Institute of Policy Analysis and Research - Rwanda

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Cooperation among Rwandan businesses for increasing resilience: Analysing existing initiatives and scoping potentials (RSGL-1301)

Christian Kind, adelphi and Dr. Aime Tsinda, IPAR-Rwanda;

Financed by the Climate & Development Knowledge Network (CDKN)

FINAL REPORT

Cooperation among Rwandan businesses for increasing resilience

Analysing existing initiatives and scoping potentials (RSGL-1301)

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As at: December 2016

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1. Introduction

This project report provides additional context to the project results that are presented in the two scientific articles, a policy brief and a handout for businesses (in lieu of the second policy brief) that also are deliverables of the CDKN-funded project “Cooperation among Rwandan businesses for increasing resilience – analysing existing initiatives and scoping potentials” (RSGL-1301).

The report is structured as follows: after a brief introduction on the project and the country context, the approach and key activities are presented before touching upon impact and challenges.

1.1 Scope of the project

The project set out to investigate costs of extreme weather events for small and medium-sized businesses (SME) in Rwanda and to scope in how far collaboration among businesses for increasing resilience is common and reduces costs triggered by extreme weather. Since the highest density of businesses in Rwanda is found in Kigali, it was chosen to focus on extreme events in this city. As flooding triggered by heavy rain is taken to be the type of extreme weather event that causes the highest and most frequent damages, it was decided to focus on this type of event. And since the area of Nyabugogo in the west of Kigali has frequently been affected by flooding in the past years and has a high density of SMEs, this area was selected as a focus for the research efforts (see red rectangle in map below).

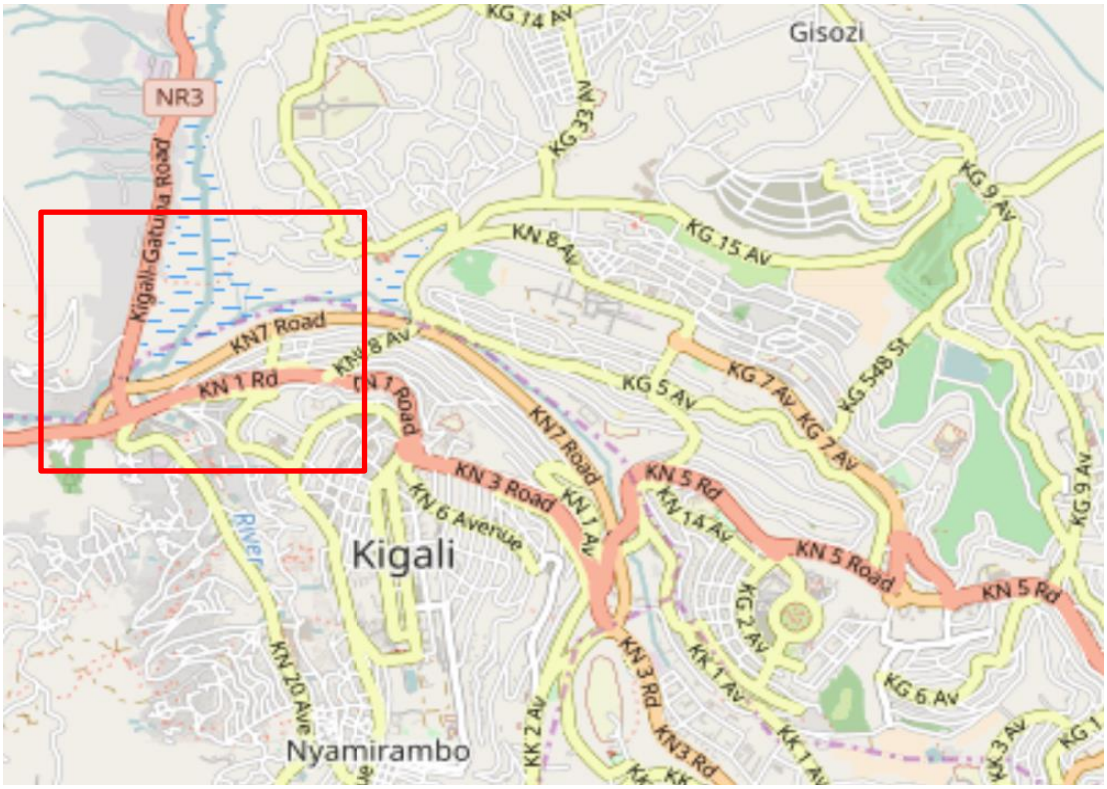

Figure 1: Map of Kigali; Map credits: © OpenStreetMap-contributors, SRTM | red rectangle indicates the Nyabugogo area

1.2 Extreme weather events in Kigali

There is no complete data base with records of all extreme weather events and the damages they caused, however, MIDIMAR keeps track of all disasters in Rwanda that lead to fatalities. Searching for reports on flooding in Kigali (2012/2013) in the archives of the daily newspaper "New Times" can provide a glimpse at the relevance of heavy rain events for the city. While the following table does not constitute a complete list of events, it provides insights into what type of impacts are usually recorded and reported on: fatalities and damages to buildings and infrastructure. Economic cost of damages or consequences for the private sector are usually not reported on.

Type of event	Date	Impacts on society and/ or environment
Pluvial flood	17.04.2012	5 people were killed due to flooding
Pluvial flood	31.10.2012	At least 15 people including a family of four were killed and property was destroyed.
Pluvial flood	24.02.2013	5 people were killed and 270 houses were destroyed; Several trees in the city were felled down crashing onto building and cars; some buildings lost their rooftops.
Pluvial flood	09.09.2013	Some roads in Kigali were swept away or blocked; businesses had to standstill; a couple of roofs were swept off and damaged several businesses; temporarily less access to the Nyabugogo trading center.
Pluvial flood	17.12.2013	Different roads and a few houses were destroyed.
Landslide triggered by heavy rain	06.05.2013	One of Rwanda's most important traffic arteries, the highway from Kigali to Musanze, and from there on to Gisenyi, was completely blocked when a land slide took out half of the road at Gashenyi / Gakenke District.

The determinants of current risk for damages by floods are manifold: the tropical climate with two rainy seasons per year, the hilly topography of Kigali and the wetlands and rivers in the city centre. Next to these environmental factors, the increasing amount of sealed surfaces, the proximity of settlements to rivers and wetlands as well as the insufficient drainage systems are key factors that currently determine the risk for damages by floods in Kigali.

Due to climate change and climate variability, the frequency and intensity of extreme precipitation events in Rwanda are expected to increase. However, Asumadu-Sarkodie et al.[1] mod-

[1] Asumadu-Sarkodie, S., Rufangura, P., Jayaweera, H.M., Phebe, A., 2015. Situational Analysis of Flood and Drought in Rwanda. Int. J. Sci. Eng. Res. 6, 960–970.

elled different future scenarios for flooding and concluded that the main driver of increased flood damage in Rwanda by 2030 will be socio-economic change, whereas climate change only plays a minor role. In 2014, the population of Kigali was estimated to be 1.1 million. According to the Kigali City Master Plan, the city authority expects that this number will increase to approximately 4.2 million inhabitants in 2040. In combination with climate change such a scenario will dramatically increase the assets at risk.

Public officials are aware of the increasing relevance of flood risk, also with respect to impacts for the private sector. The Green Growth and Climate Resilience Strategy (2011) mentions flooding as a key risk and calls for increasing the understanding of how private sector can contribute to climate resilience. The National Disaster Management Policy (2012) also circles out flooding as one of the most relevant disasters and calls for building capacities of businesses to deal with disasters. The Economic Development and Poverty Reduction Strategy 2 (2013) mentions climate change and flooding as important issues to be addressed by different actors in the coming years, the private sector is seen as a key actor for reducing climate change vulnerability; the strategy calls for raising awareness on this issue and demands support for SMEs. REMA has helped reducing risk of damages after floods by introducing laws that restrict settlements in and around wetlands. MIDIMAR has increased capacities for disaster risk reduction among public officials via trainings for disaster management committees on different administrative levels and has raised awareness in the wider public via the annual disaster risk reduction week. The City of Kigali (including the associated districts) has worked mostly on an ad-hoc basis for increasing the functionality of the existing drainage system. So far though, the above mentioned activities have not looked deeper into how flooding affects the private sector and what role this group can play in reducing flood risk.

