TECHNICAL PROPOSAL

(#1259359 – The Disaster Risk Financing Challenge Fund)

Forecast-based Financing for Food Security







STO I AN INITIATIVE OF THE NETHERLANDS RED CROSS International Center for Humanitarian Affairs



To The World Bank 1818 H Street, NW Washington, DC 20433 USA

Dear Sir/Madam,

In response to your letter of invitation to submit a proposal for The Disaster Risk Financing Challenge Fund (Selection# 1259359), dated 1 October 2018, we, Stichting VU – Institute for Environmental Studies (IVM-VU), Netherlands Red Cross – 510 (510), the UCSB Climate Hazards Center (CHC), and the Kenya Red Cross Society – International Centre For Humanitarian Affairs (KRCS-ICHA) hereby submit our joint proposal: *Forecast-based Financing for Food Security (F4S). Through the proposed project* we aim to contribute to the development of new technologies to risk financing that could revolutionize disaster management by bringing solutions that are well grounded in science and practice. We believe that the consortium here presented is able to cover all means needed and are complementary in their expertise.

The consortium partners involved bring together a significant track record on innovations in the modelling, monitoring and forecasting of drought and food insecurity, hazard mapping, risk and impact assessment, and disaster risk response, with a special focus on East Africa.

Should you require any additional information, please do not hesitate to contact us:

Institute for Environmental Studies, VU University Amsterdam De Boelelaan 1087 1081 HV Amsterdam The Netherlands

Contact persons: Ted Veldkamp: <u>ted.veldkamp@vu.nl</u> Jeroen Aerts: <u>jeroen.aerts@vu.nl</u>

Yours sincerely,

Bart van Leijen Managing Director Faculty of Science VU University Amsterdam



Head Office

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IBAN: NL52 ABNA 0472 9297 20

The World Bank 1818 H Street, NW Washington, DC 20433 USA

Place and date The Hague, 29 October 2018 Our reference IHUIT18/3482-JL-EE Contact Juriaan Lahr jlahr@redcross.nl

Subject: Letter of Association for the 2nd round proposal for Selection #1259359 "The Disaster Risk Financing Challenge Fund"

LETTER OF ASSOCIATION

Dear Sir/Madam,

In response to the invitation for sending in a 2nd round proposal for "The Disaster Risk Financing Challenge Fund", we herewith confirm that we, Netherlands Red Cross, Anna van Saksenlaan 50, 2593HT, The Hague, agree to act as partner in the consortium led by Stichting VU, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands, for the purpose of submitting a 2nd round proposal for the project: "The Disaster Risk Financing Challenge Fund", invitation for submitting a 2nd round proposal for Selection #1259359 under the title "Forecast-based Financing for Food Security".

We look forward to working with the consortium and the World Bank GFDRR team through the abovereferenced contract. This assignment is part of broader ongoing efforts by the World Bank and others to connect innovation to local contexts to help better identify changing climate and disaster risk and enable more effective decision-making to build resilience.

As such, neither the Netherlands Red Cross nor the World Bank are considered beneficiaries of the aforementioned contract. We hope to accomplish the objectives of the assignment in a spirit of partnership with the consortium and the World Bank to ultimately serve the most vulnerable communities in the selected countries.

We declare that we are eligible to participate in this project and we herewith authorize Stichting VU to represent us, Netherlands Red Cross, for the above mentioned project.

Sincerely yours,

Juriaan Lahr Head of International Assistance Netherlands Red Cross



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Office of Research 3227 Cheadle Hall Santa Barbara, CA 93106-2050 Phone: (805) 893-5089 Fax: (805) 893-2611 E-mail: waver@research.ucsb.edu

October 29, 2018

The World Bank 1818 H Street, NW Washington, DC 20433 USA

Re: Selection #1259359 under the title "Forecast-based Financing for Food Security"

Dear Sir or Madam,

In response to the invitation to send in a second-round proposal for "The Disaster Risk Financing Challenge Fund," the Regents of the University of California, on behalf of the Center for Climate Hazards at the Santa Barbara campus (UCSB), propose to act as sub-consultant in the consortium led by Stichtinig VU, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands. UCSB is eligible to participate in this project, as indicated in the attached document titled "Certificate of Eligibility and Authority to Sign Proposal."

Please note, however, that UCSB has not had adequate time to comprehensively review the World Bank Group General Terms and Conditions for Consulting Services referenced in item 17 of the Certificate of Eligibility. UCSB does anticipate requesting changes to some of the terms and conditions, but we do not have a comprehensive list at this time. Accordingly, we must reserve the right to take exception to any terms that would be problematic for our university upon determination by the World Bank Group that our proposal has been selected for funding.

Your consideration of this proposal is appreciated.

Sincerely,

Melissa Waver Senior Sponsored Projects Officer



All correspondence to be addressed to:-The Secretary General South "C" (Bellevue) Red Cross Road, Off Popo Road P.O. Box 40712, 00100-GPO,NairobiKenya Tel: (254-20) 6003593 / 3950000 Fax: (254-20) 600358 Mobiles: 0722-206958,0703-037000,0733-333045 Email: info@redcross.org Website: www.redcross.org

The World Bank 1818 H Street, NW Washington, DC 20433 USA

Nairobi, 19th October 2018

Ref: Letter of Association for the 2nd round proposal for Selection #1259359 "The Disaster Risk Financing Challenge Fund"

LETTER OF ASSOCIATION

Dear Sir/Madam,

In response to the invitation for sending in a 2^{nd} round proposal for "The Disaster Risk Financing Challenge Fund", we herewith confirm that we, Kenya Red Cross Society – International Centre for Humanitarian Affairs, agree to act as sub-consultant in the consortium led by Stichtinig VU, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands, for the purpose of submitting a 2^{nd} round proposal for the project:

"The Disaster Risk Financing Challenge Fund", invitation for submitting a 2nd round proposal for Selection #1259359 under the title "Forecast-based Financing for Food Security".

We declare that we are eligible to participate in this project and we herewith authorize Stichting VU to represent us, Kenya Red Cross Society – International Centre for Humanitarian Affairs, for the above mentioned project.

Sincerely y Ahmed Idris

Deputy Secretary General

Abstract

Prolonged drought in East Africa has pushed the region deeper into a humanitarian crisis, where households are facing significant gaps in the consumption of and access to food. Droughts in the region often have high socio-economic impacts, such as crop failures and the widespread death of livestock, high food prices and inflation, and malnutrition. A potential way to assist poor households facing chronic food insecurity and increase their resilience to shocks is through direct cash payments. This approach differs from traditional aid, which provides goods such as in-kind food for emergency responses. From 2007 to 2010, humanitarian expenditure on cash transfer programs increased from US\$1.8 million to US\$52 million, enabled by the advances, availability and adoption of appropriate technology, even in the most remote and insecure areas. Existing cash transfer programs commonly address food insecurity based on observed triggers and are crisis-driven, thus after an event has taken place (ex-post). This may result in the assistance not reaching the beneficiary in good time, reducing the effectiveness of the action.

Despite these advances and the growing understanding that timely finance prior to a disaster can be more cost-effective than post-disaster expenditures, associated uncertainties in forecast systems remain large, and scientific evidence of cash transfer triggers as well as the cost-effectiveness of ex-ante and ex-post cash transfers is missing. In result, forecast information is not routinely used as a basis for financing early action for food insecurity risk. Generating evidence to better guide cash transfers, and overcoming the challenges to act based on forecasts is crucial to promote the shift towards ex-ante cash transfers. Through *Forecast-based Financing for Food Security (F4S)*, we propose to fulfil this gap by:

- 1. Developing an impact-based probabilistic food insecurity forecasting model using Machine Learning algorithms and datasets of food insecurity drivers;
- 2. Collecting local evidence on food insecurity triggers and information on individual preferences on key design elements of cash transfer mechanisms;
- 3. Evaluating the cost-effectiveness of different cash transfer mechanisms;
- 4. Exploring the potential channels of operationalization to disseminate the knowledge and to make a first step towards operationalization.

We propose to carry out this project in the pilot countries Ethiopia, Kenya, and Uganda, with deep-dives into three case study areas: the Amhara region (Ethiopia), Isiolo district (Kenya), and Karamoja region (Uganda) to optimize the local embedding of project activities and alignment with ongoing and past project activities of our consortium members. With this project, we wish to contribute to the development of new technologies for risk financing that could revolutionize disaster management by bringing solutions that are well grounded in both science and practice. To do so, we have brought together a project consortium that combines a significant track record on innovations in the modeling, monitoring and forecasting of drought and food insecurity, hazard mapping, risk and impact assessment, and disaster risk response, with a special focus on East Africa. Through active involvement, engagement, and partnerships with key local partners we aim to generate open, transparent procedures, which are end-user oriented and based on everyone's understanding of the interactive nature of food insecurity risk.

All data, code and reports that will be collected, generated, and delivered during the project will be made publicly available.

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A - Consultant's Organization

A.1 Stichting VU – Institute for Environmental Studies (IVM-VU)

IVM-VU is a public, interdisciplinary research institute at the VU University Amsterdam. Since its creation in 1971, IVM-VU has built up considerable experience in dealing with the complexities of environmental problems through novel interdisciplinary methods. The department of Water and Climate Risk within IVM-VU is a dynamic group of 25 international researchers, faculty members and PhD students led by Prof. Jeroen Aerts and Dr. Philip Ward. Our researchers share the same interest in studying hydrological- and climate processes, and how these processes lead to risks and opportunities for society, the economy, and the environment. A defining characteristic of the department is a multi-disciplinary approach, that combines expertise from natural sciences with knowledge from the fields of economics, e-Science and geography. This approach has led to a unique research portfolio of water and climate risk projects, and the department is a global leading institute in flood and drought risk assessment, and risk management research. The department received the highest possible scientific scores from the 5-yearly national evaluation, and publishes every year in topranking journals. The department's research is also characterised by a successful integration of research in the policy domain, with a strong integration into Dutch, European, and international networks in the fields of natural hazard risk management (Prevention Web, UNISDR), climate adaptation and global cities (Connecting Delta Cities, C-40) and global water risk programs from international institutes such as the World Bank and OECD. IVM-VU has strong links with industry, including projects with the insurance and reinsurance industries (Risk Prediction Initiative, Munich RE, Achmea, SNS Reaal) and leading international think-tanks (World Resources Institute). We have a long track-record of doing field-related research together with local stakeholders in Africa, amongst others in Kenya, Ethiopia and Uganda. The topics of forecast-based financing and cash-transfer mechanisms for food security, e.g. through application of Machine Learning algorithms and big data, have been and are currently being researched with within IVM-VU through various internationally (EU H2020) and nationally (NWO) funded projects.

A.2 Netherlands Red Cross – 510 (510)

510 is a data innovation initiative of the Netherlands Red Cross. Its vision is that smart use of (big) data will help towards faster and more (cost) effective humanitarian aid at a global level. 510 wants to shape the future of humanitarian aid by converting data into understanding, and to put it in the hands of humanitarian relief workers, decision makers and people affected, so that they can better prepare for and cope with disasters and crises. Contributing to open data, data analyses and capacity building in governments and NGOs are essential to increase the understanding of humanitarian data. 510 works together with various commercial, research, and (non-)governmental partners, like Missing Maps, RCRC Climate Centre, UN OCHA, ICCO, VanderSat, Ortec, UCL, JRC. Besides the Netherlands Red Cross, 510 receives funding from EU ECHO, the Dutch Ministry of Foreign Affairs, and the Global Partnership for Sustainale Development Data. 510 supports projects and disaster relief in more than 15 countries worldwide including supporting Early Warning, Early Action Forecast-based Finance projects in 8 countries, with more on the horizon.

A.3 University of California Santa Barbara – Climate Hazards Center (CHC)

The UCSB Climate Hazards Center (CHC) is a member of the Famine Early Warning System Network (FEWSNET), therefore uniquely suited to integrate the results of this project into a variety of early warning decision processes, and has been working with East African meteorological and agricultural agencies for over 15 years. The CHC (chg.ucsb.edu) is a unique government-university collaboration, supported by the USGS Center for Earth Resources Observation and Science (EROS), which provides long term funding to the CHC to enhance drought early warning science and support an international team of drought analysts. The CHC employs about ~20 scientists in the US and developing countries, including Ethiopia and Kenva. The CHC is a major supplier of Earth Observations products to FEWSNET and other partners in the region. A series of long term cooperative agreements between the USGS and the CHC enables the ongoing support of data services, once they have proven to be useful in operational drought early warning capacities. The CHC developed and maintains a global gridded precipitation product, Climate Hazards Center's InfraRed Precipitation with Stations (CHIRPS), that is updated every 5 days and is actively used in famine early warning and drough monitoring througouth the region. CHC is in the process of developing a complementatry temperature product, Climate Hazards Center InfraRed Temperature with Stations (CHIRTS), and integrating both of these products within global weather forecasts, and regional crop forecasts. Finally, the CHC has also developed an interface (Early Warnign Explorer-EWX) to access, explore, and analyze regional climate datasets and installed an instance of the EWX at the Kenya based Regional Center for Mapping of Resources and Development.

A.4 Kenya Red Cross Society -International Centre for Humanitarian Affairs (KRCS-ICHA)

The Kenya Red Cross Society (KRCS) is a humanitarian relief organization created in 1965 by act of parliament Cap 256 of the Laws of Kenya. It operates through a countrywide network of 47 branches and has the largest volunteer network in the country. The International Centre for humanitarian Action (ICHA) is the knowledge hub of the Kenya Red Cross. It was established to generate research that will improve humanitarian work in the region. ICHA is already running projects that will add value to the consortium. The Towards Forecast-based Preparedness Action (ForPAc) project aims to integrate early warning systems by getting institutions to collaborate and improve data generation on forecasting floods and drought. The Innovative Approaches in Response Preparedness (IARP) project aims to provide effective support to the most vulnerable people faced with climate-related disasters in Ethiopia, Kenya and Uganda through piloting innovative approaches in Response Preparedness. IARP's research agenda capitalizes on the vast experience in forecast-based financing (FbF) and early action of the Red Cross and Red Crescent Movement. IARP will build the capacity of the National Red Cross Societies of Ethiopia, Kenya and Uganda to provide timely and effective support to the people that are assessed to be the most vulnerable to a forecasted extreme flood and drought event. A key actor collaborating in these projects is the National Drought Management Authority as the projects intend to use forecast data to address food security ad drought resilience in communities. Consequently, the outcomes produced by this project will build on the work and capacities in the IARP and ForPAc projects and enhance the impact of the forecast-based financing work.

