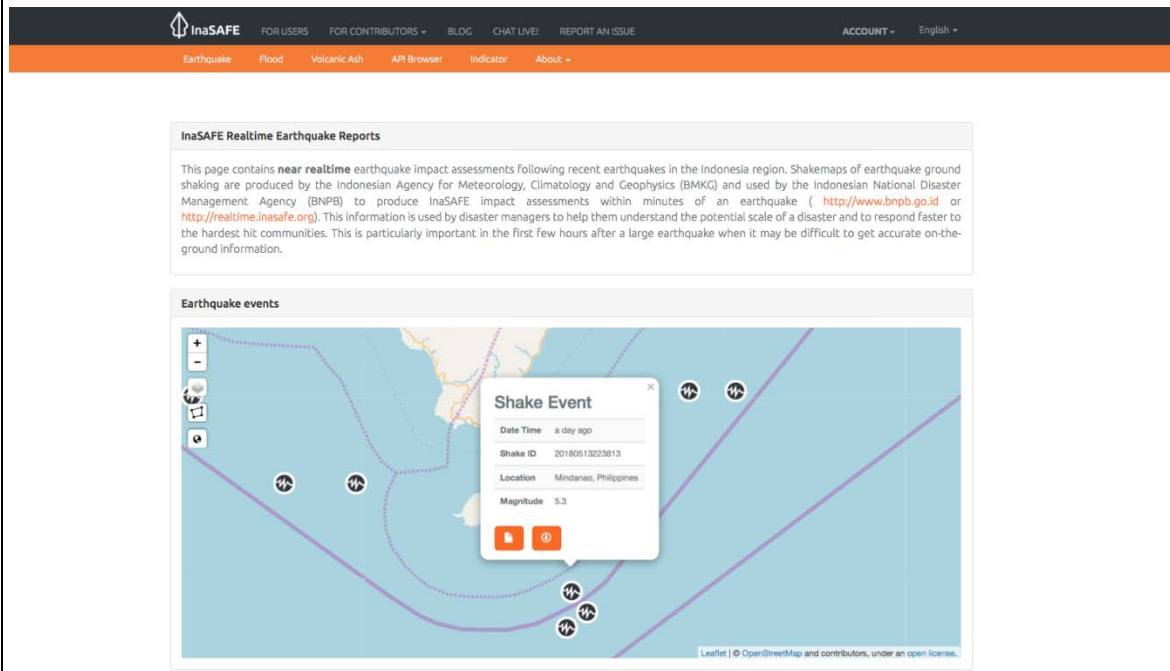


Figure 2: Screenshot of InaSAFE Realtime showing a recent quake event.

Description of actual services provided by your staff within the assignment:

The main goals of the project as outlined in the contract were:

- **Support and maintenance.** To provide ongoing support and development of the InaSAFE project.
- **Capacity building.** The project aimed to build institutional capacity (via training sessions, workshops and development of training materials) both at BNPB and within the larger community of practice within Indonesia.
- **Support and promotion.** To support users at BNPB and partner organisations, the user community at large and to promote the InaSAFE project as a well-managed and viable platform for DRR workflows.
- **Governance.** To facilitate the ongoing sustainability of InaSAFE project governance and Indonesian participation in the project governance.

Dates and versions for software releases are listed here (shown in reverse chronological order).

Date	Version	Type
June 4, 2018	4.4.0	Minor
March 20, 2018	4.3.4	Bug Fix
March 19, 2018	4.3.3	Bug Fix
March 9, 2018	4.3.2	Bug Fix
January 22, 2018	4.3.1	Bug Fix
January 22, 2018	4.3.0	Minor
November 29, 2017	4.2.5	Bug Fix
November 19, 2017	4.2.4	Bug Fix
September 26, 2017	4.2.3	Bug Fix
September 12, 2017	4.2.2	Bug Fix
September 5, 2017	4.2.1	Bug Fix
September 5, 2017	4.2.0	Minor
July 4, 2017	4.1.3	Bug Fix
June 30, 2017	4.1.2	Bug Fix
June 13, 2017	4.1.1	Bug Fix
May 28, 2017	4.1.0	Minor
April 11, 2017	4.0.2	Bug Fix
March 22, 2017	4.0.1	Bug Fix
March 6, 2017	4.0 Final	Major
February 1, 2017	4.0 Beta 3	Beta

The work was carried out over the period 1 February 2017 – 31 May 2018 with the major work elements consisting of:

- Requirements review and strategic work planning
- Implementation of new keywords driven approach to hazard and exposure definitions
- Overhaul analysis workflow to use vector zone-based calculations and deprecate legacy raster analysis based workflows
- Upgrade reporting infrastructure to provide a rich and flexible set of tools for users to create their own reports
- Training of BNPB staff and development of training resources

- Implement and deploy a new version of InaSAFE Realtime that uses the new InaSAFE architecture

Assignment name: <b>WB-1167922 and modifications (contract 7175736)</b> TOOL CORE DEVELOPMENT, DEPLOYMENT AND TRAINING, AND COMMUNITY OF PRACTICE FOR INASAFE	Approx. value of the contract (in current US\$): \$320 000
Country: Uganda, Malawi, Mozambique, Madagascar Location within country:	Duration of assignment (months): 36
Name of Client: World Bank / GFDRR	Total No. of staff-months of the assignment: ~35
Contact Person, Title/Designation, Tel. No./Address:	Vivien Deparday and Cristiano Giovando
Start date (month/year): September 2015 Completion date (month/year): October 2018	No. of professional staff-months provided by your consulting firm/organization or your sub consultants: ~35
Name of associated Consultants, if any: none	Name of senior professional staff of your consulting firm/organization involved and designation and/or functions performed (e.g. Project Director/Coordinator, Team Leader):  Tim Sutton: Project co-lead, architect, developer  Gavin Fleming: Project co-lead, GISc Practitioner
Description of Project:  InaSAFE is a contingency planning tool to help build resilient communities in the event of disasters. InaSAFE is built on top of QGIS. In this project we extended InaSAFE to support Africa-centric requirements, provided training to practitioners from participating countries and developed features in QGIS and GeoNode to support integration between QGIS, GeoNode, InaSAFE. We also deployed a new online version of InaSAFE ('GeoSAFE') that runs under GeoNode, first as a public demo and finally as a production instance at the INGC in Maputo.	
Description of actual services provided by your staff within the assignment:  Project management, technical leadership, system architecture. Overseeing technical aspects of the various	

InaSAFE- and GeoNode-related projects.

Developing new features and resolving issues in InaSAFE- and GeoNode-related projects.

Hosting and orchestrating of the InaSAFE-headless / QGIS\_server / GeoNode stack using devops tools like Docker and Rancher.

Developing training materials and conduct training courses.

Assignment name: <b>Forecast-based Financing</b>	Approx. value of the contract (in current US\$): RCCC role: \$750,000 per year
Uganda, Togo, Mozambique, Bangladesh, Peru, Ecuador, Mali, Niger, Zambia, Philippines, Vietnam, Mongolia, and others	Duration of assignment (months): Since 2013
Name of Client: German Red Cross (German Federal Foreign Office and German Federal Ministry for Economic Cooperation and Development) Netherlands Ministry of Foreign Affairs IKEA Foundation And others	Total No. of staff-months of the assignment:
Contact Person, Title/Designation, Tel. No./Address: Erin Coughlan de Perez, Manager, Climate Science The Hague The Netherlands	
Start date (month/year): January 2013 Completion date (month/year): ongoing	No. of professional staff-months provided by your consulting firm/organization or your sub-consultants: >70 per year
Name of associated Consultants, if any:	Name of senior professional staff of your consulting firm/organization involved and designation and/or functions performed (e.g., Project Director/Coordinator, Team Leader): Erin Coughlan de Perez, Manager, Climate Science Catalina Jaime, Senior Risk Advisor Ahmadul Hassan, Technical Advisor



**Description of Project:**

Forecast-based Financing (FbF) is a mechanism that uses climate and weather forecasts to enable timely disbursement of funds to implement advanced preparedness actions before a potential disaster happens and early response intervention. Many times, early actions are not taken due to lack of available funds in the exact moment when they are needed or because of a lack of quality forecast information, absence of systems and procedures to use these funds effectively and also due to the short window of time for early action. The disbursement of funds for emergency assistance can then only provide relief after the fact, meaning only after the disaster strikes. Forecast-based Financing enables the implementation of these early actions, prior to a disaster, based on a sound understanding of risks, hazards, vulnerabilities, exposure, impacts, danger levels, forecast capability, pre-determined triggers and precise community-level actions that can be implemented within the lead time.

The Climate Centre has been developing this concept since 2007 in partnership with Red Cross Red Crescent National Societies and other partners. The objectives of the Forecast-based Financing pilot projects are: 1. to build the evidence about the impact of using climate services for effective decision making before a hazardous event strikes at risk communities. 2. To develop a methodology for the design of forecast triggers, prioritization of forecast-based actions and activation of an early action financial mechanism. 3. To advocate for a new financial mechanism that allow disbursement of humanitarian/development funding based on forecast to minimize risk of disaster and prepare for response.

The Climate Centre provides technical advice for the design, implementation, learning and evaluation of Forecast-based Financing projects in different aspects from the scientific side of studying forecast performance and feasibility of applicability, design of menu of triggers, prioritization of forecast-based actions and also wider analysis of Early Warning Systems policy and Humanitarian financial mechanism.

**Description of actual services provided by your staff within the assignment:**

- Provide scientific services for the analysis of forecast skills and applicability according to the particular context/country of implementation.
- Lead partnerships with research institutions for the analysis and design of climate related services for the design and implementation of the FbF mechanism.
- Advocate with donors and other stakeholders for the scale up of the forecast-based financing concept.
- Technical support to project implementers in the ground for the implementation of the overall mechanism: design of menu of triggers, prioritization of forecast-based actions, design of standard operating procedures, monitoring, evaluation, learning and accountability, cost-benefit analysis, among others.
- Capacity building of Red Cross Red Crescent national societies and partners about the overall Forecast-based Financing concept.

<b>Assignment name:</b>	<b>Approx. value of the contract (in current US\$):</b>
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<p>Building Resilience and Adaptation to Climate Extremes and Disasters- Knowledge Manager (KM)</p>	<p>Total Value: \$13,000,000                  Climate Centre: \$1,245,000</p>
<p><b>Country:</b> Global with support to 13 specific countries: Burkina Faso, Chad, Mali, Mauritania, Senegal, South Sudan, Sudan, Ethiopia, Kenya, Uganda, Myanmar, Nepal  <b>Location within country:</b>                  Not applicable</p>	<p><b>Duration of assignment (months):</b>                  36 months</p>
<p><b>Name of Client:</b>                  U.K. Department for International Development (DFID)</p>	<p><b>Total No. of staff-months of the assignment:</b>                  Not specified</p>
<p><b>Contact Person, Title/Designation, Tel. No./Address:</b>                  Carina Bachofen, Manager, Policy &amp; Partnerships, RCCC                  Leeghwaterplein 27, 2521 CV, The Hague, Netherlands</p>	
<p><b>Start date (month/year):</b>                  April 2015-  <b>Completion date (month/year):</b>                  March 2018</p>	<p><b>No. of professional staff-months</b> provided by your consulting firm/organization or your sub consultants:                  50 staff-months</p>
<p><b>Name of associated Consultants, if any:</b>                  The International Research Institute for Climate and Society, Columbia University</p>	<p><b>Name of senior professional staff of your consulting firm/organization involved and designation and/or functions performed</b> (e.g. Project Director/Coordinator, Team Leader):                  Maarten van Aalst, Director (Team Leader for BRACED).                  Carina Bachofen, Manager, Policy &amp; Partnerships (Team Leader for Learning &amp; Uptake)\                  Pablo Suarez, Associate Director, Research and Innovation                  Cecilia Costella, Sr. Social Protection Specialist                  Bettina Koelle, Sr. Learning Specialist</p>

Roop Singh, Climate Risk Advisor  
Margot Steenbergen, Capacity Development Specialist

**Description of Project:**

BRACED is a DFID International Climate Fund flagship program, helping 500 thousand people become more resilient to climate extremes in South and Southeast Asia and in the African Sahel and its neighboring countries. To improve the integration of disaster risk reduction and climate adaptation methods into development approaches, BRACED seeks to influence policies and practices at the local, national and international level.

DFID funding for BRACED has been awarded as 3-year grants to 15 projects. DFID have also appointed a Knowledge Manager, working to generate new knowledge, evidence and learning on resilience and adaptation in partnership with the BRACED projects and resilience community. The Knowledge Manager is run by a consortium of organisation based across the world including the Overseas Development Institute, Itad, Thomson Reuters Foundation, Asian Disaster Preparedness Centre, ENDA Energie and the Red Cross Red Crescent Climate Centre.

The role of the Knowledge Manager is to ensure BRACED is contributing to a sustained and transformational impact on people's resilience to climate extremes beyond the communities directly supported by funded projects. It does this through generating evidence and learning on resilience from across the BRACED program to inform and influence policies and programs at global and national level.

Evidence from across the BRACED portfolio and beyond is gathered through evaluations at different levels, thematic research, and original learning approaches. BRACED Implementing Partners will be supported to increase the impact of their projects through integrating ongoing learning into their approach, evidence will be shared with practitioners to benefit wider programming and fed in to policy dialogues to inform national policies and institutions.

**Description of actual services provided by your staff within the assignment:**

The Climate Centre's role is to lead, design and manage the delivery of the BRACED KM's learning framework as part of an integrated KM approach. Three key objectives of this role are:

- to lead the delivery of a joint learning approach across the BRACED programme in order to maximize learning from Implementing Partner projects, KM research and evaluation, and wider knowledge and evidence.

- To facilitate learning, uptake of knowledge and partnership building through design and deliver of high quality events and innovative methodologies
- To provide substantive input at a leadership and operational level in building a successful knowledge manager, understanding the impact of the KM, and learning to inform our strategic direction and routes to change.