2. Approach and key activities

At the start of the project, key stakeholders (see Annex 1) were informed via letters or phone calls about the project and its goals, expressing the strong desire for a meeting in order to include their interests and questions in the research design. The responses were fairly limited, some responded with gratitude for being informed about the research efforts but no meetings ensued.

The analysis of literature on estimating costs of extreme weather events for businesses as well as on collaboration for resilience (see both journal articles) provided the basis for the research activities in the project. The analysis on methods for estimating costs revealed, among other things, that few attempts had been made to calculate direct and indirect damages of disasters for businesses in developing countries or emerging economies. The notable exception included assessments of costs for businesses after the flood in Thailand in 2011. Given the context of Kigali with very limited data on flood levels and frequency as well as limited records on the exact amount of businesses in a given area, it was decided that a survey among business owners was the most promising option for gaining insights into both costs of past floods and the role of collaboration among businesses in flood protection.

2.1 Preparing the survey

The survey was prepared along the following steps:

1. The area to be surveyed was defined (see map below) and the number of businesses inside the perimeter was estimated using the independent judgement of two experts (around a 1,000 businesses).

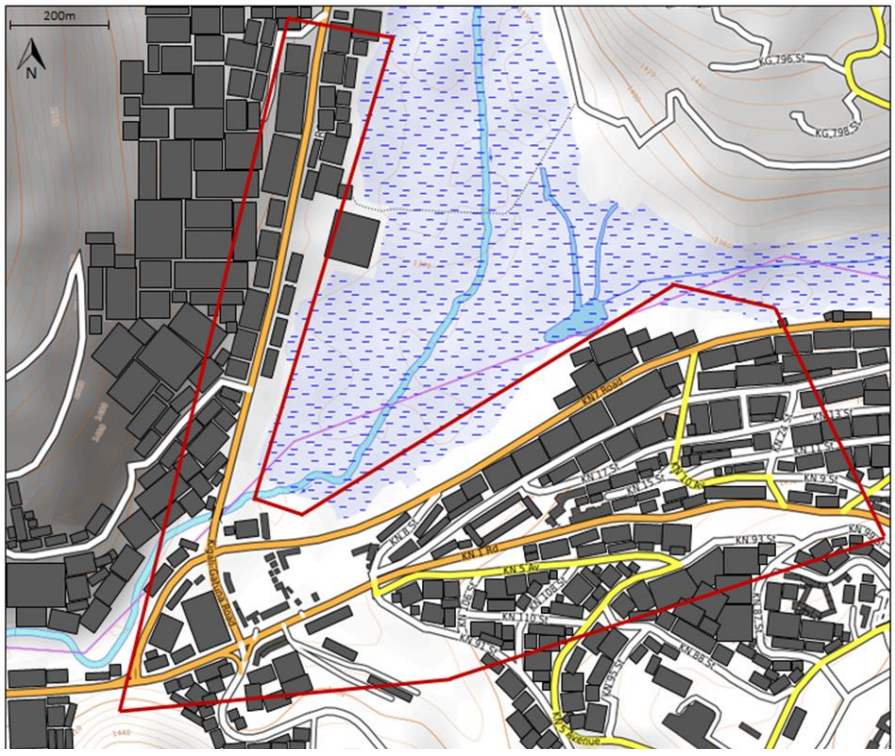

Figure 2: Map of the surveyed area; Map credits: © OpenStreetMap-contributors, SRTM | Map design: © OpenTopoMap (CC-BY-SA) | changes made: Buildings added, individuals buildings are aggregated, area encircled in red shows surveyed area

2. Using Slovin's Formula for determining how large the sample of the survey needed to be in order to allow representative findings for the whole area, it was estimated that between 330 and 360 businesses needed to be surveyed.

3. Two transect walks in the survey area were conducted to observe business types, construction and geographical features (see photos below); informal interviews with randomly chosen business owners were conducted as well.

Figure 4: Clean drainage channel

Figure 3: Littered drainage channel

Figure 6: Common structure of buildings in the area

Figure 5: Slightly damaged drainage channel

Figure 7: Nyabugogo river, photographed towards the east

4. A draft questionnaire was developed jointly by IPAR-Rwanda and adelphi.

5. The draft questionnaire was reviewed by two different experts (Dr. Alfred Bizoza, Dr. Philip Bubeck) and revised afterwards

6. The survey was piloted with business owners just outside of the target area (nine test interviews) and revised thereafter.

7. Guidelines for conducting the interviews were developed to guide the researchers involved in delivering the survey (see Annex 2 for the fieldwork guidelines).

8. The three researchers who were chosen to conduct the interviews were trained for their upcoming tasks.

9. In the course of this training, the questionnaire was finalized together with all researchers involved (see Annex 3 for the final version of the questionnaire). In the end, the questionnaire contained 24 multiple-choice questions with three parts A) general information on the business B) costs of flooding and C) protection measures.

Along the above mentioned steps two key challenges arose:

- To assess the costs of past floods, the type of damages experienced, the determinants of resilience and attitudes towards collaboration, a great number of questions needed to be asked. At the same time, the pilot application of the survey showed that business owners only had very limited time to answer questions and felt reluctant to participate if they were told that the survey took more than ten or fifteen minutes.
- During the pilot application it became apparent that respondents had trouble to remember floods and their impacts if the events were longer than four years ago.

In the face of these two challenges, it was decided to make the questionnaire as concise as possible, only focusing on flooding events from 2012 onwards and only gathering more detailed information with respect to impacts for the flood that had affected the respondents the strongest. Thus, in the course of the development of the questionnaire the number of questions was reduced from over 40 questions with many open answers to 24 multiple choice questions.

Of course it would have been more interesting to collect data on a longer period, e.g. the last ten years, and raise more information on determinants of resilience. But attempting to do this would have entailed two risks: gathering data that was not very reliable because of memory issues of the respondents and not finding enough respondents to complete the questionnaire due to lack of time among respondents for answering a large amount of questions. Only focusing on the most devastating flood for each respondent meant though that not all flood damages over the years would be covered.

During the development of the survey, the City of Kigali was approached again with information about the project and a request for supporting the efforts with an official letter that could be shown to businesses. Officials showed interest in the planned activities and provided such a letter (see Annex 4). Other stakeholders from REMA and MIDIMAR were informed more informally about the efforts.

Overall, the preparation of the survey took a lot longer than initially assumed because of the constant discussion on what questions to include, in what order and with what options for multiple-choice answers. In the end though, the differing views in the project team led to a compact and consistent questionnaire.

2.2 Delivering the survey

Between August and September 2015 the survey was conducted by three trained interviewers who approached 360 businesses overall for face to face interviews using the questionnaire. The researchers task was to approach the business owner or someone who could speak on her or his behalf, they were instructed to return up to three times to request an interview, after the third rejection the business was marked as a non-response. After around five weeks, the interviewers had finished their work with the final result of 355 valid responses (98.6%), all anonymized.

There are some overarching observations from this activity (for more details please see Annex 5 with the observations of each interviewer):

- Gathering the data took much longer than anticipated: it was expected that the survey could have been delivered by three researchers in around two weeks, in the end it took around five weeks. The main reason for this was that business owners were not as approachable as initially assumed: often the interviewers had to wait quite a bit until the owner had time for them, or the survey was interrupted because the owner had to serve clients that had come in. Numerous times interviewers were asked to return on another day but even at the second approach it was not always possible to conduct the interview.
- Overall though, thanks to the tenacity of the interviewers, almost all business owners could be convinced to take part in the survey. Here it showed that the thorough testing of the survey and the shortening of the questionnaire had been worthwhile. Other reasons for the great turnout were the fact that business owners were assured that their responses would be anonymized and that they were going to be used for research that could eventually contribute to improving flood protection in the area.
- The initial plan to record the GPS-coordinates of each business that was surveyed failed because of technical difficulties. Different apps for logging GPS-coordinates

were tested with the interviewers' smartphones but none of the apps proved to be stable, sometimes this seemed due to the smartphones being used, sometimes it seemed that the reason was the shaky reception in the survey area. Not having been able information on the exact location of the businesses is unfortunate as proximity to the Nyabugogo river might be a very relevant information for explaining the amount of damages different businesses suffered. At the same time, not recording GPS-data ensured that the answers could truly be anonymised.

- Raising information on "net profits" of business proved to be difficult: some said that this was a secret while others said that they do not keep track of profits and then – despite explaining our definition of net profits – there seemed to be different notions of what this term referred to. In the end, most respondents could be convinced to choose a bracket of net profits among the multiple-choice answers but given the aforementioned problems, one cannot be certain that all these answers were accurate.
- It could be observed that respondents were fairly familiar with floods and the reasons for their occurrence. Some seemed to be fairly fatalistic about this issue, accepting flood damages as something inevitable when having your business in low-lying areas close to a wetland; others had taken numerous measures to protect themselves and had clear demands for the government on what to do to reduce flood damages.