A.5 Complementarities of the consortium members

Our consortium combines a significant track record on innovations in the modeling, monitoring and forecasting of drought and food insecurity, hazard mapping, risk and impact assessment, and disaster risk response, with a special focus on East Africa. Through *Forecastbased Financing for Food Security (F4S)*, we wish to contribute to the development of new technologies for risk financing that could revolutionize disaster management by bringing solutions that are well grounded in both science and practice. We believe that the consortium here presented is able to cover all means needed:

- *IVM-VU* (project lead) has extensive experience in doing research on the topic of hazard, risk, and disaster risk reduction management strategies. Through various internationally and nationally funded research projects we have built up a significant knowledge base on the topic of early warning early action and forecast-based financing using big data and Machine Learning, with applications in flood risk and food insecurity. Moreover, IVM-VU has a long track-record of doing field-related research together with local stakeholders in Africa, amongst others in Kenya, Ethiopia and Uganda.
- Having experience implementing innovation within the humanitarian sector, especially forecast-based financing, *510's* contribution is invaluable within this consortium. Specifically relevant to this proposal is 510's role within the Innovative Approaches to Response Preparedness (IARP) project, which aims to mitigate the worst effects of increasingly severe climate disasters by implementing forecast-based financing in Kenya, Ethiopia and Uganda, the target countries of this proposal. 510 can help aligning the many related activities of this proposed project and those of IARP, forming synergies, increasing cost effectiveness and improving results. 510 has a regional representative based in Kenya who will play a key role in planning and supporting fieldwork in the target countries. As well as bringing expertise and experience, 510's involvement allows this consortium to tap into the local expertise and volunteer pool of the Red Cross movement, giving unparalleled reach and access in the target countries. The representative can also leverage valuable existing relationships with key stakeholders in the region to accelerate the process of this project gaining traction from the necessary parties.
- Drought early warning and food security is among *CHC's* key research areas. The CHC is a major supplier of Earth Observations products to FEWSNET and other partners in the region and has been working with local organisations for over 15 years. Moreover, the CHC developed the Early Warnign Explorer-EWX to access, explore, and analyze regional climate datasets and has one version operational at the Kenya based Regional Center for Mapping of Resources and Development. As a member of the Famine Early Warning System Network (FEWSNET) the CHC is uniquely suited to integrate the results of this project into a variety of early warning decision processes.
- *KRCS-ICHA* is the knowledge hub of the Kenya Red Cross Society and is through its 47 branches and extensive track-record in projects of similar characteristics well able to feed the project with local knowledge and expertise on forecast-based financing and cash transfer mechanisms. Through aligned project activities KRCS-ICHA will play a key role in the planning and support of fieldwork. Moreover, KRCS-ICHA will act as the focal point when it comes to the exploration of potential channels of operationalization.

B - Consultant's Experience

B.1 Stichting VU – Institute for Environmental Studies (IVM-VU)

Assignment name: Poverty and climate change	Approx. value of the contract (in current US\$): ~ US\$ 40,000
Country: Global Location within country:	Duration of assignment (months): ~ 16
Name of Client: World Bank (via subcontract with Deltares)	Total No. of staff-months of the assignment: ~2
Contact Person, Title/Designation, Tel. No./Address:	Dr. Philip Ward Tel: +31-20-5986149 De Boelelaan 1085 1081 HV Amsterdam
Start date (month/year): Sept. 2014 Completion date (month/year): Dec. 2015	No. of professional staff-months provided by your consulting firm/organization or your sub consultants: ~1
Name of associated Consultants, if any: Deltares	Name of senior professional staff of your consulting firm/organization involved and designation and/or functions performed (e.g. Project Director/Coordinator, Team Leader): Dr. Philip Ward (teamleader)

Description of Project:

Assess the relative exposure of poor people to flood and drought hazard under current conditions and future conditions (taken into account climate change)

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

Run global hydrological model, process output global hydrological model, set-up and run flood and drought hazard analysis, evaluate results, contribute to World Bank report and paper.

Assignment name: Development of national disaster risk profiles for sub- saharan Africa	Approx. value of the contract (in current US\$): ~US\$ 315,000
Country: Uganda, Ethiopia, Kenya, Niger, Senegal Location within country: whole countries	Duration of assignment (months): ~7
Name of Client: World Bank	Total No. of staff-months of the assignment: ~12
Contact Person, Title/Designation, Tel. No./Address:	Dr. Philip Ward and Dr. Hans de Moel Tel: +31-20-5983992 De Boelelaan 1085 1081 HV Amsterdam
Start date (month/year): Jul. 2015 Completion date (month/year): Dec. 2015	No. of professional staff-months provided by your consulting firm/organization or your sub consultants: ~2
Name of associated Consultants, if any: CIMA Deltares WUR	Name of senior professional staff of your consulting firm/organization involved and designation and/or functions performed (e.g. Project Director/Coordinator, Team Leader): Dr. Hans de Moel (team member on impact analysis)

Description of Project:

Development of national level risk profiles for five sub-saharan countries (Ethiopia, Kenya, Niger, Senegal and Uganda) for: fluvial flooding, hydrological drought, agricultural drought. Including probabilistic analyses and

future developments (climate change and population growth).

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

Assessing hydrological drought hazards and risk for the five countries using various indicators. Plus assisting in the flood damage assessment.

Assignment name:	Approx. value of the contract (in current US\$):
Building Disaster Resilience to Natural Hazards in Sub-	Several million US\$
Saharan African Regions, Counties and Communities	
Country: 16 countries across Africa	Duration of assignment (months): ~12
Location within country: National	
Name of Client: UNISDR	Total No. of staff-months of the assignment: n.a.
Contact Person, Title/Designation, Tel. No./Address:	Dr. Roberto Rudari
	CIMA Foundation
	Via Magliotto 2, 17100 Savona
	Italy
Start date (month/year): Jan. 2018	No. of professional staff-months provided by your
Completion date (month/year): Jan. 2019	consulting firm/organization or your sub
	consultants: ~4
Name of associated Consultants, if any:	Name of senior professional staff of your consulting
CIMA Foundation	firm/organization involved and designation and/or
WUR	functions performed (e.g. Project
	Director/Coordinator, Team Leader):
	Dr. Hans de Moel (IVM-VU teamlead)

Description of Project:

Development of flood and drought risk profiles for 16 African countries with associated one week workshops in each country to support disaster risk reduction and increases resilience to natural hazards.

Description of actual services provided by your staff within the assignment: Development of hydrological risk maps and indicators for the profiles and provide experts during some of the workshops in the countries.

Assignment name: Improving Predictions and management of hydrological extremes (IMPREX)	Approx. value of the contract (in current US\$): ~ US\$ 8,000,000
Country: Europe	Duration of assignment (months): 48
Location within country:	
Name of Client: European Union H2020 Framework	Total No. of staff-months of the assignment: ~950
Programme	~
Contact Person, Title/Designation, Tel. No./Address:	Dr. Philip Ward and Dr. H. de Moel
	Tel: +31-20-5983992
	De Boelelaan 1085
	1081 HV Amsterdam
Start date (month/year): Jan. 2015	No. of professional staff-months provided by your
Completion date (month/year): Dec. 2019	consulting firm/organization or your sub
	consultants: 48
Name of associated Consultants, if any:	Name of senior professional staff of your consulting
KNMI, Adelphi, Arctik, BSC, BFG, CIMA, Cetaqua,	firm/organization involved and designation and/or
ECMWF, FutureWater, Helmholtz-Zentrum, GFZ,	functions performed (e.g. Project
HKV, Irstea, MetOffice, Politecnico di Milano, PIK	Director/Coordinator, Team Leader):

Potsdam, Deltares, SMHI, Crete University, University	Dr. Philip Ward (IVM-VU teamlead)
of Reading, Universitat politecnica de valencia	
Description of Duciests	

Support the reduction of Europe's vulnerability to hydrological extremes through improved understanding of the intensity and frequency of future disrupting events.

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

Conducting research on flood, agricultural drought and food security risks forecasting and forecast-based financing, building forecasting models through Machine Learning and big data..

B.2 Netherlands Red Cross – 510 (510)

Assignment name: Innovative Approaches in Response Preparedness (IARP)	Approx. value of the contract (in current US\$): US\$ 11,166,026.98
Country: Kenya, Uganda, Ethiopia Location within country:National	Duration of assignment (months): 60
Name of Client: Ikea Foundation	Total No. of staff-months of the assignment: ~950
Contact Person, Title/Designation, Tel. No./Address:	Jolien van der Steen +31630873316 jvandersteen@redcross.nl
Start date (month/year): Jan. 2018 Completion date (month/year): Dec. 2022	No. of professional staff-months provided by your consulting firm/organization or your sub consultants: ~227
Name of associated Consultants, if any:	Name of senior professional staff of your consulting
Kenya Red Cross	firm/organization involved and designation and/or
Uganda Red Cross	functions performed (e.g. Project
Red Cross Climate Centre	Director/Coordinator, Team Leader):
British Red Cross	Maarten van der Veen (510 Strategic Lead)

Description of Project:

The programme builds capacity in Forecast-based Financing (FbF), supported by Data Preparedness and Cash Transfer Programming (CTP) in early action, through systems development, piloting and iteration. The programme builds the capacities of Ethiopian Red Cross Society (ERCS), Kenyan Red Cross Society (KRCS) and Uganda Red Cross Society (URCS) in the three innovative approaches to provide early action that reduces risks of people at risk of a forecasted disaster, in particular the most vulnerable, including refugees. System aims to allow well-targeted, cost-efficient and early action based on climate and weather forecasts to reduce and avoid extreme events aggravated by climate change lead to an increase in disasters and suffering

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

Supporting the National Societies in becoming more Data Prepared. Collect and analyzing critical data for an integrated risk map at community level (incl. socioeconomic data, food security and health indicators; historical data of droughts and floods; and data on current capacities such as government effectiveness index, access to electricity and access to health system).

Assignment name: ECHO II	Approx. value of the contract (in current US\$): US\$ 1,328,809.19
Country: Malawi Location within country : Zomba, Chikwawa, Nsanje, Whole country for FbF element	Duration of assignment (months): 24
Name of Client: DG ECHO	Total No. of staff-months of the assignment: ~610
Contact Person, Title/Designation, Tel. No./Address:	Simon Jones, NLRC Country Representative - Malawi sjones@redcross.nl

	+265885429756
Start date (month/year): Jul. 2017 Completion date (month/year): Jun. 2019	No. of professional staff-months provided by your consulting firm/organization or your sub consultants: ~62
Name of associated Consultants, if any: Malawi Red Cross Belgian Red Cross, Danish Red Cross	Name of senior professional staff of your consultingfirm/organization involved and designation and/orfunctions performed (e.g. ProjectDirector/Coordinator, Team Leader):Maarten van der Veen (510 Strategic Lead)

Strengthen DRR awareness and preparedness by the set-up of integrated Early Warning and Evacuation mechanisms and the reinforcement of well-trained MRCS disaster response teams. Moreover, a specific result was preparing MRCS staff and volunteers for Multi-Purpose Cash Transfers by conducting a.o.preliminary market assessments in close coordination with existing mechanisms such as the Malawi Social Cash Transfer Programme (SCTP). This MPCT-experience was tested during the pilot-phase of a developed Forecast-based financing (FbF) mechanism and as well as during actual response (for which the whole of Malawi is targeted) when natural disasters materialized during the implementation period and the crisis-modifier is triggered.

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

Combined use of satellite imagery, digital volunteering, data analysts, mobile data collection and new data integration and visualization platforms, enhancing the speed and cost effectiveness of disaster response efforts, and contributing to the availability of open data in Malawi. The Action starts with identifying and mapping the infrastructural and geographical context of the implementation area (roads, buildings, agricultural areas, rivers, water points,...) resulting in hazard risk data and maps.

Assignment name: RPII	Approx. value of the contract (in current US\$): US\$ 8,869,991.30
Country: Lebanon, Mali, Central African Republic (CAR), Zambia, Global Red Cross and Red Crescent response capacity Location within country: National	Duration of assignment (months): 48
Name of Client: Netherlands Ministry of Foreign Affairs (MoFA)	Total No. of staff-months of the assignment:~ 850
Contact Person, Title/Designation, Tel. No./Address:	Joke Reijven, Programme Manager jreijven@redcross.nl +31 70 445 5851
Start date (month/year): April 2016 Completion date (month/year): March 2020	No. of professional staff-months provided by your consulting firm/organization or your sub consultants: ~3.3 – (currently)
Name of associated Consultants, if any: Lebanon Red Crescent Mali Red Cross Central African Republic Red Cross Zambia Red Cross Red Cross Climate Centre	Name of senior professional staff of your consulting firm/organization involved and designation and/or functions performed (e.g. Project Director/Coordinator, Team Leader): Maarten van der Veen (510 Strategic Lead)

Description of Project:

RP-II consists of two components. The first focuses on building the response preparedness

capacity of the Red Cross/ Crescent National Society. The second component aims at contributing to global Red Cross and Red Crescent tools and guidelines. Mainstreamed in these two components are the development, testing and scaling-up of the following innovative approaches:

- Forecast-based Financing (FbF);

- Information management (including needs assessments);

- Cash Transfer Programming (CTP) in first response;

- Improved sanitation in emergency response.

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

Creating relevant hazard and flood risk maps to facilitate decision making in target countries. Developing data preparedness within the national societies by giving trainings and supporting the hiring of data staff. Creation of an online community risk assessment dashboards of vulnerability, coping capacity, hazard and exposure data.