Specifically the climate Centre is responsible for leadership and delivery of understanding the potential for (an increased role of) adaptive social protection in resilience building; progressing the post-2015 policy agenda; Reality of Resilience work (learning from climate extremes); Meta-level learning; providing expertise to BRACED partners through a Climate and Weather Information Helpdesk; and other high level dialogues, workshops, webinars and other creative platforms; and promoting learning and dialogue through interactive tools and approaches including learning marketplaces, writeshops, online webinar and discussion forums, and more.

<b>Assignment name:</b> Partners for Resilience II (2016-2020)	<b>Approx. value of the contract (in current US\$):</b> RCCC amount: 1.75 million per year
<b>Country:</b> Ethiopia, Kenya, Uganda, Mali, India, Indonesia, Philippines, Guatemala, Haiti <b>Location within country:</b> N/A	<b>Duration of assignment (months):</b> 60 months
<b>Name of Client:</b> Netherlands Ministry of Foreign Affairs	<b>Total No. of staff-months of the assignment:</b> Not specified
<b>Contact Person, Title/Designation, Tel. No./Address:</b>	Fleur Monasso, Manager, RCCC Leeghwaterplein 27, 2521 CV, The Hague, Netherlands +31704455886
<b>Start date (month/year):</b> <b>Completion date (month/year):</b>	<b>No. of professional staff-months provided by your consulting firm/organization or your sub consultants:</b> 140 per year
<b>Name of associated Consultants, if any:</b> None	<b>Name of senior professional staff of your consulting firm/organization involved and</b>

	<p><b>designation and/or functions performed (e.g. Project Director/Coordinator, Team Leader):</b>                  Fleur Monasso, Project Manager                  Raja Siregar, Technical advisor</p>
<p><b>Description of Project:</b>                  Partners for Resilience is an alliance of humanitarian, development, climate and environmental civil society organisations, composed of five Netherlands based members (CARE Nederland, Cordaid, the Netherlands Red Cross, the Red Cross Red Crescent Climate Centre, and Wetlands International) and their partner organizations in the South. The alliance promotes the application of Disaster Risk Management to strengthen and protect livelihoods of vulnerable communities.</p> <p>The PfR approach bridges time- and spatial scales. It integrates attention for changing risks due to changes in hazards, exposure and vulnerability. This includes a specific focus on ecosystem degradation, locally and in the wider landscape, as well as changes in hazards due to climate change (in relation to current risks, near-term changes and longer term shifts in climate patterns). The portfolio thus integrates elements from disaster risk reduction, climate change adaptation and ecosystem management and restoration.</p> <p>PfR strengthens community resilience by reducing risks and strengthening livelihoods of vulnerable communities, with specific attention for marginalized groups and women, by involving the wider civil society in addressing risks faced by all groups in society.</p>	
<p><b>Description of actual services provided by your staff within the assignment:</b></p> <p>Through a global network of specialists, the Climate Centre provides ongoing support to local partners in 11 countries across the world, to mainstream climate risk management. This entailed support to climate-smart risk reduction programming, climate policy dialogues, networking and partnerships meetings (especially with Meteorological agencies) to advance early warning early action in vulnerable areas.</p> <p>The Climate Centre also provides support for international and national dialogues on policy and humanitarian diplomacy, encouraging attention to the most vulnerable in comprehensive risk management.</p>	

### 3 Comments and/or Suggestions on the Terms of Reference

*[Present and justify here any modifications to the Terms of Reference your consulting firm/organization would like to propose, if there are any, to perform the assignment better and more effectively (e.g. deleting some activity that you find unnecessary, adding others or proposing a different phasing of the activities). Such suggestions should be concise and incorporated in your Proposal.]*

We have no comments at this time.

## 4 Description of Approach, Methodology and Work Plan

### 4.1 Technical Approach and Methodology

This is a collaborative proposal between the Red Cross Red Crescent Climate Centre (Climate Centre) and Kartoza to extend [InaSAFE's reports](#) to support Forecast-based Financing (FbF). The outcome of our work will be a platform that when new forecasts that predict high impact are uploaded to it, can generate new [maps](#) and [reports](#) that show priority intervention areas based on forecast, [threats](#) and [vulnerabilities](#) (based on forecast data and risk analysis). These intervention maps will inform decision makers when and where funds for early action should be deployed, thereby supporting forecast-based financing.

#### 4.1.1 Background:

#### 4.1.2 Proposed Approach

The Climate Centre and partners have defined five key steps to develop an impact-based forecasting model for Forecast based Financing:

1. An **in-depth risk analysis** identifies the kinds of impacts expected for a particular type of hazard, and which **types of vulnerability and exposure** can combine with the hazard to cause impact.
2. **The most suitable forecasts** are evaluated as potential candidates for the FbF trigger for the selected hazard.
3. **Hazard magnitudes** are defined using historical hydro-meteorological data to build a “climatology”, allowing implementers to understand the magnitudes of a hazard that have happened in the past.
4. **The relationship between impact and hazard magnitude** is defined. This step can be done in different ways depending on the availability and quality of data, ranging from simple expert knowledge and a composite index to a more elaborate statistical modelling approach.
5. Vulnerability and exposure information is combined in real time with operational forecasts and represented graphically/geographically in an **intervention map** to identify which areas are likely to be most impacted and to see the largest potential impact (see <http://fbf.drk.de/manual.html#c29>).

The FbF trigger methodology has been reviewed by several organizations included WMO, UK Met Office, German Red Cross, FAO and WFP. Given the early stages of impact-based forecasting development, this methodology is subject to ongoing improvement, therefore this project would be potentially be instrumental to improve the current methodology. The current methodology has been used in Bangladesh for cyclones and floods and Peru for cold waves and floods.

It is important to note that the comprehensive FbF development process not only focuses not only on the design of a system that inform when and where to do early action (FbF feature



within InaSAFE), but also key elements such as the selection of early actions that can reduce the impact of disasters, as well as the set up of protocols that will indicate who will do what and where to implement the early actions along with the financial protocols for anticipation. These elements are not part of this proposal but will be potentially part of a separate FbF project funded by other partners.

There is a need to find appropriate platforms that will bring together the hazard and vulnerability data with operational forecast information also bringing together the national agencies from both sides.

Research and application of an impact-based forecasting model using elementary and statistical modelling has ground-breaking implications for the way in which governments and humanitarian organisations can adopt Forecast-based Financing approaches within their Disaster Risk Management strategies.

In Indonesia, the Indonesia Red Cross is exploring the feasibility of setting up a national scale FbF system, aligned with a global FbF strategy in which the government and other actors are part of this early action enhancement. The objective is to build on already existing capacities, identifying gaps and opportunities for improvement of systems that are already part of government disaster management. In this case, BNPB (the national disaster agency of Indonesia) and UN-OCHA have been actively using InaSAFE and have relationships with agencies that produce source data needed to support FbF.

In tandem there have been major developments in InaSAFE that make it a well-suited platform for building an FbF tool. InaSAFE is free software that produces realistic natural hazard impact scenarios for better planning, preparedness and response activities. It provides a simple but rigorous way to combine data from scientists, local governments and communities to provide insights into the likely impacts of future disaster events. InaSAFE is available as a number of different products:

- **InaSAFE desktop** - a desktop application that runs as a plugin in QGIS and provides a graphical, interactive environment for discovering the potential impacts of a hazard on people, land and infrastructure. InaSAFE produces spatial data (maps showing affected people, buildings etc.) and tabular reports (e.g. number of people affected per area) that can be used by disaster managers to plan their humanitarian response in the event of a disaster.
- **InaSAFE Realtime** - a web environment that automatically combines hazard and vulnerability data to process flood (Jakarta) and earthquake (across Indonesia) hazard data in near realtime and produces impact reports for different exposure types. It is deployed at BNPB, the national disaster agency in Indonesia (<http://realtime.inasafe.org>).
- **GeoSAFE** - a web platform built on GeoNode that provides an interactive environment for carrying out InaSAFE analysis on the web. It is deployed in INGC, the national disaster agency of Mozambique (<http://geonode.ingc.gov.mz/>).

InaSAFE is open source and therefore can be extended to support FbF, creating specific triggers for early action based on an impact-based forecasting approach. The goal of this

proposal is to thus develop an elementary or statistical model for impact-based forecasting using GeoSAFE/InaSAFE to enable Forecast-based Financing. These improvements will be made available to users both in the desktop version of InaSAFE and in GeoSAFE.

As described above, the Indonesia Red Cross is exploring the feasibility of integrating Forecast-based Financing within its Disaster Risk Management strategy. If InaSAFE is demonstrated to be a valid tool to set up triggers for early action, this can become an integral part of their internal Early Action Protocols to be able to access funding for early action from the newly created disaster risk financing tool by the IFRC (see <https://www.forecast-based-financing.org/fund/>).

This could be a game changer for the Disaster Risk Management community in Indonesia. InaSAFE is already widely integrated into their systems, therefore an extra value-add given by an impact-based forecasting approach would imply that the government and the humanitarian organisations that already use it could save more lives and livelihoods of the most vulnerable by acting before a disaster happens. The Indonesian Red Cross (PMI) would like to explore whether InaSAFE can report when and where early action should be deployed based on a forecast and risk analysis, to reach the most vulnerable and protect their lives, livelihoods and, in some cases, protect long term development gains. Work done in this proposal can be deployed to other geographies as there is a global interest in improving the capacity of government and humanitarian organizations to act before a disaster happen.

To achieve the main goal of this proposal the specific objectives are:

- Using the FbF trigger methodology as guidance, **identify opportunities to use InaSAFE as the platform to define triggers for early action.**
- **Identify how to address the identified opportunities** (including new tools, methodologies, data sets on exposure and vulnerability, stakeholders etc.)
- **Build a prototype of the impact-based forecasting InaSAFE platform**, focussing on one selected hazard

This project will be developed in partnership between Kartoza and the Climate Centre and we will engage with Indonesian organisations such as BNPB, the Meteorological, Climatological, and Geophysical Agency (BMKG), the Indonesian Red Cross (PMI), and other global humanitarian organizations with base in Indonesia such as Humanitarian OpenStreetMap (HOT-OSM) and UN-OCHA.

The leadership of both organisations in their respective areas of expertise that converges in the framework of impact-based forecasting, offers a great opportunity to develop an innovative yet practical application that would influence radically the way forecast and risk data is used and how new and emerging disaster risk financing mechanisms can be activated for early action. A successful integration of impact-based forecasting within INASAFE will open opportunities for using this model in other countries where InaSAFE has been developed.

#### 4.2 Working with Local Partners

The Climate Centre, as the reference centre of climate risk management of the entire Red Cross Red Crescent Movement, supports the research and development of Forecast-based Financing mechanisms. A new collaboration has started with the Indonesia Red Cross (PMI) to identify the feasibility of FbF in the country. The results of this Challenge Fund research will enable PMI to collaborate with others in the selection of triggers in Indonesia.

Through the life of the project, we will maintain regular contact with stakeholders to get their input and show them our progress. Indonesia has a rich history of early warning early action; *Siaga Darurat*, meaning alerts in advance of an emergency, is embedded both in policy and in practice. BNPB currently manages InSAFE and InaRISK. During the solicitation phase, the project will meet with stakeholders who recently contributed to a scoping study on FbF in Indonesia. This includes BNPB, BMKG, MoPW and other relevant government agencies. These agencies play an important role in weather and climate analysis, forecasting, and authority to disseminate early warnings (BMKG, MoPW), as well as in disaster management, awareness raising, and entrenchment into the institutional architecture of the country (BNPB).

During the solicitation phase, the project will hold a FbA task force meeting with these stakeholders as well as groups from academia and civil society, including, for example, the Zurich Flood Alliance. This will build on existing interest by BMKG to develop impact-based forecasts, for example, and gather ideas and priorities from all actors. Over the course of the following phases in design, research, and development, our team will have small group meetings and interviews with key stakeholders to present mock-ups, identify use constraints, and feed results into the design work.

Once we have a working system, will socialise our work with including the users we have previously trained in InaSAFE, DKI Jakarta (the city of Jakarta's disaster agency), Indonesia Red Cross, UN-OCHA and other relevant agencies and stakeholders (such as the Start Network members) and show them how to use the new FbF features. InaSAFE has been traditionally used by disaster risk management agencies, given that IBF is a concept that is embraced by the WMO and the National Hydro Met agencies, in this case BMKG would be a key stakeholder for the operationalization of the tool.

The training and review phase will include several interactive workshops with small groups, so that people can receive tailored answers to their questions and walk through real disaster scenarios. We will track any stumbling blocks in the use of the products, and make changes accordingly.

We will host an instance of the platform with the view to making these new tools and features visible to potential users outside Indonesia so that they can consider adopting these tools in their own region. Knowledge dissemination of the results of the Challenge Fund will also take place at international Dialogue Platforms on FbF as well as industry specific meetings and conferences, such as Understanding Risk.

#### 4.3 Data sources and resources to be used

IbF is an emerging concept, with very few concrete examples of methodologies and applications. Nevertheless, there is a growing community that value the concept of IbF to enable the decision making process for early action; the challenge is to develop systems that build on existing platforms, yet allow establishing triggers for early action by integrating climate science. The World Meteorological Organization (WMO) launched the first multi-hazard IBF guidelines for National Hydro-Meteorological Services (NHMS) in 2015. So far, few governments have explored the use of this approach, partly because of its novelty, complexity and the fact that it requires interdisciplinary collaboration among NHMS, disaster risk management agencies, civil protection departments, humanitarian organisations and the growing expertise of Information Management experts, specialised in open source software, open data, GIS, remote sensing and machine learning among other emerging technologies. In the case of Indonesia, the country focus for this proposal, there has been a remarkable investment in forecast capabilities as well as a significant evolution in information management systems for risk management. However, despite the growing interest of government agencies, UN system, the Red Cross and other humanitarian actors, there is still need for more concrete actions towards establishing impact-based forecasting models that can enable early action.