All 355 filled out questionnaires are being kept at the office of IPAR in Kigali.

2.3 Analysing and disseminating results

After conducting the survey, all questionnaires were entered into an SPSS-database (see annex 6 for all answers). The responses were analysed using cross-tabulations and an ordered logit regression model. The results can be found in all detail in the two journal articles that were produced in the course of this project.

Key findings with about the general situation in the area are the following:

- Most businesses in the area are engaged in car repairs or sale of car spare parts (40% of the 355 businesses), 34.9% sell items for daily use.
- 50% of the businesses have been in the area for more than three years.
- The vast majority of businesses rent their premises (97.5%).
- The area is dominated by truly small businesses: most of them have one employee (31.3%, including the owner) or two employees (46.8%).
- Around 10% of businesses have an insurance that covers flood damages.

Regarding the impact of flooding the following findings are of great interest:

- 88.7% (of the 355 businesses) consider flooding to be the most relevant hazard for them, compared to landslides, windstorms and fire
- 81.1% of the businesses have been affected by flooding at least once in the three years between 2013 and 2015. 185 businesses stated that 2013 had the worst floods for them.
- Among the 288 business affected by flooding, the most common flood damages were damages to items that were supposed to be sold (experienced by 74% of the affected businesses) and damages to the premises (36.8%).
- About 50% of the businesses affected by flooding managed to open again with two days, for 7% however it took at least seven days to open shop again. On average, business took around 2.4 days to recover.
- Looking only at the most severe flooding events for businesses, the total annual flood damage between 2012 and 2015 adds up to around 178,240,000 RWF (243,000 USD), which translates to 620,000 RWF per affect businesses – which exceeds the annual profits of 23% of the businesses in the area.

Looking at flood protection the following results have high relevance:

- 71% of the 355 businesses have taken measures to protect their business against damages from floods in the past, most commonly with flood barriers (45%) or by moving valuable items to higher ground (42%; multiple answers possible).
- Among 29% of businesses who have not undertaken only 18% mentioned that measures are too expensive; 8% stated that they had not time to deal with this issue and 3% said that they lack information on how to protect themselves; thus, lack of money, time or information on flood protection do not seem to constitute relevant barrier for implementing protection measures.
- The most common response for not undertaking any flood protection measures (57%: 58 businesses) was that business owners think that there business will not be affected by floods in the future; the fact that 37 of the business owners who gave this response (63%) had been affected by floods in the past shows that past damages do not necessarily to increasing preparedness.
- With respect to possible future actions that the 355 business owners might take, 61% mentioned that they consider obtaining insurance and 29% stated that they are thinking about relocating their premises to an area with lower flood risk.
- With respect to actions that other citizens and businesses owners in the area should take, 92% said that people should stop throwing garbage onto the streets or into the drainage canals, 78% called for property owners to install private rain water harvesting tank and 72% stated that people should coordinate to implement flood protection measures together (multiple answers possible).
- With respect to actions of the local and central government, 85% of businesses requested an improvement of the drainage system, 78% would like more information on how to protect their premises from floods and 41% called for making insurance products more affordable (multiple answers possible).

Focusing on the issue of collaboration it could be found that among the 355 businesses only few are interested in sharing information on weather forecast or disaster warnings (6%) or on how to protect premises against flooding (10%). Only 11% of businesses had received help in flood recovery from other businesses and about 18% of business owners had helped other businesses in the past, mostly in cleaning up and rebuilding after a flood. Overall, the results indicate that collaboration among businesses in the area did not play a relevant role for resilience of the businesses. One possible explanation is that the businesses survey are relatively small (see above) and thus do not have much capacity to help others if they are also struggling with recovering from flood damages at the same time.

Deeper analysis of the responses showed that:

- Businesses who undertook flood protection measure have suffered significantly less damages than those who have not.
- Especially moving valuable items to higher ground was shown to significantly shorten the time needed to recover from a flood.
- Flood damages in 2013 were higher than in 2014 which could in parts be attributed to the rehabilitation of a large drainage channel in the area between those years since the number of days with heavy rain in both years is fairly similar – however, weather records only stem from one weather station on the other side of the city and do not seem absolutely reliable.

These results and recommendations on how to improve flood protection against the background of the findings were presented and discussed in a workshop with key stakeholders in March 2016. Present were, among others, representatives of REMA, MIDIMAR, FONERWA, City of Kigali and of the business community in Nyabugogo (see Annex 7 for list of participants and photo below). Participants included the Minister of Disaster Management and Refugee Affairs Séraphine Mukantabana and the Director General of REMA, Dr. Rose Mukankomeje.

The results and recommendations were received with much interest and seen as valuable additions for making a strong case for the necessity and value of flood protection in Kigali. Participants were interested in a closer investigation of the physical reasons for flooding as

well as the physical and social reasons for the damages to businesses (why were some businesses affected more than others?). There were demands to look into the ecological damages that flooding causes and to design recommendations for reducing flood risk that are new and well suited to existing framework of policies, plans and strategies. Reasons for being affected were thus analysed more closely in the journal article on the costs of flooding and recommendations for flood protection in the policy paper and the handout for businesses were put even more into the context of past and ongoing initiatives.

Figure 8: Photo of workshop participants at lunchtime

In the time after the workshop, refined research results were shared in conversations with selected business owners in Nyabugogo as well as with policy-makers. However, the final version of the policy brief has not been shared yet as it was not entirely sure yet if the researchers had addressed all valuable comments from CDKN sufficiently at this point in time.

3. Impact and challenges

3.1 Media coverage of results

The project results were also presented to journalists as well. While there is no complete list of articles that covered the results but the following three articles constitute good examples of the coverage.

The newspaper article “Nyabugogo businesses lose Rwf178m to flooding annually, shows survey” (March 2016) from “The New Times” was also published in paper format (see below) and touches on the following findings of the survey:

- 75% of the business premises could not be accessed by customers, while 38% lacked access to electricity.
- More than 80% of the respondents said the flooding experienced in 2013 was the worst in the last three years.
- 71% of 355 businesses have taken measures to protect their businesses against flooding; 28% of businesses said the measures needed to curtail the effects of flooding were too expensive or gave no information on how to deal with it.
- 60% of the respondents proposed seeking insurance, 29% considered relocation of their businesses; 25% mulled over using more water-proof building materials while some mentioned creating portable flood barriers; others called for dumping on streets and drainage channels to be effectively stopped, as well as having an early warning system.


SOCIETY. WHEN A GROWN WOMAN WON'T LEAVE PARENTS' HOME

The New Times

RWANDA'S LEADING DAILY

Made-in-Rwanda is a win for all – Kanimba

Nyabugogo businesses lose Rwf178m to floods annually, says new survey

40% rural water supply systems need revamp, says WASAC

EAC citizens not consuming 'enough' fish, new report says

Mituweli

Ishema ry'umuryango


Nyabugogo businesses lose Rwf178m to flooding annually, shows survey

Rubavu man arrested over conning job seekers

Figure 9: Media coverage of project results from March 17th 2016

The article quotes the minister of MIDIMAR stating that the findings are part of the needed continued efforts to sustain all actions for reducing disaster risks and building disaster-resilient communities. On flood events like the ones analysed in this project, the minister said “The cumulative effect of these small scale event and their recurrent nature, however, if left unattended to, is likely to undermine community resilience to disaster risk.” She added that studies as undertaken in this project are crucial as Rwanda is fast-tracking its development business agenda shaped by a growing number of SMEs. In conclusion, the minister is quot-

ed saying that the findings will awaken business people to consider resilience as a critical aspect of business sustainability.

6 THE NEW TIMES
No. 3946 FRIDAY, MARCH 18, 2016

Editorial

The NewTimes
RWANDA'S LEADING DAILY

At last, Nyabugogo flooding menace being weighed proper

COMES THE rain comes the agony and lamentations as to just when the burden of flooding around Nyabugogo and its environs would be permanently sorted.

Serious efforts were put in redeveloping the major drainage channel to ease clogging but the floods have not entirely abetted in the vicinity.

The result has been continued losses of businesses and profits. A survey on how small businesses in Kigali were being affected by recurrent flooding indicates that traders in the area experienced losses estimated at Rwf178.2 million in direct and indirect damages caused by the floods.