B.3 University of California Santa Barbara – Climate Hazards Center (UCSB CHC)

Assignment name: Identification of Seasonal and Decadal Drought through Monitoring and Modeling	Approx. value of the contract (in current US\$): US\$ 8,466,630
Country: United States Location within country: Santa Barbara, CA	Duration of assignment (months): 60
Name of Client: US Geological Survey (via the UC Center for Water Resources)	Total No. of staff-months of the assignment: 737
Contact Person, Title/Designation, Tel. No./Address:	James Rowland, Program Manager Tel: 1 (605) 594-6054 USGS EROS Center Sioux Falls, SD 57198
Start date (month/year): Feb. 2014 Completion date (month/year): Feb. 2019	No. of professional staff-months provided by your consulting firm/organization or your sub consultants: 12
Name of associated Consultants, if any: University of Minnesota (Kathryn Grace, co-PI) Alkhalil Adoum; Tamuka Magadzire; Gideon Galu; Mario Rodriguez; Chris Shitote; Diriba Korecha; Pamella Mogane	Name of senior professional staff of your consulting firm/organization involved and designation and/or functions performed (e.g. Project Director/Coordinator, Team Leader): Dr. Greg Husak (PI)
 Description of Project: This project focuses on the application and development of techniques for identifying conditions impacting the physical variables governing crop growth, such as the timing and amount of precipitation, evapotranspiration and temperate, along with human –related factors such as cropped area, agricultural inputs, and economic indicators. The research is accomplished with a network of field scientists from Africa and Central America collaborating with research scientists at the University of California, Santa Barbara. Description of actual services provided by your staff within the assignment: Development of techniques for identifying conditions impacting the physical variables governing crop growth, such as the timing and amount of precipitation evapotranspiration and temperate along with human –related 	
factors such as cropped area, agricultural inputs, and eco	nomic indicators.
Assignment name: Enhancing Eastern and Southern Africa climate services by increasing access to remote sensing and model datasets	Approx. value of the contract (in current US\$): US\$ 600,070
Country: United States Location within country: Santa Barbara, CA	Duration of assignment (months): 36
Name of Client: NASA	Total No. of staff-months of the assignment: 31

Completion date (month/year): July 2019	consulting firm/organization or your sub consultants: 31
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): Dr. Shraddhanand Shukla (PI)

To support informed agroclimate decision-making by local and national stakeholders in East Africa and Southern Africa.

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

Develop a series of agroclimatic indicators, a user interface to access and explore those indicators, and training sessions in the use of the interface and indicators for East African scientists and decision makers.

Assignment name: High-Expressivity World Modeling	Approx. value of the contract (in current US\$): ~US\$ 809,913
Country: United States Location within country: Santa Barbara, CA	Duration of assignment (months): 42
Name of Client: DARPA (via SRI International)	Total No. of staff-months of the assignment: 59
Contact Person, Title/Designation, Tel. No./Address:	Rodrigo de Salvo Braz, Lead PI 1 (650) 859-5138 SRI International, 333 Ravenswood Ave Menlo Park, CA 94025
Start date (month/year): March 2018 Completion date (month/year): Dec. 2021	No. of professional staff-months provided by your consulting firm/organization or your sub consultants:
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): Dr. Chris Funk (PI)

Description of Project:

Develop technologies that will enable analysts to rapidly build models to analyse questions relevant to national and global security.

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

Develop and improve upon existing global gridded climate products and integrate those products within subseasonal forecasting systems.

B.4 Kenya Red Cross Society -International Centre for Humanitarian Affairs (KRCS-ICHA)

Assignment name:	Approx. value of the contract (in current US\$):
Forecast-based Preparedness Action (ForPAc) project	~ US\$ 250,000
Country: Kenya	Duration of assignment (months): ~ 48 months
Location within country: Nairobi, Isiolo, Kitui,	
Nzoia River Basin	
Name of Client: Science for Humanitarian	Total No. of staff-months of the assignment: ~48
Emergencies and Resilience (SHEAR) through the	months
University of Sussex	

Contact Person, Title/Designation, Tel.	Mr. Idris Ahmed, Deputy Secretary General, Kenya
No./Address:	Red Cross Society
	South C, RedCross Road, Off Popo Road
	P.O. Box. 40712, 00100
	Tel: +254 20 3950000
Start date (month/year): Sept. 2017	No. of professional staff-months provided by your
Completion date (month/year): Dec. 2020	consulting firm/organization or your sub
	consultants: ~48 months
Name of associated Consultants, if any:	Name of senior professional staff of your
International Centre for Humanitarian Affairs (ICHA)	consulting firm/organization involved and
	designation and/or functions performed (e.g.
	Project Director/Coordinator, Team Leader):
	Ms. Maurine Ambani (Climate Science Project
	Manager)

The overall aim of ForPAc is to improve risk preparedness by developing decision-relevant drought and flood risk information, and linking this with Forecast-based Action methods that will be used to trigger risk reduction actions.

Description of actual services provided by your staff within the assignment: Mapping and understanding opportunities for FbA in EWS in Kenya and Greater Horn of Africa. Integrating improved probabilistic forecasts into existing flood/drought EWS for FbA. Monitoring, Evaluation and Learning and Scaling up and out.

Assignment name:	Annroy value of the contract (in current US\$).
Assignment name.	$Approx.$ value of the contract (in current 0.5ϕ).
Innovative Approaches to Response Preparedness	05\$ 2,000,000
(IARP) programme	
Country: Ethiopia, Kenya, Uganda	Duration of assignment (months): ~950 months
Location within country: National	
Name of Client: IKEA Foundation, through	Total No. of staff-months of the assignment: ~ 60
Netherlands Red Cross and British Red Cross	months
Contact Person, Title/Designation, Tel.	Mr. Idris Ahmed, Deputy Secretary General, Kenya
No./Address:	Red Cross Society
	South C, RedCross Road, Off Popo Road
	P.O. Box. 40712, 00100
	Tel: +254 20 3950000
Start date (month/year): July 2018	No. of professional staff-months provided by your
Completion date (month/year): 2022	consulting firm/organization or your sub
	consultants: ~ 60 months
Name of associated Consultants, if any:	Name of senior professional staff of your
International Centre for Humanitarian Affairs (ICHA)	consulting firm/organization involved and
	designation and/or functions performed (e.g.
	Project Director/Coordinator, Team Leader):
	Halima Saado,
	Saado.halima@redcross.or.ke,
	+254710315830

Description of Project:

The effect of climate related disasters on communities (including refugee populations) is reduced, through establishment of a nation-wide early warning early action system that is triggered by forecasts to enable delivery of cost-efficient, well-targeted and timely action to the most vulnerable people faced by potential disasters.

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

Forecast-based Financing (FbF), by setting up an impact-based forecast system and developing Early Action Protocols for Kenya. Data Preparedness, through the use of data to strengthen the determination of forecast-based triggers and enable unbiased, quick and relatively low-cost targeting for early action to high risk areas. Cash Transfer Programming as an early action that is triggered by forecasts, to support those at risk.

Assignment name:	Approx. value of the contract (in current US\$):
Forecast-based Early Action	~US\$ 6000
Country: Kenya	Duration of assignment (months):
Location within country: Kitui	~ 2 months
Name of Client: Kenya Red Cross Society	Total No. of staff-months of the assignment: ~2
	months
Contact Person, Title/Designation, Tel.	Mr. Idris Ahmed, Deputy Secretary General, Kenya
No./Address:	Red Cross Society
	South C, RedCross Road, Off Popo Road
	P.O. Box. 40712, 00100
	Tel: +254 20 3950000
Start date (month/year): May 2016	No. of professional staff-months provided by your
Completion date (month/year): June 2016	consulting firm/organization or your sub
	consultants: ~2 months
Name of associated Consultants, if any:	Name of senior professional staff of your
International Centre for Humanitarian Affairs (ICHA),	consulting firm/organization involved and
British Red Cross Society	designation and/or functions performed (e.g.
	Project Director/Coordinator, Team Leader):
	Dr. Halima Saado Abdillahi (Head of Research)

To take advantage of the forecasted enhanced rains in Lower Eastern region, the Kenya Red Cross Society (KRCS) distributed a hybrid maize seed variety to farmers in Kitui County, which was expected to have a high yield in the expected conditions. By enabling subsistence farmers to reap a bumper harvest, KRCS hoped to enable them to cope better with a possible lean season in 2016 in case the 2015/16 El Niño was followed by a La Niña in 2016. This intervention was one component of KRCS' wider El Niño Preparedness programme, which included pre-positioning of response supplies and training response teams at County level.

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

ICHA supported the review of the Forecast-based Action intervention in Kitui to assess the impact and the process used to implement the intervention.

C - Comments and/or Suggestions on the Terms of Reference

We have no comments or suggestions on the Terms of Reference.

D - Description of Approach, Methodology and Work Plan

D1. Technical approach and Methodology

D1.1 Problem statement

Prolonged drought in East Africa has pushed the region deeper into a humanitarian crisis, where households are facing significant gaps in the consumption of and access to food. Droughts in the region often have high socio-economic impacts, such as crop failures and the widespread death of livestock, high food prices and inflation, and increased levels of malnutrition. A potential way to assist poor households facing chronic food insecurity and increase their resilience to shocks is through direct cash payments. This approach differs from traditional aid, which provides goods such as in-kind food for emergency responses. During the last few years, there has been an increasing debate to identify which of these approaches maximizes potential benefits. Direct cash transfers are typically less expensive to administer and have the advantage of transferring the purchasing power to the recipients, who are able to address the needs that they perceive to be most urgent. They can therefore be effective for financing disaster risk. From 2007 to 2010, humanitarian expenditure on cash transfer programs increased from US\$1.8 million to US\$52 million, enabled by the advances, availability and adoption of appropriate technology, even in the most remote and insecure areas. Existing cash transfer programs for food insecurity are typically based on observed triggers and are crisis-driven, thus after an event has taken place (ex-post). This may result in the assistance not reaching the beneficiary in good time, reducing the effectiveness of the action. An example is the Kenya Hunger Safety Net Programme, which releases cash transfers for drought responses based on an observed Vegetation Condition Index. Among the numerous cash transfer programs, only a handful focus on transfers before an event occurs (ex-ante).

Over the past decades, new forecasting systems have emerged, which could pave the way towards ex-ante cash transfer mechanisms. Examples are the Africa Flood and Drought Monitor, and the climate products generated and used by the Famine Early Warning System Network (FEWSNET). Recently, there has been an emerging literature on ways to 'automatically' trigger action based on early warning systems, using predetermined thresholds. For instance, in 2015, based on an El Niño forecast, funds were released through the World Food Program's Food Security Climate Resilience Facility for Zimbabwe and Guatemala to cope with its consequent drought impacts.

Despite these advances and the growing understanding that timely finance prior to a disaster can be more cost-effective than post-disaster expenditures, associated uncertainties in forecast systems remain large, and scientific evidence of cash transfer triggers as well as the costeffectiveness of ex-ante and ex-post cash transfers is missing. In result, forecast information is not routinely used as a basis for financing early action for food insecurity risk. Generating evidence to better guide cash transfers, and overcoming the challenges to act based on forecasts are essential aspects to trigger the shift towards ex-ante cash transfers.

D1.2 General approach

Disaster risk financing has the potential to increase welfare, reduce exposure to hazards and promote mitigation prior to a shock. Therefore, timely ex-ante cash transfers can be more cost-effective than relying on ex-post disaster relief to respond to food insecurity when leveraged by a credible plan, pre-agreed triggers for action, and pre-arranged financing. To ensure adequate financial action one need to have the right information to guide fast and evidence-based decision-making. Key enabling aspects are an understanding of the potential/upcoming food security impact, the resources needed to address it, and an insight in the associated costs, beneficiaries' preferences, and lead times. A lack of evidence and information exists to support such hypothesis. Through *Forecast-based Financing for Food Security (F4S)*, we propose to fulfil this gap by:

- 5. Developing an impact-based probabilistic food insecurity forecasting model using Machine Learning algorithms and datasets of food insecurity drivers (T1);
- 6. Collecting local evidence on food insecurity triggers and information on individual preferences on key design elements of cash transfer mechanisms (T2);
- 7. Evaluating the cost-effectiveness of different cash transfer mechanisms (T3);
- 8. Exploring the potential channels of operationalization, to disseminate the knowledge gained within T1-T3 and to make a first step towards operationalization (T4).

Each of the aforementioned tasks is divided into 2-3 sub-tasks and will output a similar number of deliverables in the form of reports, datasets and open-source model code. Figure 1 visualizes the overall outline of the project and the linkages between the different tasks and sub-tasks. A full overview of tasks, sub-tasks and deliverables is provided in Table 1.



Figure 1: Flowchart describing the task and subtasks of the project with (due) dates for deliverables and milestones between brackets

We propose to carry out the F4S project in the pilot countries Ethiopia, Kenya, and Uganda, with deep-dives into three case study areas: the Amhara region (Ethiopia), Isiolo district (Kenya), and Karamoja region (Uganda), see section D1.3 for a further description of the case study areas. Throughout all project-activities, F4S has the aim to align its activities and seek for synergies with ongoing efforts in the region, such as the Red Cross' "Innovative approaches in response preparedness" (IARP) project. In the following sections we provide a detailed explanation of the envisaged tasks and sub-tasks of the project.

T1: Developing an impact-based probabilistic food insecurity forecasting model using Machine Learning algorithms and datasets of food insecurity drivers

FEWSNET and other organizations often use scenario development methodologies to assist in food insecurity forecasting and future food assistance. To describe the forecasted levels of acute food insecurity, FEWSNET translates numerous drivers into an integrated Food Security Phase Classification (IPC). This indicator intends to help actors to readily understand food insecurity crises and to take action. However, the food system is complex and multi-dimensional, and the use of a model as a proxy to such integrated assessment raises several types of uncertainty, which makes assigning probabilities to food security outcomes challenging. To grasp such an complex issue and provide a data-driven response, humanitarian organisations are currently exploring the advantages of big data and Machine Learning to improve risk-informed decision making. Measuring the benefits of such approaches will help humanitarian organisations and donors to further invest in ex-ante actions.