Access to and quality of risk data are two of the most challenging aspects of setting up elementary and statistical models for impact-based forecasting. Although open data availability has increased exponentially during recent years, there is still a lot of work to do to gather and process historical disaster impact, exposure and vulnerability data. There are a number of key public datasets we intend to make use of or explore the possibility of using:

- **PetaBencana** (a crowd-sourced flood reporting platform for Jakarta and other Indonesian cities)
- **OpenStreetmap** (a crowd sourced map of the world that provides a vital source of infrastructure data)
- **The Dartmouth Flood Observatory** large flood history archive (spanning the period 1985-2010)
- A number of public flood event related resources listed at <https://github.com/inasafe/inasafe/wiki/Sources-of-hazard-data>
- Desinventar Indonesia - DIBI - for historical disaster impact data
- HeV-E <http://assess-risk.info/#/>

The insurance sector is one of the key private sector partners that could offer access to data that is not yet available to enable early action. Significant efforts are already in place to achieve this, particularly by [OASIS Hub](#)<sup>1</sup> supported by Climate KIC (European knowledge and innovation community) and other partners.

As described in the objectives of this project, a data gap analysis will be conducted to determine what is needed to develop the impact-based forecast model. Depending on the results of this analysis, the consortium team will explore the use of private sector data if this could add significant value to the existing wealth of data that InaSAFE integrates.

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<sup>1</sup> [OASIS Hub](#)



## 5 Work Plan

In this section we outline the key elements of our work plan. Our work plan consists of 7 discrete work packages:

### 5.1 Socialisation phase

#### **Goal: Work with interested and affected parties to socialise plans and gather requirements**

During this phase we will meet with potential partners with outline our project plan to them, get them interested and involved in the work we are planning to undertake, and seek their collaboration and cooperation.

As described in the [global FbF strategy](#)<sup>2</sup>, close cooperation with the respective National Hydro-Meteorological Service is pivotal to ensure sustainability of any FbF related project, therefore information sharing and collaboration are envisioned with Indonesia's Meteorological, Climatological, and Geophysical Agency, BMKG. This applies to other Government agencies that have already been involved in InaSAFE development and use. In particular we will integrate with the local 'PetaBencana' ('Disaster Map') project as a source of local flooding data and share our work with BNPB (the National Disaster Management Agency), UN-OCHA and HOT-OSM who are active in primary data gathering in Indonesia.

Prior to the development process we will hold a 'socialisation' day in Indonesia where we will discuss these ideas with the above potential partners, starting from an internal analysis of the current InaSAFE and its potential for early action with the aim to define why and how an IbF InaSAFE tool could enhance key actors decision making processes. We will show the potential ways how the advanced tool can be useful and relevant to their work. This initial socialization will be the opportunity to get any comments and feedback. These inputs, where possible, will be included in our work plans.

### 5.2 Research phase

#### **Goal: identify sources of data, expected outputs**

##### **5.2.1 Inputs**

InaSAFE requires specific data sources to carry out an analysis. In particular hazard, exposure and aggregation data. In the Indonesian context, these data sources are already established for operational systems such as InaSAFE Realtime (<http://realtime.inasafe.org>) which is used to produce near-realtime flood (Jakarta) and earthquake (all of Indonesia) reports, and *ad hoc* reports for volcanic ash fall analysis (all of Indonesia). To support FbF we will need to evaluate these datasets and potentially identify new datasets to support our work.

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<sup>2</sup> [global FbF strategy](#)

Following the workshop we will conduct a feasibility analysis in the identified priority areas, specifically looking at available data sources and the additional data requirements that FbF analysis will introduce. There are several constraints to the availability of data sources that should be addressed including:

- **Open Data:** The data should be freely accessible and preferably redistributable so that results can be independently verified and that the developed system is sustainable in the long term.
- **Spatial Coverage:** Currently the flood hazard data used in InaSAFE Realtime is limited to Jakarta because PetaBencana does not cover the entire country of Indonesia, instead focusing on a few key areas. During the research phases we will investigate other potential sources of flood data. Similarly exposure data, in particular OSM buildings and roads, tends to be spatially clustered according to project activities from organisations such as HOT which potentially limits our ability to develop a generic national system.
- **FbF:** The FbF trigger methodology will introduce new data requirements such as vulnerability attributes which may further constrain our ability to develop a generic, national system.
- **Institutional:** In our experience in working with Government of Indonesia officials, they exhibit a strong preference towards using locally developed ‘official’ national or local datasets. These datasets may not be truly open datasets in some cases, but rather ‘available’ datasets for inter-governmental use. Our experience in working with BNPB is that OSM data is an exception to this guideline where it is generally considered an acceptable source of data for buildings and roads.

Because the product of these constraints is that the same data (and quality of data) is not available everywhere in the country, our focus will be on developing the methodology and software infrastructure within InaSAFE that is as generalized as possible so that it can be used in different regions of the country.

### 5.2.2 Outputs

If the work proposed here is successful, the outputs from the FbF analysis should be an integral part of the general outputs produced by InaSAFE’s reporting modules. Currently InaSAFE already produces impact reports and datasets (see e.g. Figure 3) below.



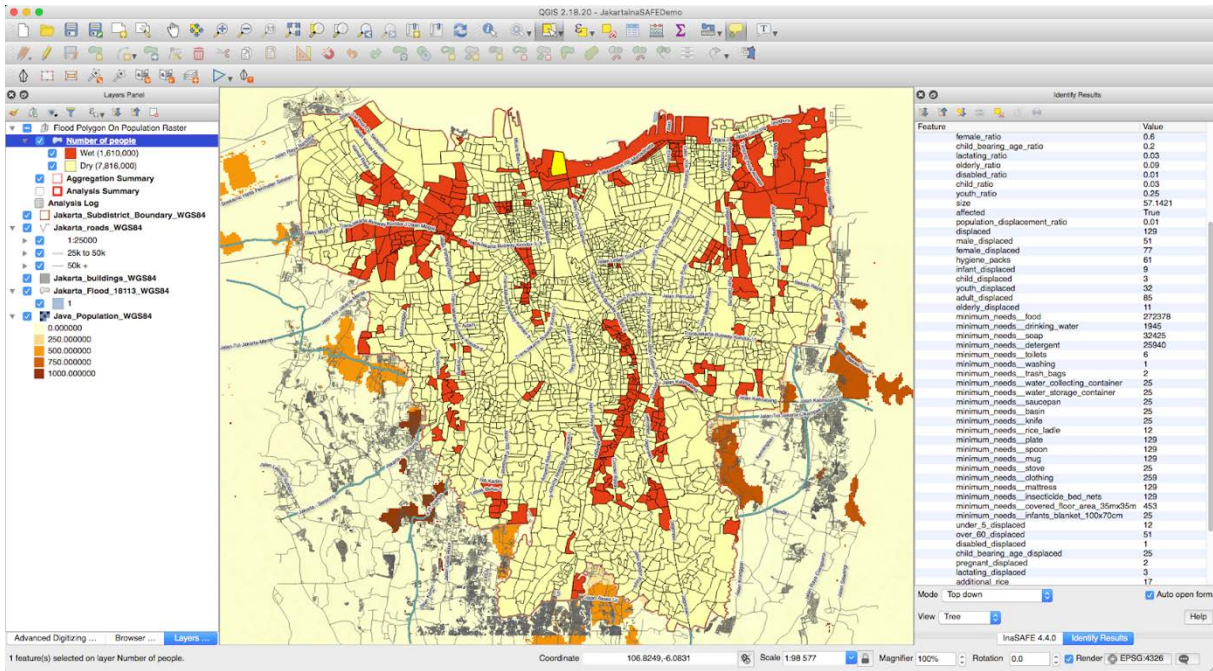


Figure 3: Example impact dataset produced by InaSAFE.

Through the work carried out in this proposal we will aim to develop additional standard InaSAFE reporting components. These would include the **hazard level map** (e.g. Figure 4) which indicates the different hazard severities / classes in the study area. The **vulnerability map** (e.g. Figure 5) will show the same geographical areas as the hazard level map, but uses vulnerability indicators and the FbF methodology to classify people or infrastructure according to different vulnerability classes. The intervention map (e.g. Figure 6) combines hazard levels and vulnerability levels to produce a dataset where priority intervention areas are identified (according to the FbF methodology). As well as cartographic outputs, we will investigate the development of other visualisation approaches (e.g. Figure 7) to present the intervention data in a meaningful way.

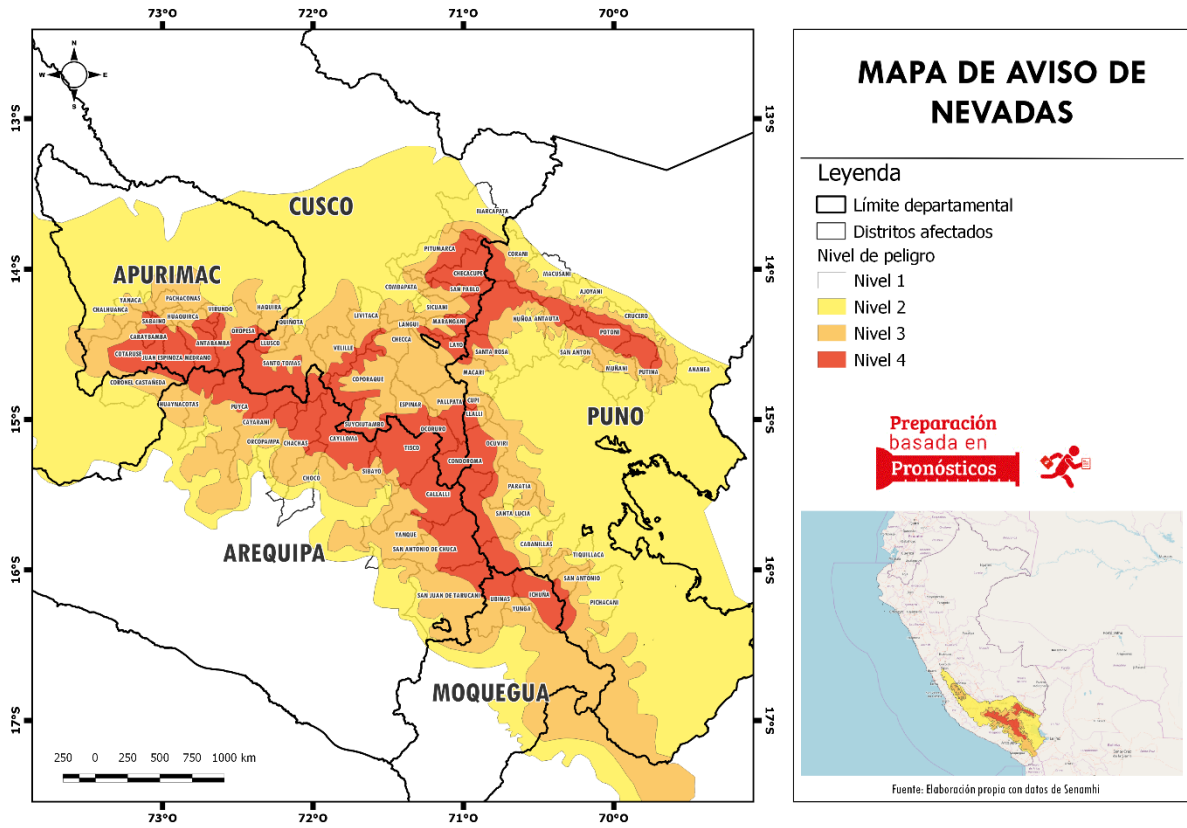


Figure 4: Example hazard level map produced as part of FbF reporting.

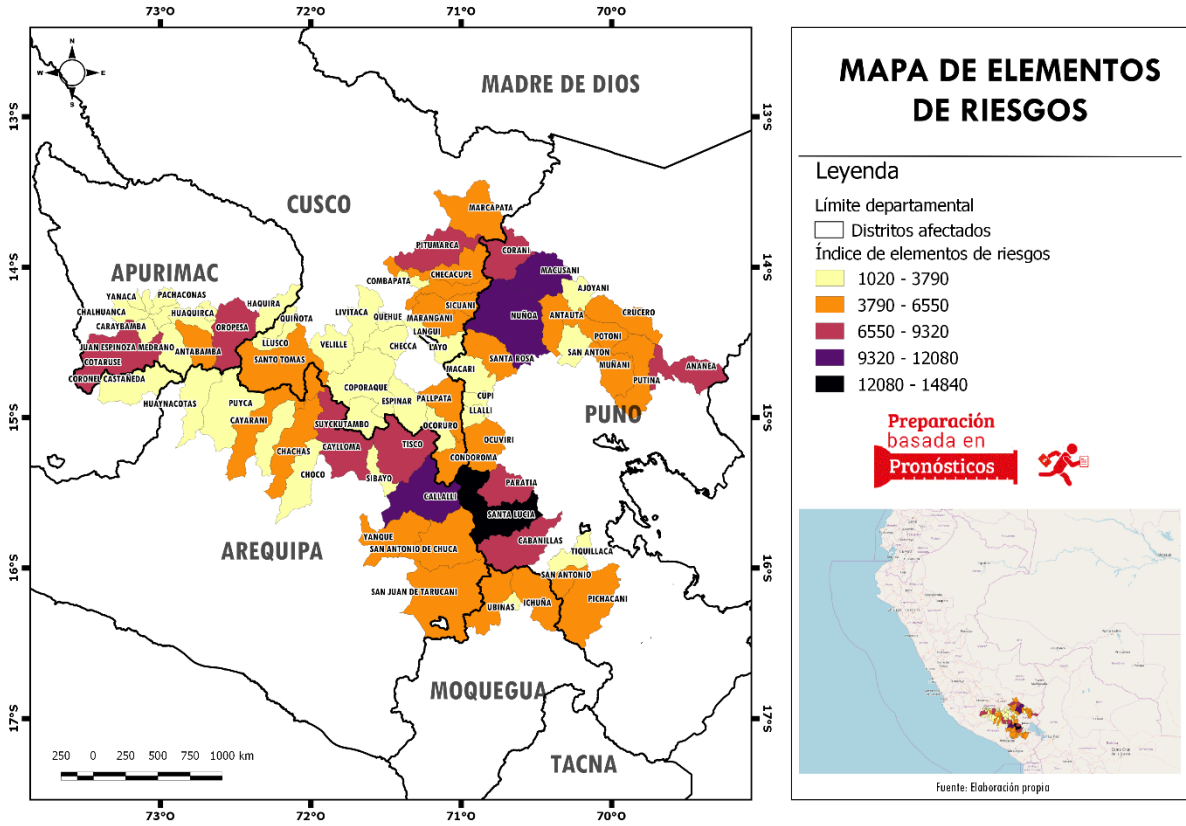


Figure 5: Example FbF vulnerability map.