At an estimated total annual profit of Rwf693.1 million, the surveyed businesses reported an annual damage cost of Rwf620,000 per business, way higher than the annual profit margin.

As a result, the researchers warned that small businesses around Nyabugogo River, Gatsata and other water catchment areas in Kigali could face further losses due to flooding if no urgent actions are taken to address the problem.

The survey was an eye-opener, giving an estimate of the reality on the ground. One wouldn't commend the effort more. But is just another step on the rungs of the ladder after reality now before the country revealed that clearing the first rung—the refurbishment of the drainage channel—was not enough to rest the flood menace.

The survey calls for serious charting of ways to check and curb the flooding since measures affected businesses have taken such as creating flood barriers, creating ditches around the buildings and using waterproof building materials are not enough.

But why do these areas flood in the first place? The answers will be a yardstick for measures to be taken. A combination of poor dumping, blocking water channels with structures, congestion and reclamation of water catchment areas, among others, could be some of the human activities to blame.

Figure 10: Editorial in the New Times, March 18th 2016

The following day (March 18th 2016), the same newspaper covered the project results and the issue of flooding in an editorial (see article to the left), stating that the research showed that the efforts in redeveloping the major drainage channel were insufficient so far. The survey was called an eye-opener but only a first step on tackling the serious issue of flooding in Kigali.

The newspaper article "Kigali's endless grapple with floods (April 2016) from "Construction Magazine Rwanda" covered the results of the survey as well, stating the vast majority of the businesses surveyed are calling for an end to the common practice of throwing garbage into the drainage canals and propose to collect rainwater on private premises for reducing run-off.

The newspaper article "Rwanda borrows Rwf 58 billion to fix flooding in Kigali" (September 2016) from "Rwanda Eye" summarizes key findings of the survey and connects the issue of flood damages to the approval for a loan of 58.7 billion RWF for a facelift of the road infrastructure in Nyabugogo. The author expresses the hope that this facelift will greatly reduce future flood damages.

3.2 Impact

As the journal articles have not been published and the policy brief has not been distributed yet, the medium-term impact of the project is difficult to assess. But thanks to the survey, the workshop and media coverage it can be assumed that awareness for the relevance of costs of flooding for businesses in Kigali has increased among policy-makers and business owners as did knowledge about options for reducing such costs.

Regarding the short-term policy-impact of the work it can be assumed that the new plan of the City of Kigali for a rainwater harvesting project in Nyabugogo (see http://www.newtimes.co.rw/section/article/2016-11-25/205675/) was at least in part triggered by the research results that had highlighted both the high economic costs of flooding in that area and the desire of businesses for rainwater harvesting.

The project results had also shown that the refurbishment of one drainage channel in Nyabugogo between 2013 and 2014 had not solved the problem of flooding. This might have contributed to the decision of the Rwandan parliament to approve a loan from a Chinese

bank in September 2016 for renewing the road infrastructure in Nyabugogo (see http://rwandaeye.com/rwanda-borrows-rwf-58-billion-to-fix-flooding-in-kigali/).

Regarding impacts outside of Kigali and Rwanda the researchers believe it is still too early to make any claims.

It should not be left unmentioned that the project activities themselves had negative environmental impacts stemming from travel activities: In the course of the project four flights were taken: one flight Berlin-London return (0.16 t CO_2), and three flights Berlin-Kigali via Istanbul or Brussels return (3 x 0.94 t CO_2) which resulted in overall emissions of 2.98 t CO_2. In line with adelphi's environmental policy these emissions are offset using carbon offsets sold by firstclimate (see https://www.adelphi.de/en/profile/sustainability).

3.3 Challenges

Despite the well-received project results there were some challenges along the way:

- Many deliverables were handed in later than planned; this can mostly be attributed to unfortunate but frequent changes within the project team at adelphi and to communication problems between the project partners.
- The initial focus on collaboration had to be abandoned because the findings of the survey showed that collaboration for resilience could not be observed in relevant ways in the surveyed area. Thus, the researchers did not write a policy brief on collaboration but prepared a handout for businesses on flood protection instead. This was in line with requests made at the roundtable workshop for outputs from the project that are easily accessible to business owners.
- Access to policy-makers was not as good as envisioned: while the attendance at the workshop was excellent, informal meetings were difficult to arrange as policy-makers stated they were very busy with other tasks. The fact that the project consortium consisted of two research organisations (and not one more advocacy-oriented organisation) probably did not help.

3.4 Possible next steps with respect to research activities

Looking forward, it could be of great interest to conduct a similar survey in four or five years to analyse if the planned activities of businesses and the City of Kigali will have led to reductions in costs from flooding. It also would be of interest to take a closer look at some of the flood protection measures that were touched upon in this project (e.g. rain water harvesting or insurance) and analyse their effectiveness and suitable ways for implementation or wider dissemination in the Rwandan context. Last but not least, it seems worthwhile to investigate more deeply how business owners who do not want to engage in flood protection despite having been affected by floods in the past can be convinced that this would be a worthwhile investment.

3.5 Acknowledgements

The researchers want to thank the 355 business owners for taking time out of their busy day to respond to the survey. Furthermore, the project team owes great thanks to Simbisai Zhanje, the CDKN/SSN project officer, for her valuable guidance, for the many insightful comments on draft deliverables and for her patience along the project journey if deliverables were coming in late.

Annex 1: Key stakeholders

INSTITUTION	CONTACT PERSON	TITLE	PHONE NUMBER	EMAIL
MINIRENA	FATINA Mukarubibi	PS	0788305291	fmukarubibi@minirena.gov.rw
MINICOM	Niyonzima Steven	National Coordinator	0788306742	
MIDIMAR	NSENGIYUMVA Jean Baptiste	Director of Risk Reduction and Preparedness Unit	0782169601	
MINECOFIN	Kabera Godfrey	DG NDPR	0788478597	godfrey.kabera@minecofin.gov.rw
MINAGRI	Mr. RURANGWA Raphael	Director general of strategic planning and programs coordination	0788301498	rrurangwa@minagri.gov.rw
REMA	Mr. Faustin Munyazikwiye	Director of climate change	0788462012	remainfo@rema.gov.rw
Rwanda Development Board	Innocent Gashugi	Environmental Impact Assessment	0788521483	innocent.gashugi@rdb.rw
PSF	William BABIGUMIRA	SPIU Director	0789803811	william.babigumira@gmail.com
Rwanda cooperative Agency	Mugabo Damien	Director General	0788301599	
Meteorological Agency	Didace Musoni		252 575813/ 250 86554	meteo@rwandatel1.rwanda1.com
City of Kigali	Fidele Ndayisaba	Mayor	0788302834	rohithpeiris@gmail.com

Annex 2: Fieldwork Manual for Carrying out the Survey

"Strengthening resilience through business collaborations"

Fieldwork Manual – Procedures for Carrying out a Business Survey

August 2015

Dr. Aime Tsinda and Mr. Christian Kind

1. Introduction

This manual sets out how to carry out a quantitative survey for businesses. It is a practical guide setting out to what to do while conducting interviews in the field. The survey itself is a highly important part of the research project "Strengthening resilience through business collaborations" that is implemented by IPAR and adelphi (an applied research institute, based in Berlin, Germany), funded by the Climate and Development Knowledge Network (CDKN). The project´s goal is to determine how businesses in Rwanda are affected by extreme weather events and in how far collaboration among businesses can strengthen their resilience.

The results of the survey will form the basis for many activities in the project; it is an essential instrument in the project for determining how businesses are affected by one of the most relevant extreme weather events, flooding. The goal is to survey 360 businesses in total.

2. Preparing for the fieldwork

The survey will be carried out by three research assistants from IPAR (Josephine, Linda and Didier) using the pre-tested questionnaire. The goal for each research assistant is to survey 120 businesses. The research assistants need to familiarise themselves with the questionnaire, ensure that they understand all questions and multiple choice answers and are comfortable in asking all questions in Kinyarwanda. It will be carried out in western parts of Kigali, in the area around the Nyabugogo river and Gatsata. The area to be surveyed is divided into three parts, each part will be covered by one research assistant:

Zone J for Josephine, there the questionnaires will be coded with the serial number J1 to J 120

Zone L for Linda, there the questionnaires will be coded with the serial number L1 to L120

Zone D for Didier, there the questionnaires will be coded with the serial number J1 to J 120

You should code all the questionnaires **before fieldwork starts**. The serial number should be entered on each questionnaire on the first page on the top right corner.