Methods:

Within T1 we will apply Machine Learning algorithms to develop a food insecurity forecasting model running at the district level for the three pilot countries, to define early warning triggers and thresholds for food insecurity, and to cross-validate our results against historical food insecurity events. Within T1, we will also assess the scalability and transferability of our models within and between the pilot countries. The following sub-tasks are formulated to reach these goals:

T1.1: We will build a collection of datasets consisting of relevant, open-source biophysical and socioeconomic data for the three pilot countries that will serve as input for the food insecurity forecasting model, based on locally and remote information. To this end, we will start with collating existing expertise and datasets from the different partners in the project, particularly from the IARP project, who are already working on a similar activity. Some of the datasets already identified include: observed, remotely sensed, and modelled data describing vegetation, rainfall, temperature, water use, staple food prices, as well as the status of other socioeconomic indicators such as infrastructure, governmental management, societal unrest, and conflicts. Missing data will be complemented via a query through online open-source biophysical and socioeconomic data repositories (e.g. FEWSNET, Humanitarian Data Exchange, Human Development Index Indicators, FAOSTAT, AQUASTAT) and by reaching out to local and international partners within our network that could provide relevant data, such as FAO, USAID, local Red Cross Red Crescent societies and FEWSNET offices, and ministries of the respective pilot countries. The collection of datasets will be validated by our experts on the ground.

T1.2: We will develop a food insecurity forecasting model for the three pilot countries running at the district level using the datasets collected in T1.1 as input. To do so, we will explore a range of simple (e.g. Fast-and-Frugal Trees) to complex (e.g. Random Forests) Machine Learning algorithms to make probabilistic predictions of food insecurity. With these models and given the accuracy of their predictions, we will define district-specific early warning triggers and thresholds for food insecurity for the three pilot countries. We will apply various validation techniques (leave-one-out or k-fold cross-validation) using reported information on food insecurity events (including: news items, aid allocation records, Red Cross and FEWSNET documentation, ministry reports, local knowledge) and data and text mining techniques to validate the food insecurity forecasting models together with their triggers and thresholds.

T1.3: Various areas within the three pilot countries and the rest of East Africa share common socioeconomic and hydro-climatic characteristics, which will bring opportunities for transferability and scalability of data and models, thereby providing a test-case for the scaling-up of our methods. We will assess the transferability of our approach within and between the three pilot countries, e.g. by means of proxies to fill data gaps in data scarce areas, and the scalability towards the rest of East Africa using the characteristics (triggers and thresholds) of the food insecurity models developed under T1.2.We will evaluate the transferability by comparing the triggers of food insecurity, their representation within the models as well as their critical thresholds for early warning, across different districts within the three pilot countries. We will qualitatively evaluate the scalability towards the rest of East Africa by comparing the critical triggers and thresholds, and their data needs, in the models developed for the three pilot countries with the data availability for the rest of East Africa.

Technical deliverables:

As output of T1 we will deliver:

TD1.1: A collection of relevant biophysical and socioeconomic datasets for the three pilot countries;

TD1.2: A food insecurity forecasting model for the three pilot countries running at the district level with early warning triggers and thresholds for food insecurity;

TD1.3: A report on the developing, testing, and validation of the food insecurity model for the three pilot countries, transferability of of the model and its triggers, and scalability towards the rest of East Africa.

T2: Collecting local evidence on food insecurity triggers and information on individual preferences and responses to cash transfers

Integrating indigenous knowledge and local measurements into any modeling exercise is essential for assessing the unique aspects of a community. Given the limited number of operational ex-ante cash transfer systems, information on individual preferences regarding the timing and expenditure of cash transfers dealing with food insecurity is lacking. Understanding and analyzing the rationale behind such decisions and preferences is essential to be able to come to a complete cost-effectiveness evaluation of cash transfers and to assess the feasibility of any forecast-based financing project.

Methods:

Within T2 we will develop, perform, and analyze the results from a survey and choice experiments designed to collect local data and knowledge. These will provide us with (additional) food insecurity drivers and information about human behaviour that shapes the key design elements of ex-ante cash transfer schemes (conditionality, targeting, payment method, and time of the aid release) and may steer the cost-effectiveness evaluation under T3. The following sub-tasks are formulated to reach these goals:

T2.1: We will develop a survey and choice experiment to collect local data and information on: (a) additional food insecurity drivers that should be incorporated in the forecasting model to optimize model performance; (b) individual preferences and behaviours that shape the key design elements of ex-ante cash transfer schemes (conditionality, targeting, payment method, and time of the aid release). Design of the survey and choice experiment will be flexible so that they can be applied with small amendments in any region of interest. Applying the KRCS gender mainstreaming policy will ensure a minimum 30% of respondents will be women and aim for an equal 50% split, while respecting cultural norms.

T2.2: We will perform the survey and choice experiment in selected case study areas of the three pilot countries (see D1.3). Per case study area, we target a minimum of 100 representative respondents. In parallel with the execution of the survey and choice experiment we will organize expert group meetings in each of the three case study areas to feedback, discuss, and validate initial findings from T1 and T2.

T2.3: We will analyze the results of the survey, choice experiment and expert group discussions. On the basis of these results we will update - where necessary- the data inputs for our food insecurity forecasting model (**T1**), and formulate additional (non-monetary) criteria for the cost-effectiveness analysis of cash transfer mechanisms (**T3**). By comparing the results of the survey and choice experiment across the three case study areas we will assess the potential transferability of both the additional data needs to optimize the food insecurity forecasting model as well as information on the individual preferences on key design elements of the cash transfer schemes across the pilot countries and scalability towards the the rest of East Africa.

Technical deliverables:

As output of T2 we will deliver:

TD2.1: A flexible survey and choice experiment design that can be amended for use in any region of interest to collect information on (a) additional food insecurity drivers that should be incorporated in the food insecurity forecasting model; (b) individual preferences and behaviours that shape the key design elements of ex-ante cash transfer schemes (conditionality, targeting, payment method, and time of the aid release);

TD2.2: A open-source database that consists of the raw results of the survey and choice experiment being executed in the case study areas of the three pilot countries;

TD2.3: A report describing the main outcomes of the survey, choice experiments, and expert group meetings making recommendations for: additional (local) data inputs to optimize the performance of the food insecurity model, and key design elements that determine the success of ex-ante cash transfer schemes in these case study areas, complemented by a discussion on

the transferability and scalability of the results to other areas within the pilot countries and/or the rest of East Africa.

T3: Evaluating the cost-effectiveness of different cash transfer mechanisms

Cash transfer mechanisms benefits are said to be more flexible for recipients than other forms of aid such as food transfers and are expected to produce a wider range of indirect benefits. Nevertheless, conclusive evidence on the benefits of cash transfer is largely missing. While there are many impact evaluations of cash transfer programs, very little data exists on cost-effectiveness, compared with other interventions, or between ex-ante and ex-post transfers. Utilizing the food insecurity forecasting model developed under T1 and the local data and evidence collected under T2, we aim to provide a better understanding of the benefits associated with cash transfer schemes and provide a full cost-effectiveness evaluation for various cash transfer schemes. In addition, we aim to provide an assessment of beneficiaries' needs during different levels of food insecurity. This assessment will produce the basis for selecting an optimal cash transfer value that could effectively reduce malnutrition rates.

Methods:

Within T3 we will perform a cost-effectiveness evaluation for which we compare different forms of cash transfer mechanisms designed to provide temporary resources to mitigate food insecurity impacts at different lead times. In our assessment, we will make a distinction between ex-ante and ex-post cash transfer schemes, the varied lead times that ex-ante cash transfer schemes require, the conditionalities for pay-out of cash-transfer schemes, and the targeted beneficiaries. The following sub-tasks are formulated to reach these goals:

T3.1: We will provide a technical overview of the potential forms of cash transfer mechanisms and their financial, technical, and infrastructural requirements. For the three pilot countries we will provide an assessment on the country-specific operationalization costs (items) of these cash transfer mechanisms. Such information will be further applied in T4.

T3.2: Using the outcomes of the food insecurity forecasting model developed under T1 we will assess the amount of cash (needs-for-transfer) which is sufficient to effectively reduce malnutrition rates for the most people. This assessment will be based on historical forecasts of different food insecurity levels and incorporate the increased needs that households may experience during a period of crisis. In doing so, we will account for the elasticity of food prices during periods of limited supply by performing a market assessment on the market functionality, price spikes, and shocks.

T3.3: While accounting for the chances of false alarms in cash-transfer triggers that come from the food insecurity forecasting model, we will assess the most cost-effective lead time for initiating ex-ante cash transfers for each of the districts within the three pilot countries. Cost-effectiveness of ex-ante cash transfer mechanisms with varying lead-times will be compared to the cost-effectiveness of ex-post cash transfers. For the three case study areas we will complement this model-based information with the outomces of the survey and choice experiment on individual preferences on the key design elements of cash transfer schemes.

Technical deliverables:

As output of T3 we will deliver:

TD3.1: A technical description of the potential forms of cash transfer mechanisms, together with their country-specific operationalization cost and required infrastructure;

TD3.2: A report on the historically modelled and validated needs-for-transfer to overcome food insecurity;

TD3.3. A report on the cost-effectiveness of ex-post and ex-ante cash transfer schemes with varying lead times at the district level for the three pilot countries, complemented with an assessment of preferences for design of cash transfer schemes within the case study areas.

T4: Exploring the potential channels of operationalization

The research agenda of F4S is systematically embedded into operational cash transfer activities underway in mainstream programming (e.g. the ongoing systems for cash transfer programming of the local Red Cross Societies) and those envisaged to be implemented into pilot areas by ongoing initiatives from the Red Cross' IARP project and the Ethiopian Red Cross cash transfer program.

Methods:

To guarantee the integration and dissemination of knowledge gained within F4S into ongoing initiatives, we will explore in T4 -together with our partners and local stakeholders of FEWSNET and Red Cross Societies- potential ways to operationalize outputs and measure gains in efficiency. The following sub-tasks are formulated to reach these goals:

T4.1: At the start of the project we will provide for each pilot country a feasibility assessment that will describe: (a) the potential and need for developing cash-transfer schemes to overcome food insecurity issues, as well as the level of success of current schemes; (b) the resources, financial and technical infrastructure available for development, roll-out, and operationalization of a cash-transfer scheme; (c) a risk assessment discussing the potential financial, technical limitations and burdens to overcome for succesfull development, roll-out, and operationalization of a cash-transfer scheme.

T4.2: At the end of the project we will provide an assessment that will describe: (a) the potential channels of operationalization for each of the three pilot countries; (b) opportunities, challenges, and limitations to transfer and scale our models and findings towards the rest of East Africa; (c) recommendations of next steps towards operationalization, considering both the need of additional technical developments as well as required linkage to funding streams.

Technical deliverables:

As output of T4 we will deliver:

TD4.1: A report with the results of the feasibility assessment performed in each pilot country; **TD4.2**: A report describing the potential channels of operationalization for each of the three pilot countries, opportunities, challenges and limitations to transfer and scale our models and findings towards the rest of East Africa, and recommendations on next steps towards operationalization.

T1: Developing a food insecurity forecasting model using Machine Learning					
Sub-task	Coverage	Technical Deliverable	Lead organization	Month due	
T1.1: Building a collection of potentially relevant and open-source biophysical and socioeconomic datasets	Pilot countries	Collection of open-source data	CHC/510	M6	
T1.2: Developing and validating a food insecurity forecasting model and define early warning triggers and thresholds	Pilot countries	Open-source model code; Report	IVM- VU/KRCS- ICHA	M11	
T1.3: Assessing the transferability of our methods between pilot countries and scalability towards the rest of East Africa	Pilot countries; East Africa	Report	СНС	M11	
T2: Collecting local evidence on food insecuri	ty triggers and inform	nation on individua	l preferences		
Sub-task	Coverage	Technical Deliverable	Lead organization	Month due	
T2.1: Developing a survey and choice experiment to collect local data and knowledge		Survey and choice experiment design	510/ KRCS- ICHA /IVM- VU	M8	
T2.2: Performing the survey and choice experiment in case study areas, targeting a minimum of 100 representative respondents per case study	Case study areas	Open-source database with raw results of survey and choice experiment	510/ KRCS- ICHA	M10	
T2.3: Analyzing the results of survey, choice	Case study areas,	Report	IVM-VU	M11	
experiment, and expert group meetings	Pilot countries				
15: Evaluating the cost-effectiveness of differ	Coverage	Technical	Load	Month	
Sub-usk	Coverage	Deliverable	organization	due	
T3.1: Listing potential cash transfer mechanisms and quantifying operationalization costs (items) and required infrastructure	Pilot countries	Open-source database with technical description of potential cash transfer mechanisms	KRCS-ICHA /510	M6	
T3.2: Quantifying the needs-for-transfer and associated costs to overcome food insecurity, complemented with individual design preferences	Case study areas; Pilot countries	Report	IVM-VU	M14	
T3.3: Evaluation of cost-effectiveness of potential cash transfer mechanisms	Case study areas; Pilot countries	Report	IVM-VU	M16	
T4: Exploring the potential channels of opera	tionalization				
Sub-task	Coverage	Technical Deliverable	Lead organization(s)	Month due	
T4.1: Performing a feasibility assessment of (a) the potential and need for cash transfer mechanisms; (b) financial and technical infrastructure and resources available; (c) limitations and burdens T4.2: Performing an assessment of: (a) the	Pilot countries	Report	KRCS-ICHA /510	M4	
potential channels of operationalization; (b) the opportunities, challenges, and limitations for transferability and scalability of methods and results; (c) step-wise recommendations towards operationalization	East Africa	керон	/510	14110	

Table 1: Overview of proposed tasks, sub-tasks, and technical deliverables

D1.3 Pilot countries, case study areas, and local embedding of project activities

Pilot countries and case study areas

For this project we propose to carry out the above mentioned actions for the pilot countries Ethiopia, Kenya, and Uganda. The selection of pilot countries and case study areas was made on the basis of:

1) **Relevancy and representativeness**: the pilot countries and case study areas experienced significant food insecurity crises. Some of the countries have hosted pilots on forecast-based financing and/or ex-ante cash transfers before and/or have an infrastructure in place;

2) **Accessibility**: the pilot countries and case study areas are currently safe and accessable for the proposed research activities with support of the local Red Cross Red Crescent Societies;

3) Alignment with ongoing project activities: the pilot countries and case study areas host multiple ongoing or past projects of members of our consortium to which we can align part of our project activities or from which we can benefit in terms of expertise and experience.