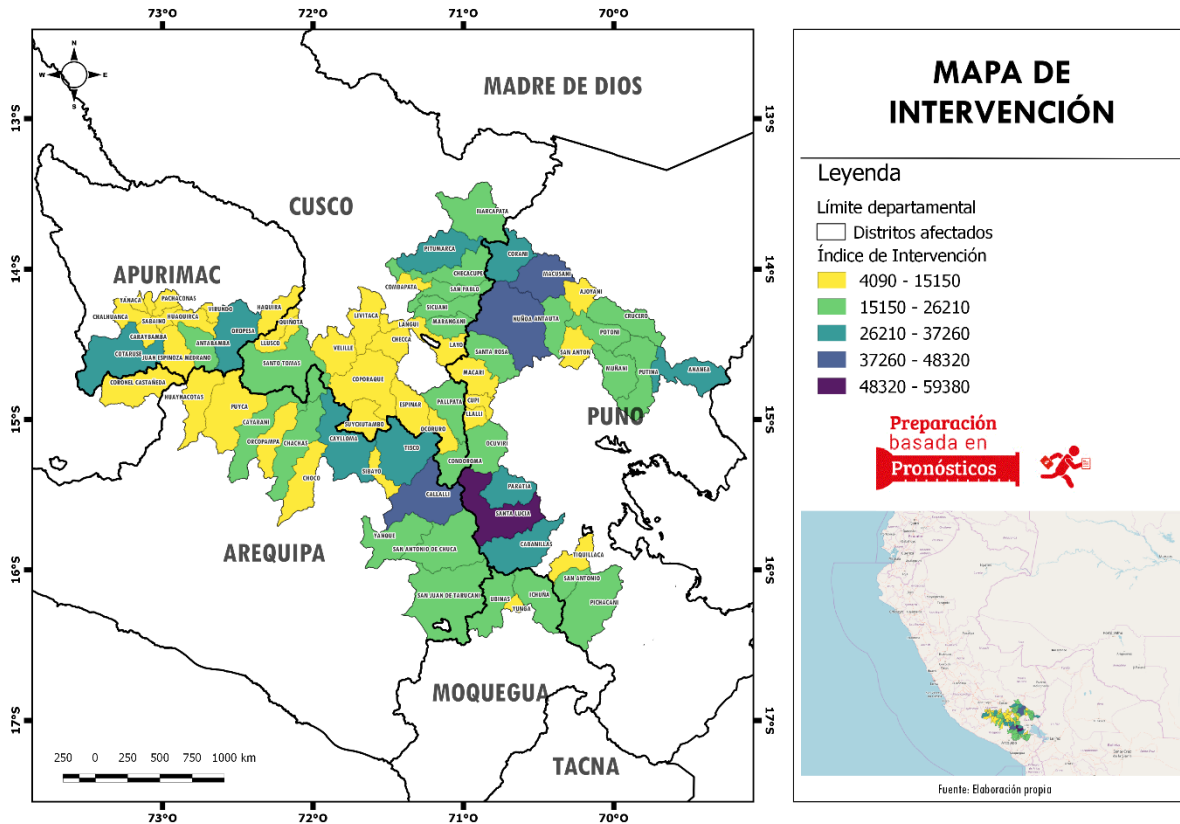


Figure 6: Example FbF intervention map.

During the socialisation workshop we will present example outputs, such as illustrated above. In the research phase we will refine and define exactly what the outputs we will produce in InaSAFE should look like based on expressed user needs, capabilities and constraints of the FbF methodology, limitations of the available input data and capabilities and constraints of the InaSAFE platform.

We will produce proof of concept mockups of all the reports and datasets to be produced by the FbF components of InaSAFE and share them with project partners and potential users for comment and review.

### 5.2.3 Platform selection

In theory, FbF functionality can be made available on several different platforms, with options being:

- InaSAFE Desktop
- InaSAFE Realtime
- GeoSAFE



As per the title of this proposal, our intention is to add FbF functionality to the **GeoSAFE** platform since it has a wider application and installed user base than InaSAFE Realtime (which is a country specific implementation for Indonesia). The potential addition of FbF to InaSAFE Realtime is not offered for this contract but can be implemented in future if desired. Indonesian users would be able to access the new FbF functionality via a GeoSAFE instance.

### 5.3 Design phase

#### **Goal: Identify changes needed to system architecture and define system requirements**

Based on the feedback from our socialisation workshop and through engagement with FbF experts within Climate Centre, we will identify what specific changes will need to be brought about to the InaSAFE Desktop and GeoSAFE to support FbF based reporting. This will be guided by the desired outputs identified in section 5.2.2 and 5.2.3.

During the design phase we will develop high level (e.g. Figure 8) and detailed system architecture diagrams to be shared with developers for review. With the help of our designer we will plan any report products with pixel perfect renderings for reproduction by the developer team.

We will follow agile software development methodologies for this project, planning out the work in a series of sprints and milestones. The key outcomes of the design phase will be a series of clearly defined issues in our product backlog (issue tracker) that define in detail all the deliverable requirements for updating InaSAFE to support FbF. All work planning will be done against QGIS 3.x API. The shift to QGIS 3.x API also implies that the core GeoSAFE product will need to be upgraded to work with QGIS 3.x as opposed to the currently supported QGIS 2.x.

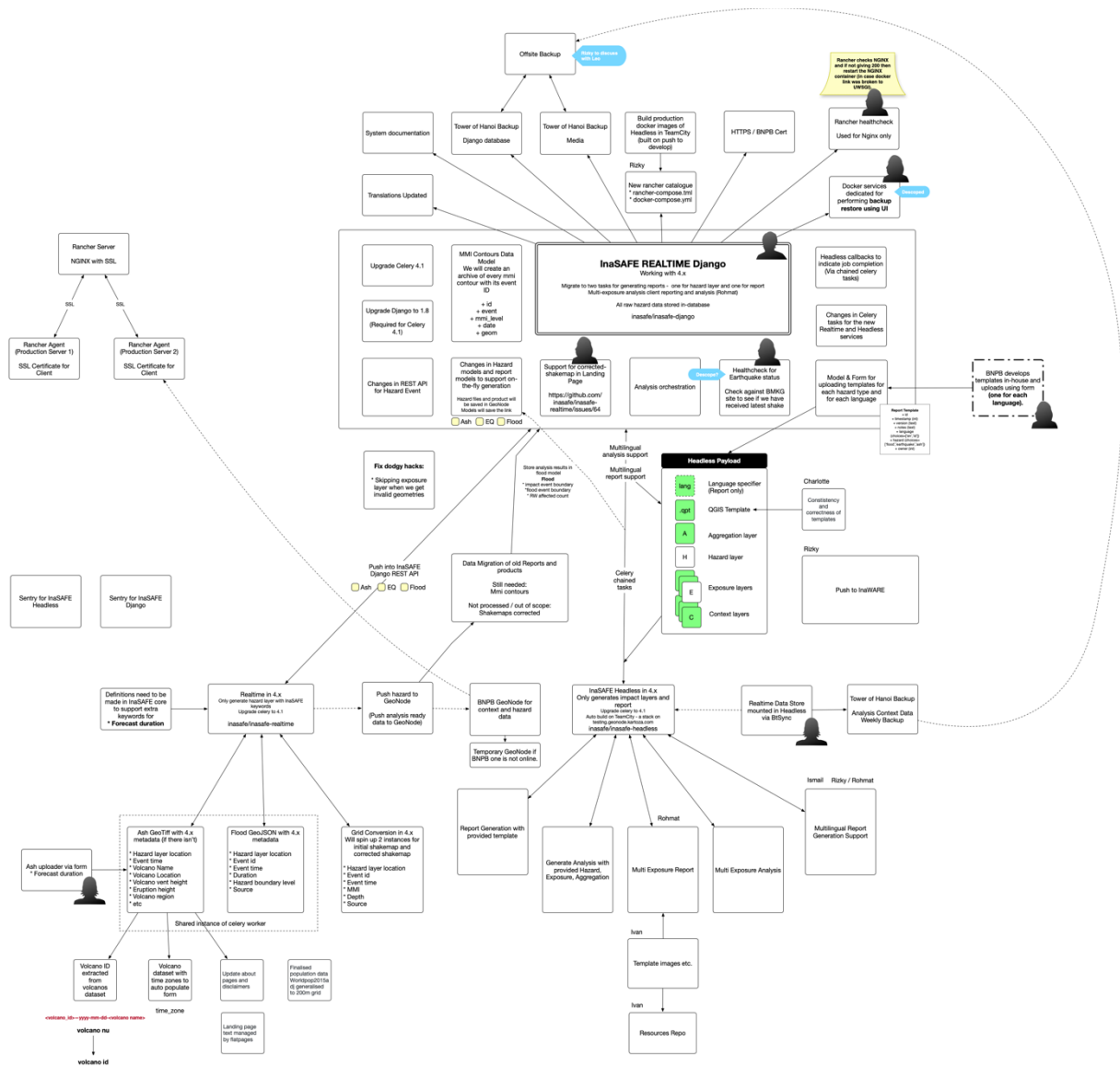


Figure 7: High level system architecture diagram example

### 5.4 Development phase

**Goal: Create and deploy new tools and functionality for InaSAFE. Work with data partners where appropriate to ensure that suitable data is available.**

During this phase we will implement the elements identified in the design phase. We will develop the new functionality in two parts:

1. **Implementation of core InaSAFE functionality:** This will in turn consist of four parts:

- a. **Algorithm / application logic:** Here we will extend the analysis routines of InaSAFE to support FbF based on the inputs from our Climate Centre and



partners and any special requirements identified during our socialisation workshop at the start of the project.

- b. User interface updates:** In this component we will develop any user interface elements needed to support the FbF parameterisation process.
  - c. Reporting engine updates:** In this component we will update the InaSAFE reporting engine to include new report elements such as the examples provided in Section 5.2.2.
  - d. Publishing:** In this component all the new identified functionality will be included in a software release, published in the QGIS plugin repository.
- 2. Implementation in GeoSAFE:** GeoSAFE uses the standard InaSAFE codebase to carry out any InaSAFE analyses. Once the new release of the core InaSAFE application has been made, we will build this new logic into the GeoSAFE web platform. Any configuration options will be hard coded as standardised options suitable for Indonesia in the GeoSAFE implementation so that minimal changes are needed to support the web implementation.

The standard reports produced by GeoSAFE will be updated to include FbF related outputs in tabular and cartographic / infographic format.

### 5.5 Deployment phase

**Goal: Deploy GeoSAFE live website with FbF support and ensure all systems function reliably. Deploy FbF improvements as new InaSAFE desktop release.**

Once the new functionality provided by InaSAFE and GeoSAFE have been implemented, they will be deployed online. In the former case we will do a standardised InaSAFE Desktop release that includes FbF support. In the latter case we will deploy a demonstration instance of GeoSAFE that includes FbF support that we will use for training and demonstration purposes. Note that the budget for this proposal does not include long term support and maintenance of a National GeoSAFE instance for Indonesia. If that is desired, we can provide this service at an additional cost, or assist partner organisations to deploy their own instance on their own hardware infrastructure. Thus the deployment will be primarily focused on desktop users and on providing a demonstrator platform for training and review by our partners.

### 5.6 Training and Review phase

**Goal: Internal review then share outcomes with partners and stake holders and solicit their feedback.**

We will hold a training and review session near the end of the contract. This will be a face to face training session in Indonesia. We will use our local staff to carry out the training in Bahasa Indonesia in order to maximise knowledge uptake. Our budget for the training session covers project member's travel and accommodation and where possible within our budget cover the costs of travel and accommodation for in-country partners should that be needed.

The training session will cover using FbF with both InaSAFE Desktop and GeoSAFE, and will cover such fundamental topics relating to QGIS and InaSAFE as may be needed to support the use of FbF tools provided. The training will use innovative approaches in adult learning, including serious games and cross-disciplinary techniques to ensure that participants feel comfortable and inquisitive about using the platform in their own context. These training materials will be made available for use in other training events as needed.

## 5.7 Support phase

### **Goal: Implement improvements based on feedback where possible and deploy to production.**

The support phase will be short for this project given the compressed time lines and first-implementation nature of this work. We will deploy the latest release of InaSAFE which includes FbF support on our partner's computer systems during the training sessions planned for them and invite them to notify us of any issues they encounter in the period following the training session and before the end of the contract delivery period. After this point we will revert to the normal community based support mechanisms that exist in InaSAFE.

Should report queries require changes to the code we have developed, or the FbF parameterisation, we will fix these issues during the support period and deploy the fixes as part of a new software release.