Before you start fieldwork read the questionnaire very carefully and make certain you are familiar with it. If you have any questions or queries make certain you ask your supervisor Dr. Aime Tsinda and make sure that you understand the answer.

Every research assistant is requested to report weekly in person to the IPAR office on what was done each day and to hand over the filled out questionnaires. This should be addressed to Dr. Aime Tsinda for quality assurance.

3. Fieldwork Timetable

Fieldwork starts on Monday the 17th of August 2015 and should be completed by the 28th August 2015 at the latest. Research assistants can work on the weekend as well, if they expect the availability of businesses to be high during that time.

4. In the Field

There are a number of important things to consider while carrying out the fieldwork.

5. Health and Safety

When you are doing fieldwork you must take a number of precautions. For this project you should do the following:

1. Always leave written information to friends, family or colleagues to where you are interviewing and between what times every day;
2. At the end of every day when you are leaving the field notify your supervisor Dr. Aime Tsinda by a text message or phone call (# 0788 305 960);
3. Avoid interviewing after dark. If you need to interview after dark you should ask one of the other team members to accompany you;
4. Always carry a mobile phone with you so that you can make a call in an emergency;
5. If you become concerned about your safety phone someone and then leave the area as quickly as you can;
6. Do not carry anything that looks worth stealing or more money than you need for your use;
7. Carry a bottle of water with you and make certain you do not get dehydrated;
8. If it is very hot bring a hat or something else to shade your head;
9. Eat light meals at regular intervals. Bananas are good for keeping energy up. Avoid sweets and sugary drinks they do not help with sustaining energy levels.

6. Sampling: How to select the businesses you will interview

Each research assistant has a dedicated zone in which only he or she will be conducting interviews. In your zone pick, a random starting point and from there on approach every second (Didier and Linda) or every fourth business (Josephine). If you come across stairs that lead upstairs to more businesses (in a two or more storey building), follow the stairs and keep approaching business that you come across in the specified frequency. Once you have come to the end of the highest level return downstairs to the street and continue your work in the direction you have chosen.

Please remember:

1. Interview informants only at your zone;
2. Once you have completed an interview, make certain you do not interview that business again;

7. Interviewing

All questionnaires must be fully completed. The questionnaire has two parts: Part A must be filled out before each interview starts. In part A it is necessary to record GPS coordinates and other related information before the administration of the questionnaire using the dedi-

cated smartphone app. In Part B all questions must be answered according to the information given by the respondent.

Present yourselves as independent researcher from IPAR-Rwanda doing research in collaboration with the City of Kigali (Have a letter of introduction with you).

Explain that you are interviewing businesses about the impacts of extreme weather events such as flooding. Also say that we hope the findings from the research will enable us and the city of Kigali to increase their protection against flooding in the future.

If a business refuses to take part in the survey, please be creative and insistent to convince them to take part anyways. We count on your ingenuity and persistence to receive a high participation rate in the survey. Please make use of a combination of the following (and other) arguments for convincing businesses to take part in the survey:

- All data will be anonymised and treated confidentially; we are not recording any names.
- This is an important research project that is fully supported by the City of Kigali.
- Providing information will help the City of Kigali to protect businesses better from future flooding.
- Many other businesses have already taken part in the survey.
- The survey does not take up a lot of time, only around ten minutes.
- If they are busy at the moment, ask them when would be a good time for you to come back.

If you have tried very hard, again and again, to convince the respondent to answer the survey but they still refuse – as the very last option – mark the the questionnaire as “REFUSAL” and move on to the next business.

Note that while you are conducting interviews you should put your mobile phone to silent mode. You should concentrate on your informants, maintain eye contact with them and use non-verbal cues to keep the conversation going. All interviews should be held where you can hear your informants well and are least likely to be disturbed.

Ask the questions and present the multiple-choice answers as written on the questionnaire. If the informant does not seem to understand what you are asking repeat the question and answers more slowly**.**

Try to encourage respondents to answer all the questions. Only record a no reply or refusal if the respondent is clearly not prepared to answer.

Make certain you keep the completed questionnaires with you at all times when you are in the field. Do not lose any questionnaires.

8. Return from the field

When you return from the field make certain that the completed questionnaires are stored in a secure location. Please try to return the complete questionnaire to your supervisor at IPAR as frequently as possible.

9. Quality assurance

The supervisor will spend three or four days on quality assurance, in the following ways

1. Check the completed questionnaires and mark for rejection those that are incomplete (more than 10%) of questions or have more than 10 percent of questions wrongly completed that cannot be reconciled (inconsistencies in responses, incorrect number entered**). (Rejected questionnaires are recorded as non-response and there is NO replacement)**. Speak to any interviewer(s) whose work is not up to standard and remind them of what is expected;
2. Do a 10% call back, in person, to check that the businesses on the questionnaire were actually interviewed.
3. Once the QA checks have been completed ensure that the questionnaires are placed in a secure location. Research assistants are requested to deliver the completed questionnaire to IPAR-Rwanda at regular intervals during the data collection stage.

Annex 3: Questionnaire

A. To be filled out by the Research Assistant before the start of the interview

District : ……
Sector : ……
Cell : ……
Village : ……

Date of the interview (DD/MM): _____ / _____

Location of business (GPS-coordinates): latitude: - 1.9 _ _ _ _ _ longitude: 30.04 _ _ _ _ _

ACTION: log the GPS location with the dedicated app and tag the place with the interview number

1. What is the **main activity** of the business? (Please circle **one**).
1.1. Retail daily use times (Mini market with food / small items for daily use, mobile phone kiosk, pharmacy, clothes and textiles)
1.2. Retail car items (gas station, spare parts for cars)
1.3. Retail construction items (selling of furniture, tools, doors, windows, paints, cement)
1.4. Wholesale of food in large quantities (very large bags of food and produce like beans or maize)
1.5. Services (for example, car repair, hair salon, travel agency, transport, real estate, business services, health services, education)
1.6. Hotel and restaurants (including bars)
1.7. Insurance and banks
1.8. Manufacturing (for example building furniture)

2. Which of the following describes the building, in which the business is located, best? (Please circle **one**).	
2.1. Small one-storey house with one business only	2.3. Small two- or three-storey building with one business
2.2. Large one-storey building with multiple businesses	2.4. Large building with multiple businesses and two or more storeys

3. What describes the location of the business within the building best? (Please circle **one**).	
3.1. Street level and front entrance	3.3. Upper level
3.2. Street level and back entrance	

"Good morning / afternoon. My name is _____ and I am a research assistant at the Institute for Policy Analysis and Research (IPAR) Rwanda. I am working on a research project in collaboration with the City of Kigali (ACTION: show the letter). We would like to seek your assistance by answering the questions below to the best of your knowledge. We kindly request you to take part in this questionnaire survey. The objective of the study is to better understand how businesses in Kigali are affected by floods in order to develop measures that can support businesses in dealing with such events – to minimise future costs. The questionnaire will take approximately 10 minutes to complete, and we acknowledge your kind contribution in this regard. Rest assured that all information gathered from you will be anonymised and treated with the utmost confidentiality."

B. Questions to be answered by the respondent

4. What is your role within the business? (Please circle **one**).	
4.1. Owner	4.3. Temporary employee (only occasionally working here, or family member)
4.2. Regular employee	

5. How many years has the business been in operation in this location? (Please circle **one**).	
5.1. Less than 1 year	5.3. Between 2 and 3 years
5.2. Between 1 and 2 years	5.4. More than 3 years

6. What is the current occupancy status of the house or apartment that the business is operating in? (Please circle **one**).	
6.1. The business owner owns the premises.	6.2. The premises are rented.

7. How many permanent employees does the business have (including yourself)? (Circle **one**).	
7.1. 1 employee	7.4. 6 to 10 employees
7.2. 2 employees	7.5. 11 to 20 employees
7.3. 3 to 5 employees	7.6. More than 20 employees

8. What is the approximate <u>monthly</u> revenue / net profit from the business (amount of money that stays with the owner after expenditures for the month have been paid for? (Please circle **one**).	
8.1. Less than 10,000 RWF	8.4. Between 100,001 and 500,000 RWF
8.2. Between 10,000 RWF and 50,000 RWF	8.5. Between 500,001 and 1,000,000 RWF
8.3. Between 50,001 RWF and 100,000 RWF	8.6. More than 1,000,000 RWF

9. Please tell me which of the following disasters is the most dangerous for your business (Please circle **one**)?	
9.1. Fire in the building	9.3. Land slide
9.2. Flood	9.4. Windstorms

10. Since 2013, how often has the business been affected by flooding? (Please put one X in each line)

If business has not been affected by flooding go to Question 18

	0 times	1-2 times	3-4 times	5-8 times	More than 8 times
10.1. In 2013?					
10.2. In 2014?					
10.3. In 2015?					