Based the possibility to align project activities with ongoing projects that are ran by members of our consortium and given our experience and expertise within the region, we propose three case-study areas as deep-dives for our project: Isiolo district (Kenya), Amhara region (Ethiopia), Karamoja region (Uganda). This initial selection of case study areas is, however, not binding and can be subject to change according to the preferences of the World Bank.

Isiolo district, Kenya

According to the Kenyan National Drought and Management Authority, in 2017, 80% of the household in Isiolo were food insecure followed by a severe drought, which affected crop production, and consequently, the access to food, poor incomes and high food prices. Isiolo is a drought-prone county, which often rely on humanitarian organizations to provide food aid relief.

Amhara region, Ethiopia

The Amhara region is often hit by droughts, and smallholder farmers are among the most likely to food insecurity, especially young rural women. In this area, rural livelihoods depends on rain-fed crop production for food consumption and income generation. The Ethiopian government often provide emergency assistance to meet population's short-term needs.



Figure 2: Proposed pilot countries and case study areas

Karamoja region, Uganda

The Karamoja region is one of the driest and poorest regions in Uganda suffering from chronic food insecurity. Its predominantly rural population is for a large share dependent on small-scale food production and especially the poorest 40% of households has limited ability to cope with production shocks due to droughts. Current rainfall deficits are pushing harvest significantly below average, following an estimated 60-80% crop loss for early 2019.

Local embedding of project activities

People closest to a problem are best placed to answer questions and identify solutions. Therefore, F4S will team up and engage key local partners from FEWSNET, 510, KRCS-ICHA, and Red Cross Societies from Kenya, Uganda and Ethiopia in order to achieve the project's goal of supporting local decision-makers with timely actionable insights and cost-effective solutions to enable food insecurity risk reduction. This way, we aim to generate open, transparent procedures, which are end-user oriented and based on everyone's understanding of the interactive nature of food insecurity risk.

F4S is fully aligned with Red Cross' IARP activities, and established a partnership with local staff and volunteers and local officers from FEWSNET and the Red Cross Society. This partnership will jointly conduct the surveys and promote participatory workshops with broader range of already identified stakeholders such as the Intergovernmental Authority on Development (IGAD), the Climate Prediction and Application Center (ICPAC), and the regional Food Security and Nutrition Working Group (FSNWG). Below, we clarify how we intend to work with locals partners within each task.

The T1 modeling co-design process is focused on the needs of users – both current and anticipated – and will offer a space for local experts and the community to contribute in building a comprehensive food security assessment and datasets across selected case-studies. This process will enable the F4S project to deliver a set of triggers that are inclusive and multi-science (natural, social, indigenous), that can be made available for decision-making and early action.

T2 seeks to integrate indigenous knowledge and regional to local measurements into the modeling exercise aiming at highlighting unique aspects of a community that are relevant for forecasting food insecurity risks. Therefore, within T2 local evidence will be collected together with our regional Red Cross and KRCS-ICHA partners, benefiting from the Red Cross' IARP project, in case-studies in the three pilot countries, targeting a minimum of100 households per case study area.

Within T3, we propose to compare different ex-post and ex-ante cash transfer schemes designed to provide temporary resources to mitigate food insecurity impacts at different lead times. Using the co-developed food insecurity forecasting model (T1) and capitalizing the findings from the survey performed (T2), F4S will provide a better understanding of lead-time and cost-effectiveness as the type and level of benefits associated with different cash transfer schemes. The recommendations formulated in T3 can be further applied in the Red Cross' IARP project, and has the potential to be disseminated via the Ethiopia Red Cross Society into the Ethiopia's Productive Safety Net Program and cash working group in Ethiopia.

Within T4 and together with our partners and local stakeholders of FEWSNET and the Red Cross Societies, we will explore potential ways and benefits of operationalizing the outputs obtained from T1-T3 into ongoing cash transfer pilot initiatives from the Red Cross' IARP and the Ethiopia's Productive Safety Net Program.

D1.4 Leveraging of private and/or public-sector resources

Despite multiple challenges, Eastern African countries are improving their response and risk management capacities through several ongoing partnerships and networks. Key stakeholders, further described below, are thoroughly engaged from the conceptual to executional phases of F4S, ensuring that the recommendations obtained from this project leverage ongoing food insecurity management mitigation activities.

The UCSB Climate Hazards Center (CHC), contributor of F4S and member of the FEWSNET, has been working with East African meteorological agricultural agencies for over 15 years, and is uniquely suited to integrate F4S' results into a variety of early warning decision processes. CHC is a major supplier of Earth Observations products to FEWSNET and other partners in the region. One of the major consumers of CHC and FEWSNET products is the Intergovernmental Authority on Development (IGAD) Climate Prediction and Application Center (ICPAC), which co-chairs the regional Food Security and Nutrition Working Group (FSNWG). ICPAC serves as the climate and decision support centre for the East African IGAD, a coalition of 11 East African countries, including Kenya, Ethiopia and Uganda. ICPAC also co-chairs, with the Food and Agricultural Organization, the FSNWG Working Group, providing monthly food security outlook reports to government, donor, and non-governmental agencies working in East Africa. Together ICPAC and FSNWG disseminate decadal, monthly, and seasonal climate oriented early warning information to regional stakeholders via e-mail, ICPAC's website, bulletins, meetings, papers, and reports. We propose to leverage the existing CHG relationship with ICPAC and FSNWG, by engaging them in the co-design, feedback process, and dissemination of the forecast products produced by this proposal.

The Netherlands Red Cross, the 510 data initiative, the Red Cross Red Crescent Climate Centre and the Red Cross National Societies of Kenya, Ethiopia and Uganda are partnering with the IKEA Foundation in the IARP project. This 5-years project, which is set to start in the second semester of 2018, aims to provide effective support to the most vulnerable people faced with climate-related disasters in Ethiopia, Kenva and Uganda through piloting innovative approaches in Response Preparedness. IARP's research agenda capitalizes on the vast experience in forecast-based financing (FbF) and early action of the Red Cross and Red Crescent Movement. IARP will build the capacity of the National Red Cross Societies of Ethiopia, Kenya and Uganda to provide timely and effective support to the people that are assessed to be the most vulnerable to a forecasted extreme flood and drought event. The programme therefore consists of 1) setting up of systems on FbF, Cash Transfer Payments and Data Preparedness; 2) piloting of the systems upon actual forecasts; and 3) learning from these activations, and adjustment of systems. Consequently, the outcomes produced by this proposal are designed to leverage the IARP operational activities. Additionally, the Ethiopia Red Cross Society, in its auxiliary to the government, is uniquely positioned to further uptake such recommendations into the Ethiopia's Productive Safety Net Program and cash working group in Ethiopia.

D1.5 Opportunities to scale up

F4S will produce concrete insights and useful tools, which puts at its centre opportunities for scalability of the proposed scientific agenda to other pilot areas in Eastern Africa. The

opportunities for scaling up future recommendations and the financing, when the latter is available, mainly depends on aspects of data availability and local context. Given that the proposed project will deliver a collection of (transferable) evidences on food insecurity triggers and information on individual preferences and responses to cash transfers, such deliverables may guide future efforts to ensure that key datasets are openly collected and available. Furthermore, this project will suggest key circumstances that form individual's preference and enables early detection of famine risks, which should be particularly addressed when broadening and planning for cash transfer interventions.

The success of scaling up the current project may also depend on the lasting commitment of all people involved, whether at the top or bottom, within public or private partnerships. Therefore, through this proposed F4S partnership (see also D1.4), we fully commit in expanding practical knowledge on forecast-based financing for food security (from detection to implementation). This also aligns with current global efforts led by the World Bank Group through its Famine Action Mechanism of responding to famine risk ex-ante or the Third Northern Uganda Social Action Fund (NUSAF 3); with the Red Cross efforts through the Disaster Relief Emergency Fund; and with national initiatives such as the Kenya Hunger Safety Net programme, and other safety net programs.

D1.6 Open-data policy

F4S strives to use only publicly available open-source data in the development of our food insecurity forecasting model to ensure accessability of our model to third parties for use and further development. All data, code and reports that will be generated and delivered during the project will be made publicly available. Data and annotated model-code generated throughout the project will be stored in a scientific data repository (e.g. 4TU) and/or made available via an open Github repository together with instructions for use. Reports will be delivered under Open Access license. Research output from this project will be disseminated through various international (scientific) conferences and publications that result from the project-activities will be published – where possible- in open-access scientific journals.

D2. Work Plan

Table 2 and Annex 3 present a Gantt-chart with a schematic overview of the workplan, including a time-line of activities, deliverables and milestones, following the technical approach and methodology described under section D1 and the requirements set in the Terms of Reference. To ensure progress within the project we will organize bi-weekly project calls with the project team. In addition to these, we will have monthly calls with the main contact person within the World Bank to report on and discuss the progress. In addition to the 11 technical deliverables (Table 1) we will deliver 3 project deliverables. These will be reports summarizing the project status and main outcomes of intermediate technical deliverables:

PD1) An inception report within 1 month of contracting, with wireframes for all thematic areas, associated activities the consultant plans to address, and clearly listing all agreed deliverables;

PD2) An intermediary report along with agreed deliverables half-way through the project. The report will include a discussion of the innovations and their concrete application for disaster risk financing, as well as their limitations;

PD3) A final report along with final agreed deliverables.

												Mon	ths								
	Activity	Deliverable Type	Lead	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
T0.1	Mobilization		IVM-VU																		
T1.1	Building collection of relevant data	Dataset	CHC/510						٠												
T1.2	Developing and validating a food insecurity forecasting model	Model; Report	IVM-VU/KRCS-ICHA																		
T1.3	Assessing the transferability and scalability of model and result	Report	CHC											٠							
T2.1	Developing survey & choice experiment	Design	510/KRCS-ICHA/IVM-VU								٠										
T2.2	Performing survey & choice experiment	Dataset	510/KRCS-ICHA										٠								
T2.3	Analyzing survey & choice experiment	Report	IVM-VU											۲							
T3.1	Listing cash transfer mechanisms	Dataset	KRCS-ICHA/510																		
T3.2	Quantifying needs-for-transfer and associated costs	Report	IVM-VU																		
T3.3	Evaluating the cost-effectiveness of cash transfer mechanisms	Report	IVM-VU																٠		
T4.1	Performing feasiblity assessment	Report	KRCS-ICHA/510				•														
T4.2	Performing assessment on potential channels of operationaliza	Report	KRCS-ICHA/510																		
	World-bank project deliverables	Report	IVM-VU	۲								۲									۲
	Meetings																				
				٠	Techr	nical d	leliver	able	•	Proje	t deli:	verabl	e		Meeti	ng					

Table 2: Gantt-chart (see Annex 3 for a full-size version)

D3. Organization and Staffing

Our team consists of 9 leading experts in the field of food security modeling, monitoring and forecasting, forecast-based financing, Machine Learning, drought impact and risk modeling, and disaster risk reduction and development activities. Within our team we have all skills and expertise at hand needed to meet the objectives and the scope of this project. Our team is well-balanced in terms of gender, seniority, thematic background, project experience, and field expertise, which will enhance successful completion of the variety of tasks listed in the proposal. The international background of our team, with partners having local offices and/or a well-established professional network in East Africa ensures the local embedding of our project activities to be successful. IVM-VU will act as coordinating partner for this project and will be responsible for delivery of the inception report, half-term report, and final report. Responsibilities for the different (sub-)tasks and associated deliverables that will feed into these reports will be shared among the project partners according to the division made in Table 1. Our leading experts and their position in this project are given below. More detailed information on our team composition, including C.V.'s of our key personnel, can be found in Annex 1 and 2.

Names	Institute	Position
Ted Veldkamp (F)	IVM-VU	Project lead, drought risk specialist
Jeroen Aerts (M)	IVM-VU	Co-project lead, water & climate risk specialist
Gabriela Guimarães Nobre (F)	IVM-VU	Machine Learning, food security and forecast-
		based financing specialist
Kostas Bischiniotis (M)	IVM-VU	Forecast-based financing specialist
Edward Bolton (M)	510	Disaster preparedness and resilience specialist
Marc van den Homberg (M)	510	Data for disaster risk management specialist
Frank Davenport (M)	CHC	Food security specialist
Maurine Kasuvu Ambani (F)	KRC-ICHA	Forecast-based financing and climate specialist
Halima Saado Abdillahi (F)	KRC-ICHA	Project manager

Table 3: Key personnel

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

Key Personnel

Name of Staff & Firm associated with ¹	Area of Expertise Relevant to the Assignment	Designation for this Assignment ²	Assigned Tasks or Deliverables	Location ³	Number of Days
Ted Veldkamp (IVM-VU)	Drought risk, climate variability	Project lead, drought risk specialist	T1, T2, T3, T4	Netherlands	10
Jeroen Aerts (IVM-VU)	Water and Climate risk	Co-project lead, water & climate risk specialist	T1	Netherlands	2
Gabriela Guimarães Nobre (IVM-VU)	Machine Learning, Food security, Forecast-based financing	Machine Learning, food security and forecast- based financing specialist	T1, T2, T3, T4	Netherlands	40
Kostas Bischiniotis (IVM-VU)	Forecast-based financing	Forecast-based financing specialist	T1, T2, T3, T4	Netherlands	40
Edward Bolton (510)	Disaster preparedness and resilience	Disaster preparedness and resilience specialist	T1, T2, T3, T4	Netherlands/ Kenya	35
Marc van den Homberg (510)	Data for disaster risk management	Data for disaster risk management specialist	T1	Netherlands	2
Frank Davenport (CHC)	Food security, climate products, forecasting	Food Security specialist	T1, T3, T4	U.S.	32
Maurine Kasuvu Ambani (KRC-ICHA)	Forecast-based financing, climate	Forecast-based financing and climate specialist	T1, T2, T3, T4	Kenya	10
Halima Saado Abdillahi (KRC-ICHA)	Project management	Project manager	T1, T2, T3, T4	Kenya	10

 ¹ Indicate if the proposed staff is an employee or agent of your consulting firm/organization or a sub consultant.
 ² Title or position as described in the TOR or otherwise named in your proposed Organization and Staffing under Section D, sub section (c).
 ³ Relative to the assignment subject of the Contract, indicate if the staff/consultant local or international.