During the support phase, we will also document and publicize the new abilities of these platforms. In real time, when a forecast is issued of an impending disaster, we will create maps of potential impact using these platforms and publicize this information nationally and internationally to increase awareness of this capability and encourage early action. We will document the use of this technology in the FbF Manual that is used within the Red Cross Red Crescent Movement, and present results and demonstrations at 3 regional and 1 international Dialogue Platforms on FbF around the world.

## 6 Staffing

To carry out the work detailed in this proposal, we have assembled a composite team with skills in both InaSAFE development and FbF.

## 6.1 Kartoza



Tim Sutton

MSc

Tim co-founded Kartoza in 2014 after running Linfiniti since 2008. Tim has been involved with InaSAFE since its inception. Tim built much of the core infrastructure of the InaSAFE software project and led the team as the scope and feature set was extended over the years. Tim is also a core QGIS committer and Project Steering Committee member for both the InaSAFE and QGIS.org projects. Tim has also conducted numerous training courses relating to QGIS, FOSS GIS and InaSAFE over the years.

Coming from a background in applied conservation management, Tim Sutton became involved in GIS in 1998 when he joined and helped to set up the GIS division of for the Scientific Services group of the Western Cape Nature Conservation Board, South Africa. During this time, he completed a master's degree in GIS and Conservation (cum laude).

Tim joined the QGIS project in late 2002 (around 6 months after it started) while he was resident in the UK for 5 years. He continued with his involvement in the project during his 2 year stay in Brazil and his subsequent return to his homeland, South Africa.



Gavin Fleming

MSc, Professional GISc Practitioner

Gavin co-founded Kartoza after running Afrispacial since 2010. Gavin is a registered Professional GISc Practitioner, a Charter Member of the Open Source Geospatial Foundation (OSGeo), on the advisory board of the CGIS at the University of Pretoria, on the National Council of GISSA and has an MSc in Genetics. Starting his GIS career in 1996, he worked at GIMS, CSIR, Mintek and SAEON before starting AfriSpatial and then Kartoza. Gavin is experienced in the design, project management and deployment of FOSS GIS applications in a variety of contexts.



## Rizky Maulana

*BSc*

Rizky is one of our developers from Indonesia and is based in Bandung, Java Island. He studied Informatics Engineering at the Bandung Institute of Technology. Rizky is a longstanding member of the InaSAFE, InaSAFE Realtime, GeoNode and GeoSAFE teams at Kartoza. He has a deep knowledge of the code base and workings of these projects and develops, troubleshoots and deploys them. Rizky is a senior developer, specialising in Python, specifically for Django applications, and in system orchestration using Docker and Rancher.

## 6.2 Climate Centre



## Erin Coughlan de Perez

*PhD*

As manager of the Climate Science Team, Erin Coughlan de Perez oversees our support on climate science for risk management. She leads climate support to Forecast-based Financing initiatives around the world, developing triggers for early action before disasters happen. Erin also leads operational science research on forecast verification and application, as well as long-term strategies for climate risk management.

She is also a Lead Author for the Intergovernmental Panel on Climate Change (IPCC) and serves on the steering committee of the Global Flood Partnership (GFP). Erin holds an adjunct appointment at the International Research Institute for Climate and Society at Columbia University, and has a PhD in climate science focused on disaster risk management.

## Catalina Jaime



*MA*

Catalina coordinates the strategic development of the forecast-based financing (FbF) concept worldwide, as well as technical support for the design and implementation of FbF projects at the global level.

She also leads knowledge management of the Science for Humanitarian Emergencies and Resilience programme, working with stakeholders on science and solutions to improve risk assessment, preparedness, early action and resilience to natural hazards.

She has 15 years' experience in the humanitarian sector, with the Red

Cross Red Crescent Movement, UN agencies and NGOs.

Her background is in industrial engineering, and she has a master's degree in humanitarian action, specializing in disaster risk reduction.



**Ahmadul Hassan**

*PhD*

Ahmadul Hassan joined the Climate Centre in 2015 as technical adviser for forecast-based financing in Bangladesh.

He is a widely published expert in the fields of water-resource planning, early warning, disaster management, climate change, vulnerability assessment, and resource modelling.

He graduated from the Bangladesh University of Engineering and Technology in 1983 and did his PhD in natural resource management in 2010.

Ahmadul was team leader on the assessment of adaptation and vulnerability for Bangladesh's Second National Communication, involved in investigating the impacts of sea-level rise on different livelihoods groups in coastal areas, including gender issues.

**Raja Siregar**



*MSc*

Raja Siregar has been working on climate change adaptation in Indonesia for 20 years, both in the capacity of advisor to government agencies and managing concrete programmes in the NGO sector.

Working for the Climate Centre, Raja leads a programme to influence local policy, practice, and investment in risk management. This includes support to the government of Indonesia in considering different adaptation and risk management strategies and funding opportunities to improve resilience.

Raja lead the institutional and policy components of the recent FbF scoping study in Indonesia, exploring the potential use of forecasts around the country.

## 7 Summary of Deliverables



Herewith follows a summary of all the items within this proposal that should be considered as deliverables for the contract:

1. Desktop review, consultation and socialisation workshop to be held in Indonesia at the start of the project.
2. Detailed implementation and design document that includes report mock-ups, data requirements (and sources), algorithms and logic workflows to be used for FbF functionality in InaSAFE.
3. InaSAFE Desktop enhancements:
  - a. FbF algorithms and damage curves for the identified hazards
  - b. User Interface updates for configuring FbF functionality
  - c. New FbF related elements in InaSAFE reports
4. GeoSAFE Enhancements:
  - a. Migrate supported version of QGIS/InaSAFE from version QGIS 2.18 LTR / InaSAFE 4.4 to QGIS 3.4 LTR / InaSAFE 5.x
  - b. Updates and enhancements to support FbF reporting from within the GeoSAFE platform.
5. Training materials:
  - a. Addition of FbF related training materials to InaSAFE Desktop lessons at: <http://changelog.inasafe.org/en/inasafe/section/list/>
  - b. Addition of FbF related training materials to GeoSAFE lessons at: <http://changelog.inasafe.org/en/geosafe/section/list/>
  - c. A guide to the software capabilities and links to training materials will be included in the FbF Manual, the Climate Training Kit, and other humanitarian materials.
6. Training session to be held in Indonesia where we will introduce participants to QGIS, InaSAFE, GeoSAFE and the FbF components of InaSAFE/GeoSAFE.
7. Concluding report: We will summarise the activities of this project in a concluding report.

## 8 Financials

Our financial offer is outlined in the separate document entitled 'Kartoza-RCRCCC-Operational Consulting Financial Proposal Response'.

## 9 Annex 1: Team Composition, Task Assignments & Level of Effort (LOE)

### Key Personnel

<b>Name of Staff &amp; Firm associated with<sup>3</sup></b>	<b>Area of Expertise Relevant to the Assignment</b>	<b>Designation for this Assignment<sup>4</sup></b>	<b>Assigned Tasks or Deliverables</b>	<b>Location<sup>5</sup></b>	<b>Number of Days</b>
Tim Sutton: Kartoza Employee	InaSAFE Expert	Consultant	System Architecture	South Africa	36.25
Gavin Fleming: Kartoza Employee	GeoSAFE Expert	Kartoza Lead	Oversee system implementation	South Africa	23.25
Rizky Maulana: Kartoza Employee	InaSAFE/GeoSAFE developer	Developer	System implementation	Indonesia	116.5
Erin Coughlan: Climate Centre	Forecast based Financing	Consultant	Scale up	United States	5
Catalina Jaime: Climate Centre	Forecast based Financing	RCCC Lead	Design and review	United Kingdom	37
Ahmadul Hassan: Climate Centre	Forecast based Financing	Consultant	System design and training	Bangladesh	20
Raja Siregar: Climate Centre	Early Warning System Policy	Consultant	Indonesia policy and uptake	Indonesia	64

<sup>3</sup> Indicate if the proposed staff is an employee or agent of your consulting firm/organization or a sub consultant.

<sup>4</sup> Title or position as described in the TOR or otherwise named in your proposed Organization and Staffing under Section D, sub section (c).

<sup>5</sup> Relative to the assignment subject of the Contract, indicate if the staff/consultant local or international.

## 10 Annex 2: Curriculum Vitae (CV) of Proposed Key Personnel

### 10.1 Tim Sutton

- 1. Name of Staff:** Timothy Paul Sutton
- 2. Proposed Position:** InaSAFE and QGIS Specialist, Project Lead
- 3. Employer:** Kartoza (Pty) Ltd
- 4. Date of Birth:** 25 April 1969 **Nationality:** South African
- 5. Education:**

University or college attended	Degree / Certificate Obtained	Date Obtained
University of Stellenbosch, South Africa	MA Geography and Environmental Studies,	2004
Cape Technikon, South Africa	B.Tech Nature Conservation	1996
Cape Technikon, South Africa	National Diploma Nature Conservation	1993

### 6. Membership of Professional Associations:

### 7. Other Training:

C++/Qt, Java, PHP / HTML / CSS / GeoDjango, Gnu/Linux system administration, Mapserver, PostgreSQL/PostGIS, MySQL, SQLite, Subversion / CVS Version control  
Geographical Information Systems (including ESRI products, MapInfo, IDRISI, and others). Microsoft Windows, Mac OSX, Visual Basic, MS Visual Studio C++, ESRI Avenue, Microsoft SQL Server, MS Access. MCSE (certification no longer maintained since I switched over to working on predominantly FOSS environment).

### 8. Countries of Work Experience:

U.K., Brazil, South Africa, Tanzania, Indonesia, Mozambique, Uganda

### 9. Languages [For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing]:

English – native tongue  
Afrikaans – good reading, writing, speaking  
Portuguese – basic reading, writing, speaking

### 10. Employment Record:

**From:** 2014 **To:** present

**Employer:** Kartoza (Pty) Ltd

**Positions held:** Co-Founder, Developer team lead

**From:** 2008 **To:** 2014

**Employer:** Linfiniti Consulting cc

**Positions held:** Founder, Developer

**From:** 2006 **To:** 2008

**Employer:** CRIA, FAPESP (Brazilian government)

**Positions held:** Guest researcher

**From:** 2003 **To:** 2005

**Employer:** University of Reading

**Positions held:** Middleware Programmer / Research Assistant

**From:** 2001 **To:** 2002

**Employer:** Water Research Center (Wrc plc UK)

**Positions held:** GIS Applications Developer

**From:** 1998 **To:** 2001

**Employer:** Western Cape Nature Conservation Board

**Positions held:** GIS Research Assistant, Scientific Services

**From:** 1996 **To:** 1998

**Employer:** Western Cape Nature Conservation Board

**Positions held:** Environmental Education Officer

**From:** 1993 **To:** 1995

**Employer:** Hermanus Municipality

**Positions held:** Reserve Manager/ Applications Developer

**From:** 1989 **To:** 1990

**Employer:** Norwich Life

**Positions held:** Computer Operator



**11. Detailed Tasks Assigned**    **12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned**

*[List all tasks to be performed under this assignment]*

InaSAFE Developer / Expert  
InaSAFE Support Services  
QGIS Developer / Expert  
QGIS / InaSAFE Training  
Map generation system  
Community workshop

*[Among the assignments in which the staff has been involved, indicate the following information for those assignments that best illustrate staff capability to handle the tasks listed under point 11.]*

**Name of assignment or project:** InaSAFE - 73177

**Year:** February 2017 – June 2018

**Location:** Indonesia

**Client:** DFAT

**Main project features:** InaSAFE is a contingency planning tool to help build resilient communities in the event of disasters. InaSAFE is built on top of QGIS. We extended InaSAFE and InaSAFE Realtime to support new hazard types and a unified architecture for all hazards. We developed new modules for vulnerable sectors of society.

**Positions held:** Project lead / Developer

**Activities performed:** Oversee all technical aspects of the InaSAFE project.

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**Name of assignment or project:** InaSAFE Africa 1167922

**Year:** September 2015 – September 2018

**Location:** Uganda, Malawi, Mozambique, Madagascar

**Client:** WorldBank / GFDRR

**Main project features:** InaSAFE is a contingency planning tool to help build resilient communities in the event of disasters. InaSAFE is built on top of QGIS. In this project we extended InaSAFE to support Afri-centric requirements, provided training to practitioners from participating country, developed features in QGIS and GeoNode to support integration between QGIS, GeoNode, InaSAFE. We also deployed a new online version of InaSAFE ('GeoSAFE') that runs under GeoNode.

**Positions held:** Project co-lead / Developer

**Activities performed:** Oversee technical aspects of the InaSAFE project. Develop training materials and conduct training courses.

---

**Name of assignment or project:** InaSAFE

**Year:** 2012 – February 2017

**Location:** Indonesia

**Client:** DFAT / Australian AID / AIFDR

**Main project features:** InaSAFE is a contingency planning tool to help build resilient communities in the event of disasters. InaSAFE is built on top of QGIS.

**Positions held:** Project lead / Developer

**Activities performed:** Oversee all technical aspects of the InaSAFE project.

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**Name of assignment or project:** InaSAFE Realtime

**Year:** 2012

**Location:** Indonesia

**Client:** WorldBank

**Main project features:** InaSAFE Realtime is a server side application that produces near realtime shake impact maps following an earthquake. InaSAFE Realtime is built on top of QGIS and InaSAFE.

**Positions held:** Project lead / Developer

**Activities performed:** Oversee all technical aspects of the InaSAFE Realtime project.

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**Name of assignment or project:** TanBIF GIS Tools

**Year:** 2010

**Location:** Tanzania

**Client:** GBIF (Global Biodiversity Information Facility)

**Main project features:** A toolkit for biodiversity informatics within QGIS

**Positions held:** Project lead / Developer

**Activities performed:** Created a toolkit for Biodiversity practitioners in Tanzania based on QGIS, openModeller. Conducted training courses for Biodiversity practitioners. Added core functionality to QGIS to serve the needs of Biodiversity practitioners.