11. When did the flood happen that affected the business the strongest (since 2013)?

	Month (MM)	Year (YYYY)

12. For the flood event you just mentioned, please tell me what types of physical damages the flood caused for the business? (Please circle **all that are applicable**)

12.1. Damage to premises (e.g. the door or walls of the building were damaged)

12.2. Damage to equipment or machinery (e.g. cash register or tools were damaged)

12.3. Damage to production inputs (e.g. wood that was supposed to be processed was damaged)

12.4. Damage to items that were supposed to be sold (e.g. furniture in furniture store was damaged)

13. What are the approximate costs caused by all these physical damages to the business (for example for repairing the building or replacing damaged machinery, etc)? (Please circle **one**).

13.1. Less than 100,000 RWF

13.2. Between 100,000 RWF and 500,000 RWF

13.3. Between 500,001 RWF and 1,000,000 RWF

13.4. Between 1,000,001 RWF and 5,000,000 RWF

13.5. Between 5,000,001 RWF and 10,000,000 RWF

13.6. Between 10,000,001 RWF and 20,000,000 RWF

13.7. More than 20,000,000 RWF

14. For the flood you just mentioned, please tell me in what other ways it affected the business affected? (Please circle **all that are applicable**)

14.1. Lack of electricity

14.2. Lack of water

14.3. Production inputs or products for sale did not arrive at the business

14.4. Manufacturing of products interrupted

14.5. Staff (including business owner) suffered

14.6. Sale of products had to be interrupted

14.7. The premises could not be accessed, neither by customers nor by employees

14.8. Employees did not have time to come to work because of illness or having to take care of flood damages at their home

from health problems

15. How many days could the business not operate as usual during and after the flood you mentioned? (please circle **one** answer)

15.1. Less than 1 day
15.2. 2 days
15.3. 3 days
15.4. 4 to 5 days
15.5. 6 to 7 days
15.6. 8 to 15 days
15.7. More than 15 days

16. How much revenue / net profit could you have made in these days that you could not operate as usual? (Please circle **one**).

16.1. Less than 1,000 RWF
16.2. Between 1,000 RWF and 10,000 RWF
16.3. Between 10,001 RWF and 50,000 RWF
16.4. Between 50,001 RWF and 100,000 RWF
16.5. Between 100,001 RWF and 500,000 RWF
16.6. Between 500,001 RWF and 1,000,000 RWF
16.7. More than 1,000,000 RWF

17. Who supported you in coping with the impacts of the flood, e.g. by lending money, helping to clean up or providing construction material? (Please circle **all that are applicable**)

17.1. Family and friends
17.2. Neighbouring businesses
17.3. Local government
17.4. Industry or business associations
17.5. Insurance
17.6. Bank
17.7. Central government

18. Have any of the following measures been implemented to protect the business against flooding? (Please circle **all that are applicable**).

If response=18.9 go to Q19, else (18.1 to 18.8) go to Q20

18.1. Moving production inputs, machinery or products permanently higher above ground
18.2. Creating a ditch around the building
18.3. Creating a flood barrier (e.g. building a small wall, sand bags)
18.4. Using more water-proof building materials, such as ceramic or concrete
18.5. Storing important goods at a different location that is less flood-prone
18.6. Obtaining an insurance (e.g. standard property insurance, business insurance)
18.7. Relocation of the business premises
18.8. No measure was taken

19. If you have not taken any measure to protect your business, please indicate why? (Please circle **all that are applicable**)

19.1. Do not foresee any future floodings
19.5. Lack of information on how to pro-

to affect the business

19.2. Impacts of flooding are not significant enough to take action

19.3. Measures are too expensive

19.4. No time to deal with this issue

tect the business

19.6. Lack of know-how to implement the measures

19.7. Other, please specify:

20. What are measures for protecting the business from flooding that have not been implemented in the business but that you might consider to implement? (Please circle **all that are applicable**)

20.1. Moving production inputs, machinery or products high above the ground

20.2. Create a ditch around the building

20.3. Creating a flood barrier (e.g. building a small wall, sand bags)

20.4. Using more water-proof building materials, such as ceramic or concrete

20.5. Storing important goods at a different location that is less flood-prone

20.6. Obtaining an insurance (e.g. standard property insurance, business insurance)

20.7. Relocation of the business premises

20.8. Other, please specify:

21. What useful actions should citizens and other businesses take to reduce the danger and costs of flooding to your business? (Please circle **up to three that are applicable**)

21.1. Stop cutting trees on the hills

21.2. Stop throwing garbage on the street or into drainage canals to avoid clogging them

21.3. Collect rain water in tanks on each premise to reduce overall run-off

21.4. Implement flood protection measures together (e.g. digging a ditch together or building a flood wall)

21.5. Help neighboring businesses if they have been affected by flooding (e.g. provide help when cleaning up or providing a small loan)

21.6. Share information on weather forecasts and disaster warnings

21.7. Share information within the community on how to protect premises against flooding

21.8. Other, please specify:

22. What useful actions should the local government or the central governments take to reduce the danger and costs of flooding to your business? (Please circle **up to three that are applicable**)

22.1. Provide more information on how to protect premises against flooding

22.2. Provide portable flood barriers (for example sand bags)

22.3. Provide early weather warnings by SMS

22.5. Provide loans if businesses have been negatively affected by flooding (for example to rebuild premises)

22.6. Improve the drainage system

22.7. Reforest certain areas

22.4. Provide loans for making buildings more protected against floods	22.8. Make insurance more affordable

23. In the last three years, have you helped other fellow businessmen to deal with flooding with one of the following actions? (Please circle **all that are applicable**)

If response=23.9 stop the interview and thank the respondent, else (23.1 to 23.8) go to Q24

23.1. Shared information on how to protect premises from flooding	23.6. Shared means of transportation, for example for transporting goods of other businesses
23.2. Shared weather or disaster warnings	23.7. Collect rain water in tanks or buckets on my premises to reduce overall rainwater run-off
23.3. Helped to build protection for securing their premises against floods (for example digging a ditch together)	23.8. Provided a loan
23.4. Helped them to clean up and rebuild their premises after a flood	23.9. Never provided help
23.5. Shared production materials or machinery that other businesses needed	

24. What was your main motivation for helping other businesses? (Please circle **one**)

24.1. They are my friends or family.	24.4. It is the right thing to do.
24.2. They have helped me in the past.	24.5. I received compensation (money) for helping them.
24.3. I am hoping that now they will help me in the future.	

Thank you very much for your time and support!

Annex 4: Letter of support from Mayor of Kigali

Republic of Rwanda
City of Kigali

Ref. n° 0350./07.01.02/15

Kigali, 05/08/2015

Executive Director
Institute of Police Analysis and Research (IPAR)
KIGALI

Dear Madam,

Re: Your request for collaboration

Reference is made to your letter dated 7th July 2015 requesting for collaboration with the City of Kigali on your planned activities related to a survey to be conducted in catchment area of Nyabugogo-Gatsata-Kimisagara-Gitikinyoni for the project "Building resilience in Rwanda through business collaboration";

We welcome this important opportunity and initiative and the City of Kigali has the pleasure to extend its collaboration for it as we do appreciate the valuable achievements we realized with IPAR and envisage more in different researches.

Please accept the assurance of our highest consideration.

Sincerely Yours,

NDAYISABA Fidèle
Mayor of the City of Kigali

Annex 5: Observations of researchers

Preliminary remark: the following sections contain the observations of the three researchers from the delivery of the survey, the remarks are unedited.

NAME OF RESEARCH ASSISTANT: UWAMAHORO LINDA

AREA OF DATA COLLLECTION: GATSATA

Businesses styles and construction features;

The common business done in Gatsata is selling of cars and motorcycle spare parts. These businesses are mostly done in small shops that are located on roadside. Based on my observation most these small shops have been there for the past 10 years, therefore they are too old and not protected from floods.

Housing construction materials (provides insight into materials available for dealing with hazards)

The shops were the businesses are carried are too old like mentioned above, but a large number of business owners in the area took measures like constructing a wall that prevents water from entering their shops during the rainy season.