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

I. Stichting VU – Institute for Environmental Studies (IVM-VU)

1. Name of Staff [Insert full name]: Ted Isis Elize Veldkamp_____

- 2. Proposed Position: Project lead, drought risk specialist_____
- 3. Employer: VU University Amsterdam, IVM, Department of Water & Climate Risk
- 4. Date of Birth: 13-08-1988_____Nationality: Dutch_____

5. Education

School, college and/or	Degree/certificate or other	Date Obtained
University Attended	specialized education	
	obtained	
VU University Amsterdam	PhD Water scarcity at the	18 December 2017
	global and regional scales	
VU University Amsterdam	M.Sc. Earth Science	2013

6. Professional Certification or Membership in Professional Associations:

American Geosciences Union, European Geosciences Union, Panta Rhei, ISIMIP

7. Other Relevant Training:

- * 2013: Scientific writing in English
- * 2013: Valorisation of scientific output

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

- * Vietnam
- * Ethiopia
- * Netherlands
- * Germany
- * Austria

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

Languages Skills	Writing	Speaking	Reading
Dutch	Mother tongue	Mother tongue	Mother tongue
English	Good	Good	Good
German	Fair	Fair	Good
French	Poor	Poor	Fair

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

2017- current	Employer: International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria Position(s) held: Research fellow
2015-2016	Employer: Potsdam Institute for Climate Impact Research, Potsdam, Germany Position(s) held: Visiting researcher
2006 – current	Employer: Institute for Environmental Studies (IVM), VU University Amsterdam, the Netherlands Position(s) held: PhD, Post-doc, Assistant Professor

11. Detailed Tasks Assigned Drought risk specialist	12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned
	Name of assignment or project: <i>Poverty & Climate Change</i> <i>Project</i>
	Year: 2014-2015 Location: Global – selection of World Bank countries Client: World Bank – contracted by Deltares Main project features: Assess the relative exposure of poor people to flood and drought hazard under current conditions and future conditions (taken into account climate change). Positions held: Drought / Water scarcity specialist
	Activities performed: Process output global hydrological model, set-up and run drought hazard analysis, evaluate results, contribute to report and paper.
	Name of assignment or project: Global scale assessment of physical and social water scarcity – Part of the EartH2Observe project
	Year: 2014 - ongoing Location: Global Client: European Commission Main project features: A global scale drought and water scarcity assessment using the Tier 1 EartH2Observe water resources data from a portfolio of global hydrological and land use models. Positions held: Drought/water scarcity specialist
	Activities performed: Analyse and process output of multiple global hydrological and land use models, set up a framework for the analysis of water scarcity & drought events, execute all drought & water scarcity analysis, gap

analysis (data, metrics, information) with respect to global
scale end-users, wrote report.
Name of assignment or project: Think Hazard! Tool:
Development of recommendations and Results checking
Year: 2016
Location: Global – selection of World Bank countries
Client: World Bank
Main project features: Sanity checking" of the
drought/water scarcity hazard levels that are generated by the
Think Hazard! Tool
Positions held: Drought / Water scarcity specialist
Activities performed: Evaluation of models, data, and tools
being part of the TH! Tool. Drought risk calculations for
selected countries. Inventory of additional (open-source) data-
sources.

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.

Date: 12 October 2018_____ Day/Month/Year

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

- 1. Name of Staff [Insert full name]: Jeroen Aerts_____
- 2. Proposed Position: Project co-lead
- 3. Employer: VU University Amsterdam, IVM, Department of Water & Climate Risk
- 4. Date of Birth: 14-09-1968 Nationality: Dutch

5. Education

2000 - 2002 PhD. Spatial Optimization techniques and Resource Allocation, University of Amsterdam.

1986 - 1992 M.Sc. Physical Geography, University of Amsterdam.

6. Professional Certification or Membership in Professional Associations:

Member	Geassocieerd lidmaatschap Raad voor de leefomgeving en infrastructuur (RLI)
Member	Dutch Science Foundation NWO evaluation commission 2010-2018
Chair	Water Management Section of KIVI- NIRIA 2007-2015
Coordinator	Coordinator theme adaptation and River systems under the FES program 'Knowlegde for Climate' (2,5 Million Euro's) (until 2010)
Coordinator	National adaptation programme under BSIK 'Climate change spatial planning' (24 Million Euro's) (2004-2012)
Member	American Geosciences Union
Member	Scientific steering committee Royal Netherlands Embassies for Climate change and East Africa
Member	Platform on Water and Climate through CPWC
Member	Steering committee research Perspectives programme for the River Meuse
Member	Advisory board on Adaptation for the Dutch Ministry of Development Aid, DGIS
Member	Steering Group Cooperative Programme on Climate and Water
Member	European Geophysical Union
Member	International Society for Multi-Criteria Decision Making

7. Other Relevant Training:

* netlogo course, agent based modeling

- **8.** Countries of Work Experience: [List countries where staff has worked in the last ten years]:
- * USA
- * Vietnam
- * Kenya
- * Ethiopia
- * India

- * Bangladesh
- * Ghana
- * South Africa
- * Netherlands
- * Germany
- * Austria

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

Languages Skills	Writing	Speaking	Reading
Dutch	Mother tongue	Mother tongue	Mother tongue
English	Good	Good	Good
German	Fair	Good	Good
French	Poor	Poor	Fair

2016-2017	Guest Professor	University of California Santa Barbara (UCSB); Department of geography, USA
2015-	Director	Institute for Environmental Studies(IVM), Vrije Universiteit Amsterdam
2012	Full Professor Water and Risk	Institute for Environmental Studies(IVM), Vrije Universiteit Amsterdam
2007	Professor of water, risk and insurance	Institute for Environmental Studies(IVM), Vrije Universiteit Amsterdam
2005	Associate Professor (UHD)	Institute for Environmental Studies(IVM), Vrije Universiteit Amsterdam
2001	Assistant professor	Institute for Environmental Studies(IVM), Vrije Universiteit Amsterdam
1999	Visiting Scientist	NCGIA, University of California Santa Barbara (UCSB).
1998	Deputy Head	Division Policy Analysis and Instruments, Resource Analysis
1997	Coordinator / senior advisor	GIS and Remote Sensing division (SIG), Resource Analysis
1996	Advisor	Resource Analysis
1993	Junior Advisor	Resource Analysis
1992	Junior Advisor	Dutch Ministry of Housing, Spatial Planning and the Environment, Department of Climate Change
1990	Teacher Assistant	University of Amsterdam

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

11. Detailed Tasks Assigned	12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned
Water & climate risk specialist	Hanure the Tasks Assigned
	Name of assignment or project: <i>EU ENHANCE; Risk partnerships and natural Hazards</i>
	Year: 2012-2017
	Client: EU– FP7
	Main project features: Assess the risk from different natural
	hazards, such as droughts, and estimate risk projections into
	the future. Assess what risk partnerships are able to cope with trends in risk
	Positions held: Risk assessment modeller and PI
	Activities performed: Develop risk models, assess adaptation
	options and stakeholder meetings
	Name of assignment or project: <i>Improving predictions and management of hydrological extremes (IMPREX)</i>
	N. 2015
	Year: 2015 - ongoing
	Client: European Comission
	Main project features: A global scale risk and forecast
	assessment of droughts and floods.
	i ositions neiti. I loot and drought specialist
	Activities performed: Conducting research on flood, agricultural drought and food security risks forecasting and forecast-based financing.
	Name of assignment or project: Think Hazard! Tool:
	Development of recommendations and Results checking
	Year: 2016
	Location: Global – selection of World Bank countries
	Client: World Bank Main project features: Sanity checking" of the
	drought/water scarcity hazard levels that are generated by the
	Think Hazard! Tool
	Positions held : Drought / Water risk specialist
	Activities performed: Stakeholder assessment and
	vulnerability approach

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.

Date: 15 October 2018____

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

Day/Month/Year

- 1. Name of Staff [Insert full name]: Konstantinos Bischiniotis_____
- 2. Proposed Position: Forecast-based financing specialist_____
- 3. Employer: VU University Amsterdam, IVM, Department of Water & Climate Risk
- **4. Date of Birth**: 11-06-1986 **Nationality**: Greek

5. Education

School, college and/or	Degree/certificate or other	Date Obtained
University Attended	specialized education	
	<u>obtained</u>	
VU University Amsterdam	PhD Impact of forecast	1/10/2015 - now (ongoing)
	quality in flood risk	
	management strategies	
TU Delft	MSc. Hydraulic	2015
	Engineering and Risk	
	Management	
AU Thessaloniki	MSc Hydraulic and	2010
	Environmental Engineering	

6. Professional Certification or Membership in Professional Associations:

American Geosciences Union, European Geosciences Union, Technical Chamber of Greece

7. Other Relevant Training:

* 2013: Scientific writing in English

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

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

Languages Skills	Writing	Speaking	Reading
Greek	Mother tongue	Mother tongue	Mother tongue
English	Good	Good	Good
Spanish	Good	Fair	Good
German	Fair	Poor	Fair

10. Employment Record[Starting with present position, list in reverse order every employment held]:2015- currentEmployer: Institute for Environmental Studies (IVM), VU
University Amsterdam, the Netherlands
Position(s) held: PhD

2014-2015Employer: Potsdam Institute for Climate Impact Research,
Delft, the Netherlands Germany

Position(s) held: Graduate student

2011 – 2013Employer: Self-employed
Thessaloniki, Greece
Position(s) held: Construction Manager

11. Detailed Tasks Assigned	12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned
Forecast-based financing specialist	
	Name of assignment or project: Impact of forecast and projection quality on mixtures of risk management strategies
Year: 2015-2019 Location: Global – selection of pilot countries from Forecast-based financing project of the Red Cross Crescent Client: NWO Main project features: Evaluate and improve operative weather- and seasonal-scale forecasts. Help decision-midentify the optimal portfolio of disaster risk manage investments based on available information about the conditions. Positions held: PhD	
	Activities performed: Influence of antecedent conditions in flood generation is sub-Saharan Africa, incorporation of seasonal precipitation forecasts in flood risk management, global predictability of cold and heat waves, evaluation of the global hydrological warning system (GloFAS) in Peru, incorporation of practice-oriented decision contexts into a forecast-based flood early warning/early action system

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: 15 October 2018 Day/Month/Year

- 1. Name of Staff [Insert full name]: Gabriela Guimarães Nobre
- 2. Proposed Position: Machine Learning, food security and forecast-based financing specialist
- 3. Employer: VU University Amsterdam, IVM, Department of Water & Climate Risk
- **4. Date of Birth**: 02/11/1988 **Nationality**: Brazilian

5. Education

School, college and/or	Degree/certificate or other	Date Obtained
University Attended	specialized education	
	<u>obtained</u>	
VU University Amsterdam	PhD in climate variability,	10/2015 – now (ongoing)
	flood and drought risks	
University of Kiel	MSc. in Environmental	10/2013 - 10/2015
	Management	

6. Professional Certification or Membership in Professional Associations: American

Geosciences Union, European Geosciences Union, Water Youth Network, UN Major Group for Children and Youth, Global Risk Assessment Framework Expert Group (UNISDR)

7. Other Relevant Training:

- * 2018: Natural Hazards in the Anthropocene
- * 2017: Increasing Strategies for Coasts
- * 2016: Scientific writing in English
- * 2014: Multi-Risk Assessment and Mitigation in Europe

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

- * Brazil
- * Ireland
- * Germany
- * Denmark
- * Netherlands
- 9. Languages [For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing]:

Languages Skills	Writing	Speaking	Reading
Portuguese	Mother tongue	Mother tongue	Mother tongue
English	Good	Good	Good
Spanish	Good	Fair	Good

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

2015 – current Employer: Institute for Environmental Studies (IVM), VU

	University Amsterdam, the Netherlands Position(s) held: PhD Researcher
2016 - 2016	Employer: University of California, Santa Barbara, USA Position(s) held: Visiting Researcher
2015 - 2015	Employer: Technical University of Denmark, Copenhagen, Denmark Position(s) held: Researcher Assistant
2013-2015	Employer: University of Kiel, Kiel, Germany Position(s) held: Researcher Assistant

11. Detailed Tasks Assigned	12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned
Machine Learning, food security and forecast-based financing specialist	
	Name of assignment or project: <i>Improving predictions and management of hydrological extremes (IMPREX)</i>
	Year: 2015 - ongoing Location: Global
	Main project features: A global scale risk and forecast assessment of droughts and floods.
	Positions held : Flood and drought specialist
	Activities performed: Conducting research on flood, agricultural drought and food security risks forecasting and forecast-based financing.
	Name of assignment or project: Water Sensitive Cities
	Year: 2012 - ongoing Location: Global
	Client: Australian Government Main project features : Develop and apply innovative concepts and tools to improve water management systems in cities across the globe. Positions held: Flood specialist
	i ositions neiu. 1400u specialist
	Activities performed: Conducting research on compound floods and developing advanced statistical model for assessing water sensitive urbanism to compound extremes floods.

Name of assignment or project:Priority ActionsProgramme/Regional Activity Centre (PAP/RAC)
Year: 2013 - ongoing
Location: Europe
Client: European Comission
Main project features: Develop integrated approaches to provide solutions to the complex environmental, social, economic and institutional problems of coastal zones. Positions held: Flood specialist
Activities performed: Conducting research on flooding risk assessment of coastal areas and assessing flood risk to UNESCO World Heritage sites in the Mediterranean.