### 13. Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



Date: 21 Oct 2018

*[Signature of staff member or authorized representative of the staff]*

*Day/Month/Year*

Full name of authorized representative: Timothy Paul Sutton

## 10.2 Gavin Fleming

**1. Name of Staff:** Gavin John Fleming

**2. Proposed Position:** GIS / LIS consultant

**3. Employer:** Kartoza (Pty) Ltd

**4. Date of Birth:** 19 January 1970 **Nationality:** South African

### 5. Education:

University or college attended	Degree / Certificate Obtained	Date Obtained
University of the Witwatersrand	MSc, Population Genetics	1996
University of the Witwatersrand	BSc(Hons), Genetics	1993
University of the Witwatersrand	BSc, Genetics and Microbiology	1992

### 6. Membership of Professional Associations:

SAGC (South African Geomatics Council) Registered Professional GeoInformation Science (GISc) Practitioner (PGP1234)

Member of SAGI (South Africa Geomatics Institute) and GISSA (Geoinformation Society of South Africa)

On the advisory board of the Centre for GeoInformation Science at the University of Pretoria

On the advisory board of the STDM (Social Tenure Domain Model) project

On the advisory board of GeoforAll

### 7. Other Training:

Statistics 511 (Wits), Modelling in Conservation Biology (Wits), Data Management in Conservation (Wits), GIS and database design (including ArcInfo, ArcSTORM, Object-oriented design for the ArcInfo 8 data model, Geodatabase design; all at GIMS), Building Web Pages (CSIR), Project Management the TOC Way (CSIR), Practical Mathematical Optimisation for Engineers and Scientists (UP), Introduction to Fuzzy Logic and Applications in GIS (ESRI), Spatial Analysis in GIS (ESRI), Selling Skills (CSIR), Marketing of Knowledge Intensive Offerings (CSIR), Multi Agent Systems modelling (CIRAD / UP), Java programming (CSIR), Pacific Institute's Investment in Excellence, Python programming (TBS), Time Management (CSIR), Object-oriented Analysis with Use Cases (GuruHut), Object-oriented Modelling with UML (Mental Arrow); Linking Industry, Biodiversity Action and Poverty Relief for a Sustainable Environment (CSMI, Wits, Feb 2006); Transdisciplinary economics for sustainability, lecture at GIBS by Manfred Max-Neef; Re-organisation and management of complex social-ecological systems: global and southern African perspectives (Resilience Alliance, April 2006); Techno-economic evaluation of mineral projects (GSSA, Clyde Mallinson, May 2006); WBCSD water scenarios seminar (NBI, Saxon Hotel, 18 September 2006). New Economics (South African New Economics, Kleinmond, 12-16 November 2006. Presented by Margaret Legum, Norman Reynolds and others.); The design, construction and rehabilitation of mine tailings storage facilities and landfills for closure purposes (CSMI, Wits, Jan 2007); Cost Engineering Techniques (Mintek, Jan 2007); Presentation skills (Mintek, Jan 2007); 2<sup>nd</sup> South African International Workshop on Sensor Web Enablement (5-6 Feb 2007, Breakwater Lodge, Cape Town); Management and Leadership Skills (Mintek, June 2007); Sustainable Community Investment Programme (The Cottage, Observatory, 21-23 August 2007. Presented by Norman Reynolds and others); Management and Leadership Skills (Mintek, June 2007); Introductory course in (geo)spatial profiling, spatial-economic analysis and the use of GAP3 as a geospatial analysis platform (CSIR, 1-2 June 2009). Various FOSS GIS workshops at FOSS4G conferences.

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**8. Countries of Work Experience:**

South Africa, U.K., Colombia, Nigeria, Indonesia, Lesotho, Tanzania, Mozambique, Uganda

**9. Languages**

English – native tongue

Afrikaans – good reading, writing, speaking

Spanish – good reading, writing, speaking

**10. Employment Record**

**From:** 2014 **To:** present

**Employer:** Kartoza (Pty) Ltd.

**Positions held:** Co-Founder, Shareholder, Joint Managing Director.

**From:** 2010 **To:** 2014

**Employer:** Afrispatial cc

**Positions held:** Founder, business development, marketing, sales, GIS design and implementation, GIS analyst.

**From:** 2010 **To:** 2010

**Employer:** Information Management Scientist, South African Environmental Observation Network (SAEON).

**Positions held:** Establishing the South African portal of the Nairobi Convention Clearinghouse (NCCH; [www.saeonocean.co.za/geonetwork](http://www.saeonocean.co.za/geonetwork)). Managing GeoNetwork, GeoServer and MetaCat systems. Supporting SAEON's systems engineer and Node and data managers.

**From:** 2006 **To:** 2009

**Employer:** Mineral Economics and Strategy Unit, Mintek

**Positions held:** Senior GISc and Sustainable Development Researcher. FOSS GIS systems and software, novel geospatial applications and analysis, sensor web enablement of environmental observations, achieving sustainable outcomes through mining, Local Economic Development.

**From:** 1999 **To:** 2005

**Employer:** CSIR (Environmentek / NRE, Satellite Application Centre and Meraka Institute for Advanced ICT)

**Positions held:** GIS Specialist, Environmental Modeller, Geoinformation Science Researcher, GIO

**From:** 1996 **To:** 1999

**Employer:** Geographic Information Management Systems (GIMS) (Pty) Ltd (Now ESRI South Africa).

**Positions held:** GIS specialist

**Earlier:** Statistical research with SAS and relational databases into cancer and HIV at the South African National Cancer Registry, Braamfontein and the Oxford Cancer Intelligence Unit, England (1 year, 1995-1996); Extensive laboratory, statistical and project management experience during MSc and Honours degrees; Teaching conversational Spanish and high school English; English-Spanish Translation.



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### 11. Detailed Tasks Assigned

General role as GIS and DRR consultant, particularly around GeoSAFE, QGIS and other open source tools.

### 12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned

**Name of assignment or project:** Online Operational Natural Disaster Risk Assessment platform

**Year:** 2015-2016

**Location:** Global, prototype focussed on Tanzania

**Client:** World Bank GFDRR

**Main project features:** A Geonode-based, curated online clearinghouse of natural disaster exposure and hazard data and associated features in GeoSAFE, InaSAFE and QGIS that enable browsing and searching online sources for conducting disaster impact scenarios.

**Positions held:** Project manager, system design, implementation

**Activities performed:**

- project management
  - system design
  - system implementation and administration
- 

**Name of assignment or project:** InaSAFE Realtime

**Year:** 2017

**Location:** Global, focussed on Indonesia

**Client:** DFAT and World Bank GFDRR

**Main project features:** A headless platform based on QGIS and InaSAFE that automatically fetches flood, earthquake and other disaster observation feeds, performs hazard-exposure impact functions on them and produces reports that are published on a website and pushed to individual recipients.

**Positions held:** Project manager

**Activities performed:** Interpreting project requirements, client liaison, managing development team, managing deployment infrastructure, monitoring delivery.

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**Name of assignment or project:** GeoSAFE-Geonode-QGIS integration

**Year:** 2017

**Location:** Global

**Client:** World Bank GFDRR

**Main project features:** Improving the pluggability of alternative backends (QGIS and Geoserver) into GeoNode; integrating QGIS and GeoNode via a QGIS plugin; improving metadata functionality in GeoNode; improving the UI and UX of GeoSAFE; various other improvements in the QGIS-GeoNode-GeoSAFE ecosystem.

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**Positions held:** Project manager

**Activities performed:** Interpreting project requirements, client liaison, managing development team, managing deployment infrastructure, monitoring delivery.

**13. Certification:**

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



\_\_\_\_\_ Date: 1 October 2018

*[Signature of staff member or authorized representative of the staff] Day/Month/Year*

Full name of authorized representative: Gavin John Fleming

### 10.3 Rizky Maulana Nugraha

- 1. Name of Staff:** Rizky Maulana Nugraha
- 2. Proposed Position:** Software Engineer
- 3. Employer:** Kartoza (Pty) Ltd
- 4. Date of Birth:** 19<sup>th</sup> May 1990 **Nationality:** Indonesia
- 5. Education:**

University or college attended	Degree / Certificate Obtained	Date Obtained
Bandung Institute of Technology	Bachelor Engineer	14 <sup>th</sup> July 2012

#### 6. Membership of Professional Associations:

**7. Other Training:** Microsoft Windows, Microsoft C#, Microsoft C++, Microsoft Visual Basic, MacOS, iOS, NVIDIA CUDA. Extensive experience with Open Sources technologies and development environments including: C/C++/Objective-C, Java, PHP, Javascript, HTML/CSS, Python, Django, Liferay, OpenCL, Android, GNU/Linux system administrations, PostgreSQL/PostGIS, MySQL, SQLite, Git version control, and many other tools.

#### 8. Countries of Work Experience: Indonesia

#### 9. Languages *[For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing]:*

Indonesia : Speaking - good, reading - good, writing - good

English : Speaking - fair, reading - good, writing - good

#### 10. Employment Record *[Starting with present position, list in reverse order every employment held by staff member since graduation, giving for each employment (see format here below): dates of employment, name of employing organization, positions held.]:*

**From:** February 2015 **To:** Current

**Employer:** Kartoza (Pty) Ltd

**Positions held:** Software Engineer

**From:** January 2014 **To:** December 2014

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**Employer:** Rotterdam Community Solution

**Positions held:** Android and Java Web Software Engineer

**From:** July 2012 **To:** March 2013

**Employer:** C.V. Bentang Inspira Technology

**Positions held:** Java Web Software Engineer

**11. Detailed Tasks Assigned    12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned**

Software developer

**Name of assignment or project:** InaSAFE - 73177

Web developer

**Year:** February 2017 – June 2018

Trainer

**Location:** Indonesia

**Client:** DFAT

**Main project features:** InaSAFE is a contingency planning tool to help build resilient communities in the event of disasters. InaSAFE is built on top of QGIS. We extended InaSAFE and InaSAFE Realtime to support new hazard types and a unified architecture for all hazards. We developed new modules for vulnerable sectors of society.

**Positions held:** Developer

**Activities performed:** Developer for InaSAFE Realtime – and online near realtime disaster potential impact reporting platform.

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**Name of assignment or project:** InaSAFE Africa  
1167922

**Year:** September 2015 – September 2018

**Location:** Uganda, Malawi, Mozambique, Madagascar

**Client:** WorldBank / GFDRR

**Main project features:** InaSAFE is a contingency planning tool to help build resilient communities in the event of disasters. InaSAFE is built on top of QGIS. Inn

this project we extended InaSAFE too support Afri-centric requirements, provided training to practitioners from participating country, developed features in QGIS and GeoNode to support integration between QGIS, GeoNode, InaSAFE. We also deployed a new online version of InaSAFE ('GeoSAFE') that runs under GeoNode.

**Positions held:** Developer

**Activities performed:** Implementation of GeoSAFE and INGC GeoNode portal.

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**Name of assignment or project:** InaSAFE

**Year:** 2012 – February 2017

**Location:** Indonesia

**Client:** DFAT / Australian AID / AIFDR

**Main project features:** InaSAFE is a contingency planning tool to help build resilient communities in the event of disasters. InaSAFE is built on top of QGIS.

**Positions held:** Developer

**Activities performed:** Software developer for the InaSAFE project. Main developer for InaSAFE Realtime. Developed InaSAFE reporting framework.

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### 13. Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



\_\_\_\_\_  
Date: 26 Oct 2018

*[Signature of staff member or authorized representative of the staff]*

*Day/Month/Year*

Full name of authorized representative: Tim Sutton



#### 10.4 Erin Coughlan de Perez

1. **Name of Staff:** Erin Coughlan de Perez
2. **Proposed Position:** Manager, Climate Science Team
3. **Employer:** Red Cross Red Crescent Climate Centre
4. **Date of Birth:** 13 Sep 1987 \_\_\_\_\_ **Nationality:** USA

#### 5. Education

<u>School, college and/or University Attended</u>	<u>Degree/certificate or other specialized education obtained</u>	<u>Date Obtained</u>
VU University Amsterdam	PhD Candidate	2018
Columbia University	MA Climate and Society	2011
McGill University	BS Environment, International Development	2009

#### 6. Professional Certification or Membership in Professional Associations:

Lead Author, IPCC Working Group II 6<sup>th</sup> Assessment Report  
Steering Committee, Global Flood Partnership  
Steering Committee, Global Flood Awareness System

#### 7. Other Relevant Training: \_

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#### 8. Countries of Work Experience: [List countries where staff has worked in the last ten years]:\_

Kenya, Uganda, Ethiopia, South Sudan, Mozambique, Tanzania, Togo, Peru, Barbados

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#### 9. Languages [For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing]:

English: Native Speaker;  
French: Fair in speaking/reading/writing;  
Spanish: Fair in speaking/reading, poor in writing

#### 10. Employment Record [Starting with present position, list in reverse order every employment held]:

From 2011\_\_ To present\_\_

Employer: Red Cross Red Crescent Climate Centre

Positions held: Manager, technical advisor

From [Year]: 2012\_\_ To [Year]: 2017

Employer: Columbia University

Positions held: Associate professor, teaching assistant

From [Year]: 2010\_\_ To [Year]: 2011

Employer: Global Network for Climate Solutions

Positions held: Research Assistant

From [2008\_\_ to 2008

Employer: McGill University Department of Biology

Positions held: Field Research Assistant

### 11. Detailed Tasks Assigned

Manage a team of technical advisors to provide comprehensive support for the development of Forecast-based Financing systems. Develop methodologies for the evaluation and selection of forecast thresholds, integration of vulnerability assessments, and selection of effective forecast-based actions. Establish and execute monitoring and evaluation protocols to assess the effectiveness of this work, and convene relevant actors national and regional dialogue platforms to share learning and encourage collaboration.