The geographic features in the area available are swamps near the Gatsata bridge; these swamps are usually filled with water during the rainy reason.

The challenges faced in the data collection were the following:

- New owners business that had been working from Gatsata for less than one year

- Resistance: The respondents resisted at first thinking am Rwanda revenue employee in charge of tax collection but I talked to them and convinced them by telling them we(IPAR) were working with the city of Kigali and we were collecting information to find solutions of the disaster in their area thus (flooding).

What do you think we need to take into consideration in the qualitative research?

While conducting the quantitative research a group of citizens who live in the area should be interviewed not only the people who work there because the citizens of Gatsata are more affected by floods.

Anything in relation to the research project

Generally the respondents had the same main challenge which is lack of proper drainage system. Most of the respondents said that the only solution to their problem of being affected by floods can be solved by construction a drainage system.

Conclusively the data collection was carried out well, **I did not deal with any refusals**, the respondents were cooperative and so helpful, they answered all the questions as asked because most of them were aware of flooding.(most of them were affected by flooding)

NAME OF RESEARCH ASSISTANT: Didier

AREA OF DATA COLLLECTION: Catchment Gitikinyoni and Kimisagara

I did 120 questionnaires. 3 respondents were totally reluctant. This means that I administered 117 questionnaires.

My observations

- Most of business construction features that I interviewed, majority houses were of small one storey, made of bricks and others with mud especially the part of GITIKINYONI. Majority of these shops construction are not able to deal with flood or any other hazards.
- Some available rain gutters to evacuate runoff need to be maintained (rehabilitation and removal of different garbage that are stopping water to pass). And also enlarged.
- Concentration of houses settled on hills around Nyabugogo is the main cause of runoff. And due to incapacity of available rain gutters to evacuate this run off, this lead to flooding.

Other flood damages observations included:

1. Road and rain gutters destructions due to flood strength;
2. Traffic jump;
3. Extra costs to cleaning up water flows inside building.

Some people's opinions and suggestions

- Some people especially street vendors throw wastage through existing rain gutters. Others take advantage of rain falling where they throw the wastage from their home into water channels to avoid payments. As consequence this action brocks the rain water to pass.

- All these useful actions are not sustainable but firstly relocate people on high risky zone and reforest the area up there. And also enlarge these existing rain gutters. This is effective and sustainable measure. Or if people remain there on up hills, enlarge rain gutters, and oblige them, all to have tanks, and gutters have to be constructed around the buildings.

-Weather forecast conditions on public screen where everyone will know what is going to happen watching those screen.

-Rehabilitate, strengthen and maintain existing bridges and rain gutters.

-Stop digging stones on the hills that were holding the soil there.

Problematic of net profit: some answers

1. Employee: Some employees would reply that: "I'm not concerned and not right person to ask. I don't care about that I only care on my monthly salary".

2. Owners: Some blamed EBM(Electronic Bill Machine). They said that soon they will close the business. For others they could say that it is a great secret. They can't reveal to any one even their siblings. Some could have doubt saying that what if I'm investigating them. And some others don't count. They make profit by adventure. They don't do any accounting to show that they made a profit or loss.

Research assistant: Kaitesi Josephine

Working area: Nyabugogo

- Observations in terms of

Businesses styles and construction features: Most of the houses in my working area were strongly built by sand and bricks and had metallic doors and their walls were painted. These houses are large buildings with one, two or more storeys with multiple businesses. Around the car park were also small storey house made of metals and iron sheets which were painted by the yellow colour.

Generally the respondents reported that their houses are not a threat because they are strong but during rainy season (flooding), water is always passing through their door way so most of them decided to put flood barriers i.e built a small wall in front of their entrance to the business houses so that they can prevent water from entering their premises.

Geographical features such as slopes, swamps (propensity to flooding):

Most of the respondents reported that Nyabugogo is in a valley and that is why flooding will always affect people's business. Besides Nyabugogo being a valley, on its slopes are poorly planned settlements and people who are settled on the slopes never collect rain water in tanks on each premises to reduce overall run off hence this increase flooding.

Availability of pipes for evacuating runoff, vegetation, etc

Trenches in Nyabugogo were enlarged and increased so this reduced the effect of flooding in this area.

Resilience capacity and coping strategies (People and Buildings): Most of the business buildings in Nyabugogo had flood barriers i.e. building a small wall in front of the door way so that in case of flooding, sales are not affected by water. Also in some business buildings, by the use of timber/wood, production inputs, machinery or products are permanently higher above the ground. Some few people obtained insurance and many other people are also planning on obtaining one.

Process of data collection

What I like is the availability of the respondents. The respondents were available and I did not waste time looking for them because they were always in their businesses. Secondly, I got to know more about Nyabogogo and several businesses that take place around that area.

The challenges

Data collection was time consuming than expected. This was because the business men and women were always busy attending to their clients so giving you 20 minutes to conduct an interview was not easy. A time they could tell you to wait until the client goes and when he/she goes another one would come immediately and you could continue waiting until no more clients. Other times they could tell you to come the next day.

Sunshine was hitting so much .

Are the respondents reluctant to answer questions?

It was **only 2 respondents out of the 120 respondents** that were reluctant to answer the questions. The 118 respondents were all willing to answer the questions.

What strategies used so that they answer your questions:

Firstly I would introduce myself by names and institution I am working for (IPAR). Secondly, I would tell them the objective of the study was to better understand how businesses in Kigali

are affected by floods in order to develop measures that can support businesses in dealing with such events in order to minimize future costs.

I assured them that their responses will be treated in a strictest confidence and there was no need for mentioning their names.

I told them the questionnaire will take approximately 10 minutes so I had to put questions in a straight forward clear and non threatening way so that they don't get confused.

Also I would build rapport so that the communication process becomes easier and more effective. I used to listen more that speaking and showed them that I am enjoying the inter-view by varying my voice and facial expression.

What do you think we need to take into consideration in the qualitative research?

During qualitative research, we should put in mind that we are dealing with business people who value their time and the research will consume a lot of time.

Overall question: Are businesses aware of the risk caused by extreme weather events (flooding for example)?

Yes all businesses were aware of the extreme weather events mostly flooding because flooding is affecting these people directly and with the exception of 2015, in all the past years, flooding used to affect the people of Nyabugogo badly. Some business men reported that they were planning to shift (relocate the premises) because they have a cooperative for business men and they are building a business house at Mulindi.

Annex 6: Answers to the questionnaire (frequency tables)

Below are the answers provided by the respondents to the questions in the survey. The tables are exports from SPSS; the full dataset is also available as .sav-file, compatible with most statistics softwares.

What is the main activity of the business?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Retail daily use (Mini market with food/ small items for daily use, Mobile phone kiosk, pharmacy, clothes and textiles)	124	34,9	34,9	34.9
	Retail car items(gas station,spare parts for cars)	142	40.0	40,0	74.9
	Retail construction items (selling of furniture,tools, doors, windows, paints,, cement)	9	2.5	2,5	77.5
	Whole sale of food in large quantities(very bags of foods and produce like beans or maize)	27	7.6	7,6	85.1
	Services(for example, car repair, hair salon,travel agency, transport, real estate, business services,,health services, education)	12	3.4	3,4	88.5
	Hotels and restaurants(including bars)	15	4.2	4,2	92.7
	Insurance and banks	2	.6	0,6	93.2

	Manufacturing(for example building furniture)	24	6.8	6,8	100.0
	Total	355	100.0	100,0	

Which of the following describes the building, in which the business is located, best

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Small one-storey house with one business only	180	50.7	50,7	50.7
	Large one storey building with multiple businesses	106	29.9	29,9	80.6
	Small two-or three storey building with one business	21	5.9	5,9	86.5
	Large building with multiple businesses and two or more storeys	48	13.5	13,5	100.0
	Total	355	100.0	100,0	

What describes the location of the business within the building best

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Street level and front entrance	267	75.2	75,2	75.2
	Street level and back entrance	79	22.3	22,3	97.5
	Upper level	9	2.5	2,5	100.0
	Total	355	100.0	100,0	

What your role within the business?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Owner	240	67.6	67.6	67.6
	Regular employee	105	29.6	29.6	97.2
	Temporary employee(only occasionally workimg here, or family member)	10	2.8	2.8	100.0
	Total	355	100.0	100.0	