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.

Guimenan Adres.

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

Date: <u>25/10/2018</u> *Day/Month/Year*

II. Red Cross Netherlands – 510 (510)

- 1. Name of Staff [Insert full name]: Edward (Ted) Bolton_____
- 2. Proposed Position Disaster preparedness and resilience specialist
- 3. Employer: Netherlands Red Cross/510
- 4. Date of Birth: 08/07/1993______Nationality: BRITISH_____
- 5. Education

School, college and/or	Degree/certificate or other	Date Obtained
University Attended	specialized education	
	obtained	
University of Amsterdam	MSc. Political Geography	August 2017
Nottingham Trent University	BSc. Geography	July 2015

7. Other Relevant Training: _____

- 8. Countries of Work Experience: [List countries where staff has worked in the last ten years]:_____U.K, Netherlands, France, Malawi, Kenya, St. Maarten
- 9. Languages [For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing]: Writing Speaking Reading English Mother tongue Mother tongue Mother tongue Dutch Fair Fair Fair

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

i	
2017-Current	Employer: Netherlands Red Cross/510
	Positions held:
	NLRC Delegate Kenya – Innovative Approaches in Response
	Preparedness (IARP), In-country lead - Digital VCA and Data
	Preparedness in Malawi – ECHO II, Information Manager – NLRC Irma
	Response
2015-2016	Employer: Avocet EA
	Positions held:
	Director (Self Employed)/Environmental & Geospatial Consultant
2014-2015	Employer: Freelance
	Positions held.
	Catastronha Disk Modeler Expedition planning Archiving
	Catasulophe Kisk Wouclei, Expedition planning, Alchiving

11. Detailed Tasks Assigned	12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned
Disaster preparedness and resilience specialist	
	Name of assignment or project: <i>Innovative Approaches in</i> <i>Response Preparedness (IARP)</i>
	 Year: 2018 (ongoing) Location: Kenya Client: IKEA Foundation (Donor) Main project features: Aims to mitigate worst effects of increasingly severe climate disasters with forecast-based financing (FbF) supported by data preparedness and cash transfers. Positions held: Data Preparedness Delegate – 510/NLRCS
	 Activities performed: Responsible for data preparedness element, including: Establishment, set-up and training of a regional data team in Kenya including support on Strategy, Business model, Finance, Marketing, HR & Communication. Training and Capacity building within KRCS Directly supporting implementation of IARP project aims in implementing a National Forecast-based-Finance system. Including Stakeholder engagement, data gathering and analysis for key decision making.

Name of assignment or project: ECHO II – Digitized VCA
N. 2017
Year: 2017
Location: Malawi
Client: EU ECHO
Main project features: Develop disaster preparedness and
resilience in Malawi
Positions held: In-country Lead
Activities performed: Responsible for the piloting of a
digitized form of the Red Cross Vulnerability Capacity
Assessment (VCA) tool and the successful execution of a
surveying project in which data, including household
assessments for the ECHO II Forecast-based
Financing (FbF) pilot.
Name of assignment or project: NLRC Hurricane Irma
Response
Year: 2017/2018
Location: Sint Maarten
Client: NLRC Fundraising
Main project features: Response and early recovery
period to damage to 2017 Hurricane Irma in Sint Maarten
Positions hold: Information Manager
Activities performed: Provided project support for the Cash
and Shelter projects as well as strategic support at a
programmatic level and coordination with other actors.
Including:
• The selection and training of volunteers and staff.
Leading volunteers during distributions.
Co-convener and NLRC technical lead within St
Maarten technical working group.
Beneficiary identification and supervision/execution of
field assessment
• The creation and upkeep of the workflow system and
database for the shelter project.

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.

F. Bolton

Date:16 October 2018

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

Day/Month/Year

- 1. Name of Staff : Marc van den Homberg, MBA
- 2. Proposed Position: Data for disaster risk management specialist
- 3. Employer: 510 an initiative of the Netherlands Red Cross
- **4. Date of Birth**: 17 July 1970 **Nationality**: Dutch

5. Education

School, college and/or University	Degree/certificate or other	Date
Attended	specialized education obtained	Obtained
IFRC/Tata Institute for Social	Disaster Management Certificate	June 2015
Sciences	(cumulative $GPA = A$, excellent)	
Rotterdam School of Management,	Executive MBA (electives on	February
NL	entrepreneurship in emerging	2005
	countries)	
Delft University of Technology, NL	PhD in Physics	January 1998
Utrecht University, The Netherlands	MSc in Physics (with distinction)	March 1993
University of Wisconsin, USA	Thesis work Physics	1992-1993

6. Professional Certification or Membership in Professional Associations:

OCHA Information Management Working Group, All Hazards Disaster Expert Skype Group; World-Wide Human Geography Data Working Group.

7. Other Relevant Training:

Supporting Humanitarian Action in Responding to Emergencies and Disasters, OCHA (2015); International Project Management Association D certificate (2000).

- **8.** Countries of Work Experience: Africa (Burundi, Burkina Faso, Malawi, Mali, South Africa and Zambia) and Asia (Bangladesh, India, Nepal, The Philippines and Vietnam)
- **9.** Languages: Dutch (native), English (fluent), French (EU level C1 certificate, registered interpreter as reserve officer with the Civil military interaction command), German (good spoken, average written), Spanish (basic)

10. Employment Record:

From: July 2016 To: Current

Employer: 510 an initiative of the Netherlands Red Cross

Positions held: Scientific Lead

From: 2015 To: Current

Employer: Independent researcher and consultant Data4Resilience

Positions held: Research and consultancy assignments for

- **Practical Action** (Nov 2016-now): wrote Springer climate risk management book chapter on role of technology to reduce Loss and Damage for poor and vulnerable communities and to reach climate justice through key global agreements (Sendai, Paris, SDG). Case study on transborder early warning systems in India, Nepal and Bangladesh.
- UN OCHA and Netherlands Ministry of Foreign Affairs (early 2016) Delivered consultancy with Dalberg on a vision for and the feasibility of an entity to improve the use of data across the humanitarian ecosystem, which was instrumental in the setting up of OCHAs Centre for Humanitarian Data in The Hague.
- UN OCHA (Jan–July 2016): With Leiden University and New York University GovLab performed a risk analysis on the data policies for OCHA's ICT systems and processes and contributor to OCHA Data Risk Taxonomy.
- Cordaid (Sept 2013-Sept 2015 through TNO, after that as independent consultant).
 - Developing data-driven cross border community based early warning system in India, Nepal, Bangladesh. Co-created close partnerships with governmental organizations such as Ministry of Disaster Management and Relief in Bangladesh, with regional institutes such as Regional Integrated Multi-Hazard Early Warning System for Africa and Asia and with national and local NGOs.
 - Provided input on multi-hazard early warning systems to Asia Regional Plan for Implementation of the Sendai Framework at the Nov 2016 AMCDRR conference. International observer of the Dibrugarh Emergency Management Exercise on invitation of National Disaster Management Authority of India.
 - Lecturer on Data Preparedness in 2016 Massive Open Online Course (MOOC) on Science and Technology for DRR, UNESCO Cooperation & Development Center (CODEV) at the École Polytechnique Fédérale de Lausanne (EPFL).
 - Supervised research with Utrecht University into applying data science to bridge information gaps by determining decision maker's information needs, mapping data sets on these needs and linking disparate data sets.
 - Participated in innovative field-research in The Philippines one month after the Typhoon Haiyan with Disaster Resilience Lab.
- NATO Center of Excellence Crisis Management and Disaster Reponses (July 2016). Lecturer on Towards a Balkans' Data for Disaster Management Collaborative? at workshop on Implications of Climate Change and Disasters on Military Activities: Building Resiliency and Mitigating Vulnerability in the Balkan Region.

From: 2003 To: 2015

Employer: Netherlands Research and Technology Organization TNO

Positions held: Leader and founder of ICT for Development team (2006-2015), implemented pro-poor ICT innovations funded by EU, Netherlands Ministry of Foreign Affairs, World

Bank, NGOs; Research department manager (Jul 2004-Jun 2011); Member of company's top 250.

From: 1997 To: 2002

Employer: KPN Research (incumbent mobile and network operator)

Positions held: Program manager radio networks (2000-2002); Test manager i-mode BASE, Brussels, Belgium (Jun 2002-Nov 2002); Project leader Cell Broadcast (2002), implemented Cell Broadcast, SMS alert system, for a civil information system of two Dutch Ministries.

11. Detailed Tasks Assigned	. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned
Data for disaster risk management specialist	
	Name of assignment or project: Innovative Approaches in Response Preparedness IARP
	Location: Kenya Uganda and Ethionia
	Client : IKEA Foundation (Donor)
	 Main project features: Aims to mitigate worst effects of increasingly severe climate disasters with forecast-based financing (FbF) supported by data preparedness and cash transfers. Positions held: Scientific lead of the data preparedness activities
	Activities performed:
	• Risk analysis and impact-based forecasting (IBF) modeling as part of the trigger methodology for floods and droughts.
	• Assessment of the potential of indigenous knowledge early warning triggers for IBF.
	• Reporting on and synthesis of data preparedness activities.
	• Supervision of two MSc computer science/information management students for research on Open data and Machine Learning to predict food insecurity in Ethiopia. First results were published as extended abstract at UNESCO Tech4Dev 2018 conference.
	Name of assignment or project: <i>Improving Preparedness</i>
	to Agro-Climatic Extremes in Malawi

Year: 2018 (just started)
Location: Malawi
Client: Natural Environment Research Council (NERC)
and DFID (Donor)
Main project features:
Positions held: Project leader and main researcher for 510
part
1
Activities to be performed:
• Input into design, preparation, and facilitation of
consultation workshops
• To process the community risk indicator data to input
into the case study selection
• To co-design data collection methods;
• Integrate findings from indigenous knowledge
indicators and early actions study into the agroclimatic
indices development
• To put together an overview of technical, legal,
commercial and organizational barriers in setting up
climate services and possible mitigation measures.
• Input into the writing of the interim and full project
report and the peer-reviewed publication.
Name of assignment or project: Response preparedness
program II
Year: 2018 (ongoing)
Location: Mali and Zambia
Client: Netherlands Ministry of Foreign Affairs (Donor)
Main project features: Support Red Cross National
societies in their response preparedness
Positions held: Scientific lead
A stimiting monthanneads
Acuviues performed:
• Data preparedness trainings and workshops.
 KISK analysis and IBF for floods, see also
<u>IIUPS://dashdoard.510.global/</u>
wante of assignment of project: Risk assessment for FbF
Vear: 2017 (October)-2018 (June)
Location: Peru and Ecuador
Client: German Red Cross (Dopor)

-

Main project features: Support Red Cross National
societies of Peru and Ecuador with FbF
Positions held: Scientific lead/project leader
Activities performed:
• Data preparedness trainings and workshops.
• Risk analysis and IBF for floods, see also
https://dashboard.510.global/
• The risk analysis was included into the first Early
Action Protocol that was approved for the FbA window
 into the DREF fund by IFRC.
Name of assignment or project: Global Dialogue
platform for FbF
Year: 2017, 2018
Location: Berlin
Client: mostly funded via Princess Margriet Fund and
IARP project
Main project features: The Dialogue Platforms' overall
goal is to develop a methodology for Forecast-based
Financing. Experience from current FoF-phois is evaluated
at the Dialogue Platforms and additional scientific
asthere meteorologiste, elimete scientiste, humanitarian
actors and donors
Positions held: Scientific lead of the data preparedness
activities
Activities performed:
• Co-organize data preparedness workshop and present
• Contributor to A guide to trigger methodology for
forecast-based financing of the Red Cross Movement
(with Red Cross Red Crescent Climate Centre and
German Red Cross).
Name of assignment or project: Impact-based
forecasting for the Philippines
Year: 2017 -2018
Location: Philippines
Client: Princess Margriet Fund (donor), Philippines Red
Cross (client)
Main project features: Develop an impact-based forecast

Positions held: Scientific lead
Activities performed:
• A historical impact database was created for about
12 typhoons in the last five years
• A Machine Learning model (random forest tree)
and multiple linear regression were tested
Depute of the model were used to predict the
• Results of the model were used to predict the impact on houses during the 2018 turboon
Manakhut
Name of assignment or project: ECHO II – Enhancing
resilience in Malawi
N/ 2017
Year: 2017
Location: Malawi
Client: EU ECHO
Main project features: Develop disaster preparedness
and resilience in Malawi
Positions held: Scientific lead
Activities performed:
• Supervising a pilot to digitally support the Red Cross
Vulnerability Capacity Assessment (VCA) tool.
• Risk analysis and preliminary IBF to prioritize
vulnerable and poor communities for a cash transfer
FbF pilot.
Name of assignment or project: Building a Data
Collaborative to support SDGs on Health and WASH in
Malawi and the Democratic Republic of Congo
1 5 6
Year: 2017-now
Location: Malawi, Democratic Republic of Congo
Client: Global Partnership for Sustainable Development
Data (UN and Worldbank)
Main project features.
Positions held. Scientific lead
Activities performed:
• Development of methodology for characterization of
data ecosystems
 Year: 2017 Location: Malawi Client: EU ECHO Main project features: Develop disaster preparedness and resilience in Malawi Positions held: Scientific lead Activities performed: Supervising a pilot to digitally support the Red Cross Vulnerability Capacity Assessment (VCA) tool. Risk analysis and preliminary IBF to prioritize vulnerable and poor communities for a cash transfer FbF pilot. Name of assignment or project: <i>Building a Data Collaborative to support SDGs on Health and WASH in Malawi and the Democratic Republic of Congo</i> Year: 2017-now Location: Malawi, Democratic Republic of Congo Client: Global Partnership for Sustainable Development Data (UN and Worldbank) Main project features: Positions held: Scientific lead Activities performed:

• Organization and facilitation of inception and technical workshops
• Data collection and curation, including subsequent analysis
• Lead author of report and scientific paper

Name of assignment or project:Digital inclusion offloodaffectedcommunities(https://www.cordaid.org/en/news/digital-inclusion-flood- affected-communities/)affected-communities/
Year: 2013 - 2016 Location: Bangladesh
Client: Cordaid
Main project features: Professional and responding communities implement preparedness and response activities to avoid loss of lives and protect livelihoods during floods in Bangladesh. We determined and clustered the information needs of these decision makers and mapped these on available data sets from many different stakeholders. Data gaps were identified, most notably the lack of timely, sufficiently granular and geospatial data. We worked on three ways to address these. (1) A Coordinated Data Scramble and data governance among the many organizations to reach a higher level of coordination in the data collection process, avoiding duplicates and promoting coherence. (2) We developed an app to disseminate early warning, collect data at household level during and after the flood on e.g. early warning effectiveness and trained volunteers and government officials to do so. (3) We developed a geospatial sharing dashboard to feedback the collected data to the responding and professional community in both Bangla and English.
Positions held: Senior expert data for disaster management Activities performed: developing the M&E framework, the requirements for the dashboard and app, creating an overview of multi-institutional information requirements and data sets available as a function of time, lead author of research paper and report on this work.