### 12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned

*[Among the assignments in which the staff has been involved, indicate the following information for those assignments that best illustrate staff capability to handle the tasks listed under point 11.]*

Name of assignment or project: Forecast-based Financing\_\_

Year: 2012-present\_\_\_\_\_

Location: Uganda, Togo, Mozambique, Bangladesh, Peru, Mali, Niger, Zambia, Kenya, Ethiopia\_\_

Client: German Government, Netherlands Government, IKEA Foundation, others\_\_

Main project features: Design of scientific thresholds for action, institutionalization of Early Action Protocols for forecast-based action\_\_\_\_\_

	<p>Positions held: Project manager__</p> <p>Activities performed: Technical support, oversight, management. Provide comprehensive support for the development of Forecast-based Financing systems. Develop methodologies for the evaluation and selection of forecast thresholds, integration of vulnerability assessments, and selection of effective forecast-based actions.__</p>
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**12.** Do you currently or have you ever worked for the World Bank Group including any of the following types of appointments: Regular, term, ETC, ETT, STC, STT, JPA, or JPO? If yes, please provide details, including start/end dates of appointment.

No

### Certification

I certify that (1) to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience; (2) that I am available for the assignment for which I am proposed; and (3) that I am proposed only by one Offeror and under one proposal.

I understand that any wilful misstatement or misrepresentation herein may lead to my disqualification or removal from the selected team undertaking the assignment.

Erin Coughlan de Perez Date: 22/Oct/2018



*[Signature of staff member or authorized representative of the staff] Day/Month/Year*

## 10.5 Catalina Jaime

1. **Name of Staff** [*Insert full name*]: Catalina Jaime
2. **Proposed Position**  
Senior Risk Adviser
3. **Employer:** Red Cross Red Crescent Climate Centre
4. **Date of Birth:** 02/05/1981 **Nationality:** Colombian
5. **Education**

<u>School, college and/or University Attended</u>	<u>Degree/certificate or other specialized education obtained</u>	<u>Date Obtained</u>
<u>Uppsala University (Sweden) / University of Deusto (Spain)</u>	<u>MA in International Humanitarian Action</u>	<u>December 2009</u>
<u>Universidad Nueva Granada - Colombia</u>	<u>BA in Industrial Engineering</u>	<u>July 2005</u>

- 6. **Professional Certification or Membership in Professional Associations:**  
 Scholarship of the European Commission - Erasmus Mundus Program  
 Specialized in Conflict, Disaster and Peace-Building
7. **Other Relevant Training:** \_\_\_\_\_  
 \_\_\_\_\_
8. **Countries of Work Experience:** [*List countries where staff has worked in the last ten years*]: Colombia, Nepal, Dominican Republic, Haiti, Uganda, Madagascar, Philippines, (current based in UK supporting projects in: Mozambique, Peru, Bangladesh, Uganda, togo, Ecuador, Mongolia etc)
9. **Languages** [*For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing*]:  
 Spanish (mother tongue) English (second language Good in all) French (fair speaking, poor writing) \_\_\_\_\_
10. **Employment Record** [*Starting with present position, list in reverse order every employment held*]:  
 From [Year]: 2016 To [Year]: now

Employer: **Red Cross Red Crescent Climate Centre**  
 Positions held: Senior Risk Adviser, former Forecast-based Financing coordinator

- Technical advice to the Red Cross Red Crescent Movement and partners for the design, implementation and evidence building of FbF interventions.
- Knowledge Manager of forecast-based action research.
- Liaison between policy, science and practice actors in the area of early warning early action and risk analysis for anticipated decision making.
- Representation at global and national level of the Forecast-based Financing concept.

From [Year]: 2014 To [Year]: 2015

Employer: **Swiss Red Cross** - Philippines

Positions held: Disaster Risk Reduction Delegate and Recovery Coordinator

- Conduct needs assessments and project proposal writing after Typhoon Haiyan
- Technical advice to the Philippine Red Cross in the design and implementation of DRR and CCA interventions.
- Technical advice and PMER of the Haiyan Recovery projects.
- Technical support to the Swiss Embassy and Swiss Development Cooperation (SDC) during the DRR ASEM conference in Manila, May and June 2014.

From [Year]: 2011 To [Year]: 2014

Employer: **German Red Cross** - Haiti - Uganda – Madagascar

Positions held: Disaster Risk Reduction (CCA) Delegate and Recovery Coordinator

### **Madagascar**

- Evaluate and propose new alternatives for climate smart vulnerability and capacity assessments.
- Train national staff of the Malagasy Red Cross in the VCA methodology.

### **Uganda**

- Comprehensive project management and set up of a long term resilience building CCA/DRR project for floods and droughts (Integrated fields of work: WASH, livelihoods, DRR in schools, shelter and food security).
- Development of the first Forecast-based Financing mechanism.

- 
- Capacity building of Uganda Red Cross staff on vulnerability and capacity assessments, climate risk assessments, climate smart interventions, community action plans, early warning systems and others.
  - Liaise and promote coordination with different governmental and non-governmental organizations. Promote close coordination with academic institutions and the Uganda Hydro and Meteorological Departments.
  - Design the CCA/DRR strategy for school preparedness.

### Haiti

- Comprehensive community and school DRR project management.
- DRR/CCA focal point for the German Red Cross.
- Liaise and maintain close working relationship with different government departments, NGOs, and civil society on behalf of GRC.
- Promote capacity building of local authorities and Haitian Red Cross.
- Responsible for the implementation, monitoring, evaluation and reporting of the DRR project.
- Responsible of training needs assessment and the proper use of training modules for DRR, including the preparation of training materials in close coordination with the Haitian Red Cross, the IFRC and other partners National Societies active in the sector.

From [Year]: 2010 To [Year]: 2011

Employer: **Shelter & NFI Cluster (UNHABITAT and IFRC)** - Haiti

Positions held: Shelter Information Manager Coordinator – National (UNHABITAT) and regional (IFRC)

- Coordinate the Shelter Information Management Unit at national level (UNHABITAT) and regional level (IFRC) [www.shelterhaiti2010.org](http://www.shelterhaiti2010.org)
- Provide shelter situation analysis and information tools to the Shelter Cluster members, Government counterparts and other humanitarian actors.
- Coordinate the Emergency Contingency Planning strategy for the shelter cluster 2011.
- Data gathering, collection, monitoring and analysis of emergency shelters, NFI, transitional shelters and permanent housing solutions in the earthquake affected territory.
- Coordinate together with CCCM cluster the return strategy of IDPs.
- Developed together with the WASH cluster an information-sharing platform.
- Coordination with other cluster leads and stakeholders to ensure complementarity and cross-sectoral analysis of information on the disaster response.



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From [Year]: 2009 To [Year]: 2009

Employer: **National Society for Earthquake Technology – NSET** - Nepal

Positions held: Community Based Disaster Risk Management Evaluator

- Evaluate Community Based Disaster Risk Management (CBDRM) initiatives implemented by NSET in Kathmandu Valley and South Nepal, using participatory evaluation tools.
- Carry out a comparative analysis of CBDRM approaches among UNDP, ActionAid, Nepal Red Cross Society and NSET projects.
- Support implementation of the Disaster Preparedness for Safer Schools Workshop.
- Develop a CBDRM guideline.

From [Year]: 2007 To [Year]: 2008

Employer: **United Nations Department of Safety and Security- UNDSS - Colombia**

Positions held: **Field Security Coordination Assistant**

- Identify and build relationships with key humanitarian organizations, Government and the Community to improve information access in the northeast region of Colombia.
- Implement Annual Training Plan for UN staff and other UN partners in the field.
- Member of the Mine Action Board of the Department of Santander.
- Data gathering, collection and analysis of conflict related issues, landmines and natural hazards in the northeast region of Colombia.
- Advise local authorities for the inclusion of DRR strategies as a crosscutting issue in the development plans of each municipality (POT).
- Facilitate coordination spaces on security matters between UN agencies, Red Cross Movement, National Authorities, NGOs and other Organizations.
- Implementation of early warning system for UN workers.
- Design an Standard Operation Process handbook (DRR and Security Risk Management)

From [Year]: 2004 To [Year]: 2007 and then 2010

Employer: **United Nations World Food Programme - WFP** – Haiti/Dominican Republic and Colombia

Positions held: **Procurement Officer / Operations Assistant**

- Provide technical advice on procurement activities, following rules, procedures and regulations for the Haiti emergency operation.
- Issue local and international tenders, evaluate offers and make recommendations for the finalization of purchases and the award of contracts by using WFP's corporate system.

- Review technical proposals of suppliers and carry out cost/benefit analysis for equipment and services procurement.
- Liaise with WFP appointed inspection and superintendent firms to ensure quality control, specification conformity, volume assessment, monitoring and verification of deliveries.
- Track all commodities from point of origin to destination, accounting for all commodities received in person or through a WFP staff and comparing counts to waybills.
- Issue local and international tenders, evaluate offers and make recommendations for the finalization of purchases and the award of contracts of Non Food Items for the extended emergency operation.
- Follow up the MOSS compliance of WFP central and field offices (UN Security guidelines)
- Development and implementation of Security and Admin field assessments.
- Elaborate monthly and annual purchase planning for WFP Services Units and field offices.
- Food Monitoring distribution during flood emergency.

<p><b>11. Detailed Tasks</b></p> <p><b>Assigned</b></p> <p><i>[List all tasks to be performed under this assignment]</i></p> <ul style="list-style-type: none"> <li>- Focal point from the Climate Centre team for the project implementation</li> <li>- Introduce the trigger methodology guidance and explore with the Karoza team the entry point for InaSAFE as an impact-based Forecasting tool.</li> <li>- Knowledge broker for the project.</li> <li>- Liaison with Climate Centre team member in</li> </ul>	<p><b>12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned</b></p> <p><i>[Among the assignments in which the staff has been involved, indicate the following information for those assignments that best illustrate staff capability to handle the tasks listed under point 11.]</i></p> <p>Name of assignment or project: <u>Forecast-based Financing pilot project (currently in more than 20 countries)</u></p> <p>Year: 2016 - now _____</p> <p>Location: UK _____</p> <p>Client: German Red Cross, IFRC, Netherlands Red Cross, DFID/NERC _____</p> <p>Main project features: Contribute to the strategic development of the Forecast-based Financing approach, member of the IFRC Forecast-based Action technical team. _____</p> <p>Positions held: <u>Senior Risk Adviser, former Forecast-based Financing coordinator</u></p> <p>Activities performed: Technical and strategic advise__</p>
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Indonesia and other relevant partners.	
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**12.** Do you currently or have you ever worked for the World Bank Group including any of the following types of appointments: Regular, term, ETC, ETT, STC, STT, JPA, or JPO? If yes, please provide details, including start/end dates of appointment.

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**Certification**

I certify that (1) to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience; (2) that I am available for the assignment for which I am proposed; and (3) that I am proposed only by one Offeror and under one proposal.

I understand that any wilful misstatement or misrepresentation herein may lead to my disqualification or removal from the selected team undertaking the assignment.



\_\_\_\_\_  
*[Signature of staff member or authorized representative of the staff]*

Date: 22/10/2018

*Day/Month/Year*

## 10.6 Ahmadul Hassan

1. **Name of Staff** [*Insert full name*]: AHMADUL HASSAN
2. **Proposed Position**  
**Technical Adviser of Forecast based Financing**
3. **Employer**: Red Cross and Red Crescent Climate Centre
4. **Date of Birth**: Jan 1, 1962 **Nationality**: Bangladesh and Legal US resident
5. **Education**

<u>School, college and/or University Attended</u>	<u>Degree/certificate or other specialized education obtained</u>	<u>Date Obtained</u>
Institute of Water & Flood Management (IWFM), Bangladesh University of Engineering & Technology (BUET)	PhD "A Decision Support Framework for Sustainable Land and Water Management in a Floodplain"	2010
Department of Water Resources Engineering, Bangladesh University of Engineering & Technology (BUET)	M.Sc. in Water resource Engineering "Development of Design Criteria of the Water Regulatory Structures for Floodplain Fisheries Management in Jamalpur Area, Bangladesh".	2001
Department of civil engineering, Bangladesh University of Engineering & Technology (BUET)	B.Sc. in Civil Engineering	1983

### 6. Professional Certification or Membership in Professional Associations:

Vice president of Bangladesh Society for Geo Informatics, 2008-2009

Fellow Member of Institution of Engineers, Bangladesh (IEB), 2004

Member of CAPNET, 2004

Member of Disaster Management Group,

Member of American Society for Photogrammetry and Remote Sensing, 2003

Member of Bangladesh Computer Society (BCS), 1998

## 7. Other Relevant Training:

Received 5days Train the trainer (ToT) workshop of Water Diplomacy organized jointly by Tufts University and Massachusetts Institute of Technology, held in Boston, USA, on 25-29 June, 2012

Programming ArcInfo with Visual Basic for Applications; Conducted by ESRI South Asia; EGIS Training Centre, 30 July to 1-3 August 2000.

Programming Map Objects with Visual Basic; Conducted by ESRI South Asia; EGIS Training Centre, 18-20 May 1998.

Using ARC GRID with Arc/Info; Conducted by ESRI South Asia; EGIS Training Centre, 20-23 April 1998.

Using ArcTin; Conducted by ESRI South Asia; EGIS Training Centre, 30-31 March 1998.

Customizing ArcInfo with AML; Conducted by ESRI South Asia; EGIS Training Centre, 22-25 March 1998.

Training Course on Visual Basic; Conducted by Bangladesh Computer Council; BCC Training Centre; 2 December 1997 to 22 January 1998

Introduction to Arc/INFO NT; Conducted by ESRI South Asia; EGIS Training Centre, 18-23 December 1997.

Report Writing Course; Conducted by British Council; 23 September to 16 October 1997.

Basic Training Course on Mathematical Modelling; Conducted jointly by Danish Hydraulic Institute (DHI) and Bangladesh University of Engineering & Technology (BUET), 19 May- 13 June 1990.

## 8. Countries of Work Experience: *[List countries where staff has worked in the last ten years]:*

Bangladesh, Ethiopia, Sudan, Egypt and Mozambique

## 9. Languages *[For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing]:*

Language	Speaking	Reading	Writing
Bengali (M.T)	Excellent	Excellent	Excellent
English:	Excellent	Excellent	Excellent

## 10. Employment Record *[Starting with present position, list in reverse order every employment held]:*

November 2015 till date : Technical advisor ( hydrology and climate change) for 'forecast-based financing for disaster preparedness' at Red Cross and Red Crescent Climate Centre, The

Netherlands. Technical support to the FbF team in Bangladesh to develop the forecast based trigger to activate early action(s). Define and implement danger level based on hydrology and topography of the area and vulnerability of the exposed population.

March 2013 to October 2015 date: UNDP, Bangladesh - Programme coordinator at UNDP for the project 'Building Community Resilience through Integrated Water Management" Programme: Natural Resources Management (Ecosystem and water resources) Expert.

July 2002 to February, 2013: Director of Research and Development and Disaster Management / Senior Water Resource Planner/ Environmentalist/ Climate Change and Disaster Management Expert/ Early Warning Expert / Hydrologist at CEGIS.

March 1997-June 2002: EGIS-II: (Resource Analysis (RA), The Netherlands) as Senior Water Resource Planner and Modeller/ Technical Adviser/Cluster-Coordinator( GIS and RS)/ Senior Modular/Disaster Management Expert

July 1995- March 1997: EGIS-I: (Delft hydraulics, The Netherlands) as GIS co-team leader/ Water Resource Planner and Mathematical Modeller

November 1991-June 1995: FAP 19 (ISPAN, USA): as GIS Modeller/GIS Manager/ Water Resource Planner and Mathematical Modeller

March 1990-October 1991: SWMC (DHI, Denmark): Specialist in Mathematical Modelling

January 1989-March 1990: MPO Phase II (Harza Engineering International, USA): Database Specialist/ Water Resource Planner

February 1988-January 1989: Flood Control and Drainage Project III (Engineering Planning Consultant (EPC), Bangladesh): Hydraulic and Structural Engineer

January 1984-January 1988: MPO Phase I (Harza Engineering International, USA): Planning Engineer/ Mathematical Modeller

August 1983 - January 1984: Civil Engineering Department, BUET: Teaching Assistant (Civil Engineering)

<p><b>11. Detailed Tasks</b></p> <p><b>Assigned</b></p> <p>FbF Specialist</p>	<p><b>12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned</b></p> <p><i>[Among the assignments in which the staff has been involved, indicate the following information for those assignments that best illustrate staff capability to handle the tasks listed under point 11.]</i></p>
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I work at Red Cross and Red Crescent Climate Centre, The Netherlands as Technical advisor. My responsibility is to assess the knowledge base of early warning system, analyse hazard forecasts, and support the development of Forecast-based Financing systems. I support teams in Bangladesh, the Philippines, and Vietnam to combine hazard forecasts with vulnerability and exposure information to assess who is most likely to be impacted by an upcoming hazard event. Develop menu of trigger for flood and cyclone to activate the early action to reduce risk from extreme event.



We have developed several methods to combine vulnerability, exposure, and hazard forecasts, and I have been researching datasets that best support impact forecasting for early action.

From March 2013 to October 2015, I worked as Programme coordinator at UNDP for the project 'Building Community Resilience Through Integrated Water Management', an EKN - Support for UN Joint Actions under UNDAF Pillar-5. My prime responsibility under this project is to prepare and implement work plan, maintain liaison and coordinate with all the UN agencies (WFP, UNDP and ILO) involved in this project, monitor and evaluate the project activities and provide technical and advisory support wherever necessary. I have to coordinate the interventions activities with the partner implementing organization in both UN and Government Agencies (such as Department of Environment, Department of Forestry and Bangladesh Water Development Board) to meet the targeted objectives with quality in time.

As a means of sustainable natural resource management, an integrated water management tool has been applied to reduce dependency, enhance productivity and improve quality. This is done through safe guarding the ecosystem, creating alternative income generating opportunities and reducing natural shocks aiming to enhance resilience of communities in the coast and haor ecosystem including targeted ecological sensitive areas.

From July 2002 to February 2013, working as the Director of Research and Development, Modelling and Training Division in CEGIS. I am involved in several projects like Blue Gold, River Bank Improvement Program (RBIP), EIA, navigation modelling etc. Recently I have completed a project assessing climate change impact on water availability in GBM basin using SWAT model. In addition, as a member of Management Coordination Committee, I was involved for taking all strategic decision, project planning, resource planning, allocation and monitoring of projects. I have over 29 years of experience in water resource planning, disaster management, climate change impact assessment, environmental assessment and natural resource management using hydrological, hydrodynamic models and GIS-RS tools. Have several publications as author and co-author of various national and international books and journal papers.

In Ethiopia, I have been engaged as Hydrologist to develop an operational hydrological model for the Eastern Nile Basin. Here I set up SWAT-a hydrological mathematic model for the whole Eastern Nile Basin for developing water balance model.

I have worked in the project Climate Change Scenarios and Water Availability in the GBM Basin funded by World Bank through. I was mainly involved in generating climate change scenario and water availability assessment using hydrological model SWAT.

I was also involved in the project 'Bangladesh Integrated water resource assessment project' with CSIRO where I estimated non agricultural water demand.

Involved as a team leader in Activity 4: Programmes Containing Measures to Facilitate Adaptation to Climate Change of the Second National Communication Project of Bangladesh. Assessed vulnerability on different sectors, including agriculture and food security using Decision Support System for Agro technology Transplant (DSSAT) model.

As a Project co-ordinator, working on developing climate resilience cropping pattern by using DSSAT model for the project "End to end agriculture forecasting system addressing climate variability to increase food production for ensuring food security".

I was also involved as a senior mathematical modeller, involved in setting up and calibrating hydrologic and hydrodynamic model (SOBEK by WL | Delft hydraulics) for Madhumoti river system in Southwest area of Bangladesh, developed flood depth duration module using hydrodynamic

model result and digital elevation model for Brahmaputra floodplain in Bangladesh, design and implement Community Based Flood Information System (CFIS) for flood vulnerable areas in Bangladesh, conduct training on early warning system for flood preparedness and early warning project (FPEW I) of Eastern Nile Technical Regional Office (ENTRO).

Involved as a deputy team leader in mid-term review mission of CDSP-III, (Char development and settlement project), funded by Netherlands Embassy, worked as Environment/Humanitarian Assistance/Climate Change specialist in CIDA country review mission, ADB's Early Warning Need Assessment study, World Bank's study on Climate change impacts on food security; climate change impacts on DFID investments.

As a climate change and disaster management expert, involved in research on "Investigating the impacts of relative Sea Level Rise on coastal communities and their livelihoods in Bangladesh", conducted research to find the impacts of Sea Level Rise on land use and world's largest Mangrove forest, involved in development of climate change scenarios for water and land use planning, lead the "water, coastal area, natural disaster and health sector" team in formulation of National Adaptation Programme for Action (NAPA) under different climate changes scenarios, involved in climate change risk assessment for food security project funded by World Bank.

Worked in multidisciplinary environment with local and international professionals in more than 50 projects in different level of professionalism and managements, participated in preparation of National Water Management Plan preparation, represented CEGIS in negotiations, meeting, seminars, expert consultation, business developments and networking with donor agencies, government and non-government organizations.

Worked as Technical Advisor of the Team Leader of the EGIS-II, a reputed organization for sophisticated environmental analysis and planning using advanced GIS and RS technologies, capacity hydrology, spatial modelling and application of remote sensing to analyze the environmental impact by different interventions.

As a GIS, RS and Natural resource expert, lead the GIS and RS sections in using GIS, RS and DTM technologies for environmental analysis in water resources management and planning in ISPAN/EGIS-I/EGIS-II (1992-2002), worked as manager of GIS system and introduced GIS techniques and modelling in national level natural resource planning and monitoring (FAP 19 and EGIS Phase-I), responsible for administered Survey and Instrument division of SWMC.

Developed water balance model, crop suitability model, salinity model, crop water requirement model, drought assessment model, demand and resource allocation model, RS based discharge prediction model, flood plain sedimentation model, RS based flood depth-duration computation model, cyclone shelter management information system, Fish-Rice trade-off model, Fish habitat stratification model, crop damage assessment model, investment analysis model, MCA based decision support system to evaluate measures and strategies, software for hydraulic structures, software for account management for ISPAN (FAP 19, 16, 23 and 18).

Provide guidance in several arsenic monitoring and mitigation projects to assess environmental consequences, lead a multidisciplinary project of 2.4 million dollar (funded by the Royal Netherlands Embassy), 'Analytical Framework for Integrated Water Resource Management' for Ministry of Water Resources, Bangladesh for national level water resources planning

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**12.** Do you currently or have you ever worked for the World Bank Group including any of the following types of appointments: Regular, term, ETC, ETT, STC, STT, JPA, or JPO? If yes, please provide details, including start/end dates of appointment.

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**Certification**

I certify that (1) to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience; (2) that I am available for the assignment for which I am proposed; and (3) that I am proposed only by one Offeror and under one proposal.

I understand that any wilful misstatement or misrepresentation herein may lead to my disqualification or removal from the selected team undertaking the assignment.



*[Signature of staff member or authorized representative of the staff]*

Date: \_\_\_\_\_

*Day/Month/Year*

## 10.7 P. Raja Siregar

1. **Name of Staff** [*Insert full name*]: P. Raja Siregar

2. **Proposed Position**

**Technical Adviser of Forecast based Financing**\_\_\_\_\_

3. **Employer:** IFRC/Red-Cross Climate Centre

4. **Date of Birth:** 28 September 2018 **Nationality:** Indonesia

5. **Education**

<u>School, college and/or University Attended</u>	<u>Degree/certificate or other specialized education obtained</u>	<u>Date Obtained</u>
<u>Wageningen University (WUR), Netherland</u>	<u>MSc</u>	<u>January 2019</u>
<u>Bogor Agriculture University (IPB)</u>	<u>BSc</u>	<u>December 1997</u>

6. **Professional Certification or Membership in Professional Associations:** Fisheries Diving Club

7. **Other Relevant Training:** Logical Impact Evaluation Short Course, Central European University (2016)

8. **Countries of Work Experience:** [*List countries where staff has worked in the last ten years*]:Indonesia\_\_\_\_\_

9. **Languages** [*For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing*]: Indonesia (Good), English (Good)\_\_\_\_\_

10. **Employment Record** [*Starting with present position, list in reverse order every employment held*]:  
From [Year]: 2016 To [Year]: now\_\_\_\_\_

Employer: IFRC/Red-Cross Climate Centre\_

Positions held: Climate and Resilience Advisor

From [Year]: March 2015 To [Year]: Sept 2016\_\_

Employer: Mercy Corps Indonesia\_\_\_\_\_

Positions held: Director of Programs on DRR and CCA

From [Year]: Oct 2010 To [Year]: Dec 2014\_\_\_\_\_

Employer: Indonesian Climate Change Trust Fund (ICCTF)- BAPPENAS.

Positions held: Climate Adaptation Expert

From [Year]: 2009 To [Year]: 2010\_\_\_\_\_

Employer: OXFAM GB in Indonesia\_\_\_\_\_

Positions held: Country Policy Advocacy and Communication Manager

From [Year]: 1998 To [Year]: 2007\_\_\_\_\_

Employer: WALHI (FoE Indonesia)\_\_\_\_\_

Positions held: Policy Advocacy Manager

<p><b>11. Detailed Tasks Assigned</b></p> <p>To support in-country climate related strategic partnerships to influence policy, practice and investment discussions and/or decisions and promote the use, mainstreaming of and/or institutionalization of Integrated Risk Management (IRM), Responsible for optimising Red Cross Red Crescent Climate Centre’s involvement in support of the S-PfR partners within its established frameworks</p>	<p><b>12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned</b></p> <p><i>[Among the assignments in which the staff has been involved, indicate the following information for those assignments that best illustrate staff capability to handle the tasks listed under point 11.]</i></p> <p>Name of assignment or project: IFRC-PfR Program          Year: 2016 - now _____</p> <p>Location: Jakarta_____</p> <p>Client: Ministries/Government Agencies_____</p> <p>Main project features: integration DRR, CCA and Environment Management into Policy, Practice and Investment_____</p> <p>Positions held: Climate and Adaptation Advisor_____</p> <p>Activities performed: policy dialog, production policy analysis and briefing._____</p>
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and in accordance with its Red Cross Red Crescent mandates and principles, Ensure the effective coordination between the SPfR partners and proactively work with the Red Cross Red Crescent Movement, especially National Societies (NSs) and the IFRC to ensure strategic influencing to enhance Resilience.	
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**12.** Do you currently or have you ever worked for the World Bank Group including any of the following types of appointments: Regular, term, ETC, ETT, STC, STT, JPA, or JPO? If yes, please provide details, including start/end dates of appointment.

No

### Certification

I certify that (1) to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience; (2) that I am available for the assignment for which I am proposed; and (3) that I am proposed only by one Offeror and under one proposal.

I understand that any wilful misstatement or misrepresentation herein may lead to my disqualification or removal from the selected team undertaking the assignment.



\_\_\_\_\_  
[Signature of staff member or authorized representative of the staff]

Date: 28 October 2018  
Day/Month/Year






- 1 Indicate all main activities of the assignment, including delivery of reports (e.g.: inception, interim, and final reports), and other benchmarks such as Client approvals, etc.. For phased assignments indicate activities, delivery of reports, and benchmarks separately for each phase.
- 2 Duration of activities shall be indicated in the form of a bar chart.