III. University of California Santa Barbara – Climate Hazards Center (CHC)

1. Name of Staff [Insert full name]: Frank Davenport_____

- 2. Proposed Position: Food security specialist
- 3. Employer: University of CA, Santa Barbara, Climate Hazards Center_____
- 4. Date of Birth: 16-06-1979______Nationality: USA______

5. Education

School, college and/or	Degree/certificate or other	Date Obtained
University Attended	specialized education	
	obtained	
University of CA, Santa	PhD Geography	December 2013
Barbara		
University of CA, Santa	M.A. Geography	December 2008
Barbara		

6. Professional Certification or Membership in Professional Associations:

American Geosciences Union, Western Regional Science Association

7. Other Relevant Training:

- * 2009: Spatial Econometrics Advanced Institute in Rome, Italy
- * 2012: Stanford Workshop in Formal Demography in Palo Alto, CA
- 8. Countries of Work Experience: [List countries where staff has worked in the last ten years]: * Mexico
 - *Uganda
- **9.** Languages [For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing]:

Languages Skills	Writing	Speaking	Reading
English	Mother tongue	Mother tongue	Mother tongue
Spanish	Fair	Fair	Fair
10. Employment Record	[Starting with present posit	ion, list in reverse order eve	ry employment held]:
2016- current	Employer: Climate Ha	zards Center, Departme	ent of Geography,
	University of CA, Sant	a Barbara	
	Position(s) held: Assis	tant Researcher	
2013-2015	Employer: Climate Ha	zards Center, Departme	ent of Geography,
	University of CA, Sant	a Barbara	
	Position(s) held: Asso	ciate Specialist	

2005 – 2006	Employer: University Space Research Association/SERVIR, Panama City, Panama Position(s) held: GIS Consultant
2002-2005	Employer: Redlands Institute for Environmental Design, Management, and Scienc, University of Redlands, Redlands, CA Position(s) held: GIS Research Analyst

11. Detailed Tasks Assigned	12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned		
Food security specialist			
	Name of assignment or project: <i>Identification of Seasonal and Decadal Drought through Monitoring and Modeling</i>		
	Year: 2014-2019		
	Location: Global – selection of African, Central		
	Client: US Geological Survey (USGS)		
	Main project features: Support Famine Early Warning Network (FEWS-NET) through the development of gridded climate weather/products and statistical modeling of food security outcomes. Positions held: Researcher		
	Activities performed: Develop climate products and develop statistical models on crop yields, prices, birth weights, child stunting. Synthesize results in peer reviewed publications.		
	Name of assignment or project: <i>High-Expressivity World</i> <i>Modeling</i>		
	Year: 2018-2021 Location: Global Client: D.A.R.P.A (via SRI International) Main project features: Develop technologies that will enable analysts to rapidly build models to analyse questions relevant		
	to national and global security Positions held : Researcher		
	Activities performed: Upgrade existing global climate a temperature products and integrate them within sub-season forecasting sytems. Provide ad-hoc and domain Food Secur		

	expertise to World Modellers	programming community.
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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.



Date: 15 October 2018____

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

Day/Month/Year

IV. Kenya Red Cross Society -International Centre for Humanitarian Affairs (KRCS-ICHA)

- 1. Name of Staff [Insert full name]: Halima Saado Abdillahi_____
- 2. Proposed Position: Project manager
- 3. Employer: Kenya Red Cross Society, International Centre for Humanitarian Affairs
- 4. Date of Birth:
 15-5-1981
 Nationality:
 Kenyan

5. Education

School, college and/or	Degree/certificate or other	Date Obtained
University Attended	specialized education	
	<u>obtained</u>	
University of KwaZulu-	PhD Ethnobotany	April 2011
Natal, South Africa,		
Completion		
University of KwaZulu-	MSc Ethnobotany,	2008
Natal South Africa	Upgraded to PhD	
Moi University Eldoret	BSc Botany	November 2004
Kenya		

6. Professional Certification or Membership in Professional Associations:

Society of Economic Botany (Kenya Chapter) South African Association of Botanists Society of Conservation Biology Tropical Biology Association Nature Kenya

7. Other Relevant Training:

2015: Basic Response Skills in Humanitarian Crisis-Kenya Red Cross Society
2006: Certificate of participation in the Tropical Biology Association Course in Madagascar
2005: Databasing (BRAHMS) and collection guide compilation of East Africa Euphorbiaceae
1999: Certificate of participation in the Earth Watch Fellowship Program, Cameroon's
Rainforest

- 8. Countries of Work Experience: [List countries where staff has worked in the last ten years]: * Kenya
- **9.** Languages [For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing]:

Languages Writing Speaking

Reading

Swahili	Good	Good	Good
English	Good	Good	Good
10. Employment Record	[Starting with present posi	tion, list in reverse order eve	ery employment held]:
Feb 2017- current	Employer: Kenya Rec	Cross Society, Internat	ional Centre for
	Humanitarian Affairs;		
	Position(s) held: Head	l of Research, Knowled	ge and Learning
October 2015 –	Employer: Environment and Climate Change Adaptation, Disaster		
January 2017	Risk Management Department		
	Position(s) held: Program Manager		
2011 June –	Employer: National M	luseums of Kenya (NM	K), Nairobi, Kenya
September 2015	Position(s) held: Senior Research Scientist and Head of Economic		
	Botany Section, Botan	y Department	
2005 Jan–2011 May	Employer: National M	luseums of Kenya (NM	K)
	Position(s) held: Assis	stant Research Scientist	

11. Detailed Tasks Assigned	12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned
Project manager	
	Name of assignment or project: <i>Research on How the Red</i> <i>Cross and Red Crescent Movement responded to 2015-2017</i> <i>Drought in East Africa</i>
	 Year: 2018 Location: Ethiopia, Kenya, Somalia Client: International Federation of Red Cross and Red Crescent, British Red Cross Main project features: Assess the current drought response within the Movement, generate learning from previous drought crises, other drought affected regions in Africa and other humanitarian agencies. Positions held: Lead researcher
	Activities performed: Stakeholder interviews, review of relevant literature, workshops, compilation of information and report writing.
	Name of assignment or project: Development of Kenya Red Cross Society Cash Transfer Programming Strategy
	Year: 2018 Location: Kenya Client: Kenya Red Cross Society Main project features: Assess the cash transfer work done by Kenya Red Cross Society to date, and use the learning and needs to develop the Cash Transfer Programming Strategy to guide the work going forward. Positions held: Coordinator
	Activities performed: Review of documentation on cash transfer programming, discussion with staff, writing of the strategy
	Name of assignment or project: Innovative Approaches in Response Preparedness (IARP) project
	Year: 2018 Location: Kenya, Ethiopia, Uganda Client: IKEA Foundation, Netherlands Red Cross Main project features: The project seeks to put in place an early warning early action system that enables Red Cross National Societies in partnership with government agencies

 and meteorological services, humanitarian organizations and others to carry out cost-effective and timely actions for the most vulnerable people. Positions held: Kenya Project Manager 	
Activities performed: Budget and work plan development and tracking, stakeholder discussions, report writing.	

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.



Date: 19 October 2018

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

Day/Month/Year

- 1. Name of Staff [Insert full name]: Maurine Kasuvu Ambani_____
- 2. Proposed Position: Forecast-based financing and climate specialist
- 3. Employer: Kenya Red Cross Society, International Centre for Humanitarian Affairs
- **4. Date of Birth**: 11-03-1984 **Nationality**: Kenyan

5. Education

School, college and/or	Degree/certificate or other	Date Obtained
University Attended	specialized education	
-	obtained	
University of Nairobi	M.Sc. Meteorology	August 2011
University of Nairobi	B.Sc. Meteorology	June 2007

6. Professional Certification or Membership in Professional Associations: Kenya Meteorological Society

7. Other Relevant Training:

- 8. Countries of Work Experience: [List countries where staff has worked in the last ten years]:
 - Kenya Ethiopia Ghana Niger Mozambique Malawi
- **9.** Languages [For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing]:

Languages Skills	Writing	Speaking	Reading
Swahili	Good	Good	Good
English	Good	Good	Good
French	Fair	Fair	Good
German	Poor	Poor	Fair
10. Employment Record Sept 2017- current	[Starting with present posit Employer: Kenya Red Humanitarian Affairs Position(s) held: Proje	ion, list in reverse order even Cross Society, Internat ect Manager Climate Re	y employment held]: ional Centre for search

Oct 2011 – Aug 2017 Employer: CARE International

Position(s) held: Intern, Climate Communications Officer, Climate **Communications Advisor Employer:** IGAD Climate Prediction and Applications Centre **January 2008 –** October 2008 **Position(s) held:** Junior Research Fellow **11. Detailed Tasks 12. Work Undertaken that Best Illustrates Capability to** Assigned Handle the Tasks Assigned Forecast-based financing and climate specialist Name of assignment or project: Innovative Approaches in Response Preparedness (IARP) project Year: 2018 Location: Kenya, Ethiopia, Uganda **Client:** IKEA Foundation. Netherlands Red Cross Main project features: The project seeks to put in place an early warning early action system that enables Red Cross National Societies in partnership with government agencies and meteorological services, humanitarian organizations and others to carry out cost-effective and timely actions for the most vulnerable people. Positions held: Climate Advisor Activities performed: Conducted a feasibility study on Forecast-based Financing (FbF) in Kenya. Support the development of a "menu of forecasts" for the FbF projects in Kenya, with support to be provided for Ethiopia and Uganda. Provide technical support to the selection of forecast triggers and development of Early Action Protocols for FbF in East Africa. Name of assignment or project: Forecast-based Preparedness Action project Year: 2018 Location: Kenya Client: University of Sussex, under the Science for Humanitarian Emergencies and Resilience (SHEAR) programme Main project features: Apply the principles of Forecastbased Action (FbA) in Kenya, focusing on improving forecasts for extreme drought and flood events and

integrating these into the existing early warning systems									
Positions held : Project Manager									
i ositions neid. Project Manager									
Activities performed: Conducted and evaluation of existing									
EWS in Kenya for floods and droughts, and review of									
existing initiatives in the Greater Horn of Africa. Stakeholder									
interviews and discussions to understand risk perceptions,									
and set baselines for FbA. Explore entry points for forecasts									
in EWS. Report writing, budget and work plan development									
 and tracking.									
Name of assignment or project: Adaptation Learning									
Programme (ALP)									
Very 2011 2017									
Lear: 2011 - 2017									
Client: DEID Danida, Finnish Covernment, Austrian									
Development A genery through CAPE International									
Main project features: Increase the capacity of vulnerable									
people in Africa to adapt to climate variability and change									
through development and implementation of innovative									
approaches in Community based Adaptation.									
Positions held: Climate Communications Advisor									
Activities performed: Developed approaches to integrate									
the use of weather and climate information in adaptation									
decision making. Provided technical support and capacity									
building for ALP country offices as well as other countries in									
 Africa to use climate information approaches in adaptation.									
Name of assignment or project: IGAD Climate Prediction									
and Applications Centre									
Year: 2008									
Location: Greater Horn of Africa (GHA)									
Client: IGAD Member States									
Main project features: Development of climate forecasts									
for the GHA region and provision of capacity building on									
climate and related issues.									
Positions held: Junior Research Fellow									
A attriting nonformed. Contributed to development of the									
Activities performed: Contributed to development of ten- day and seasonal climate forecasts for GHA countries									
1 and 3 and 3 cubothal children to couble to 101 01111 could 103.									

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.

Date: 19 October 2018 Day/Month/Year

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

Annex 3: Work Schedule

				Months																	
	Activity	Deliverable Type	Lead	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
T0.1	Mobilization		IVM-VU																		1
T1.1	Building collection of relevant data	Dataset	CHC/510						٠												1
T1.2	Developing and validating a food insecurity forecasting model	Model; Report	IVM-VU/KRCS-ICHA											٠							
T1.3	Assessing the transferability and scalability of model and result	Report	СНС																		i
T2.1	Developing survey & choice experiment	Design	510/KRCS-ICHA/IVM-VU								٠										
T2.2	Performing survey & choice experiment	Dataset	510/KRCS-ICHA																		i
T2.3	Analyzing survey & choice experiment	Report	IVM-VU																		ł
T3.1	Listing cash transfer mechanisms	Dataset	KRCS-ICHA/510																		
T3.2	Quantifying needs-for-transfer and associated costs	Report	IVM-VU																		I
T3.3	Evaluating the cost-effectiveness of cash transfer mechanisms	Report	IVM-VU																		ł
T4.1	Performing feasiblity assessment	Report	KRCS-ICHA/510																		i
T4.2	Performing assessment on potential channels of operationaliza	Report	KRCS-ICHA/510																		
	World-bank project deliverables	Report	IVM-VU	•								۲									
	Meetings																				
					Techr	nical d	eliver	able	•	Proje	t deliv	verabl	e		Meeti	ing					

- 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.