How many years has the business been in operation in this location?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1year	41	11.5	11.5	11.5
	Between 1 and 2 years	83	23.4	23.4	34.9
	Between 2 and 3 years	55	15.5	15.5	50.4
	More than 3 years	176	49.6	49.6	100.0
	Total	355	100.0	100.0	

What is the current occupancy status of the house or apartment that the business is operating in?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	The business owner owns the premises	9	2.5	2,5	2.5
	The premises are rented	346	97.5	97,5	100.0
	Total	355	100.0	100.0	

How many employees does the business have(including yourself)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1employee	111	31.3	31,3	31.3
	2employees	166	46.8	46,8	78.0
	3 to 5 employees	57	16.1	16,1	94.1
	6 to 10 employees	11	3.1	3,1	97.2
	11 to 20 employees	8	2.3	2,3	99.4
	More than 20 employees	2	.6	0,6	100.0
	Total	355	100.0	100.0	

What is your approximate annual revenue/ net profit from the business(Amount of money that stays with the owner after expenditures for the month have been paid for)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 10,000frw	15	4.2	4,2	4.2
	Between 10,001 and 50,000frw	62	17.5	17,5	21.7
	Between 50,001 and 100,000 frw	104	29.3	29,3	51.0
	Between 100,001 and 500,000 frw	146	41.1	41,1	92.1
	Between 500,001 and 1,000,000frw	4	1.1	1,1	93.2
	More than 1,000,000frw	3	.8	0,8	94.1
	Refused	13	3.7	3,7	97.7
	Don't know	8	2.3	2,3	100.0
	Total	355	100.0	100.0	

Please tell me which of the following disasters is the most dangerous for your business

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fire in the building	33	9.3	9,3	9.3
	Flood	315	88.7	88,7	98.0
	Land slide	3	.8	0,8	98.9
	Windstorms	4	1.1	1,1	100.0
	Total	355	100.0	100.0	

In 2013, how often the business has been affected by flooding?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0times	147	41.4	41,4	41.4
	1-2 times	183	51.5	51,5	93.0
	3-4 times	25	7.0	7,0	100.0
	Total	355	100.0	100,0	

In 2014, how often the business has been affected by flooding?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 times	194	54.6	54,6	54.6
	1-2 times	154	43.4	43,4	98.0
	3-4 times	7	2.0	2,0	100.0
	Total	355	100.0	100,0	

In 2015, how often the business has been affected by flooding?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 times	314	88.5	88,5	88.5
	1-2 times	40	11.3	11,3	99.7
	3-4 times	1	.3	0,3	100.0
	Total	355	100.0	100.0	

When did the flood happen that affected the business the strongest? (since 2013)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	355	100.0	100.0	100.0

When did the flood happen that affected the business the strongest? (since 2013)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2012	2	.6	0,7	.7
	2013	186	52.4	64,6	65.3
	2014	89	25.1	30,9	96.2
	2015	11	3.1	3,8	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

For the flood you just mentioned, please tell me what types of physical damages the flood caused for the business?(to circle all that are applicable)

		Frequency	Percent
Missing	System	355	100.0

Damages to premises(e.g. the door or walls of the building were damaged)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	106	29.9	36,8	36.8
	No	182	51.3	63,2	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Damages to equipment or mashinery (eg. cash register or tools were damaged)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	54	15.2	18,8	18.8
	No	234	65.9	81,3	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Damages to production inputs (eg. wood that was supposed to be processed was damaged)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	9	2.5	3,1	3.1
	No	279	78.6	96,9	100.0
	Total	288	81.1	100.0	

Missing	System	67	18.9		
Total		355	100.0		

Damages to items that were supposed to be sold (eg. furniture in furniture store was damaged)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	213	60.0	74,0	74.0
	No	74	20.8	25,7	99.7
	4.00	1	.3	0,3	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Other damages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	48	13.5	16,7	16.7
	No	240	67.6	83,3	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Other damages (Specification)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	310	87.3	87,3	87.3

Costs of cleaning up because the whole area was full of solid waste.	1	.3	0,3	87.6
up because the whole area was full of solid wastes.	1	.3	0,3	87.9
Destruction of gutters here	1	.3	0,3	88.2
Dirty water that entered the business and needed to be cleaned up.	1	.3	0,3	88.5
It destroyed the road	1	.3	0,3	88.7
Lagage(bags) of clients were all filled with water and were spoilt	1	.3	0,3	89.0
olid waste that need to be cleaned	1	.3	0,3	89.3
Our whole verander was ful of solid wastage and costed us money to buy detergents	1	.3	0,3	89.6
Road destruction	2	.6	0,6	90.1
Road has been damaged	1	.3	0,3	90.4
Road has been destroyed	1	.3	0,3	90.7
Road was negatively affected	1	.3	0,3	91.0
Roads and water entered our business that needed to be cleaned up	1	.3	0,3	91.3
Roads destruction	3	.8	0,8	92.1
Roads flooded	2	.6	0,6	92.7

Roads were all flooded and we could not get clients	1	.3	0,3	93.0
Roads were flooded	1	.3	0,3	93.2
Roads were flooded and this hindered the coming of clients	1	.3	0,3	93.5
Roads were flooded and we couldnt get clients	2	.6	0,6	94.1
Roads were full of water and clients would not access our business	1	.3	0,3	94.4
Rubbish around the business that needed to be cleanedup	1	.3	0,3	94.6
Solid waste entering business that need to be cleaned up.	1	.3	0,3	94.9
Solid waste in the business that needed to be cleaned.	1	.3	0,3	95.2
Solid waste that entered the house that needed cleaning	1	.3	0,3	95.5
Solid waste that lead to costs of buying detergents to clean up.	1	.3	0,3	95.8
Solid waste was allover the working area	1	.3	0,3	96.1
Solid wastes and dust that needed to be cleanedup.	1	.3	0,3	96.3
Solid wastes entered business which needed cleaning up	1	.3	0,3	96.6

Solid wastes that lead to costs of cleaning up.	1	.3	0,3	96.9
Solid wastes that needed to be cleaned up	1	.3	0,3	97.2
Solid wastes that needed to be cleanedup.	1	.3	0,3	97.5
Solid wastes which lead to costs of cleaning up	1	.3	0,3	97.7
The parking yard of city valley hotel was full of water and solid waste that needed to be cleaned	1	.3	0,3	98.0
The road was destructed	1	.3	0,3	98.3
The whole area up to our door was full of solid waste	1	.3	0,3	98.6
Traffic jumb and vehicles could not pass	1	.3	0,3	98.9
Water flows and I paid money for cleaning up	1	.3	0,3	99.2
Water on the verander that needed to be cleanedup	1	.3	0,3	99.4
Whole area was flooded and they couldnt get clients	1	.3	0,3	99.7
Working area got dirty and we had to cleanup	1	.3	0,3	100.0
Total	355	100.0	100,0	

What are the approximate costs caused by all these physical damage to the business(for example for repairing the building or replacing damaged machinery,etc)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 100, 000 frw	133	37.5	46.2	46.2
	Between 100,000 and 500,000frw	62	17.5	21.5	67.7
	Between 500,001 and 1,000,000 frw	28	7.9	9.7	77.4
	1,000,001 rwf and 5,000,000frw	38	10.7	13.2	90.6
	Between 5,000,001 and 10,000,000	1	.3	.3	91.0
	Not declared	26	7.3	9.0	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

For the flood you just mentioned, please tell me in what other ways it affected the business affected ?

		Frequency	Percent
Missing	System	355	100.0

Lack of electricity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	111	31.3	38.5	38.5
	No	177	49.9	61.5	100.0
	Total	288	81.1	100.0	

Missing	System	67	18.9		
Total		355	100.0		

Lack of water

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	1.4	1.7	1.7
	No	283	79.7	98.3	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Production inputs or products for sale did not arrive at the business

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	2.3	2.8	2.8
	No	280	78.9	97.2	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Manufacturing of products interrupted

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	288	81.1	100.0	100.0
Missing	System	67	18.9		
Total		355	100.0		

Staff(including business owner) suffered from health problems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	288	81.1	100.0	100.0
Missing	System	67	18.9		
Total		355	100.0		

Sale of products had to be interrupted

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	164	46.2	56.9	56.9
	No	124	34.9	43.1	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

The premises could not be accessed neither by customers nor by employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	216	60.8	75.0	75.0
	No	72	20.3	25.0	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Employees did not have time to come to work because of illness or having to take care of flood damages at their home

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	.6	.7	.7
	No	286	80.6	99.3	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

How many days could the business not operate as usual during and after the flood you mentioned ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than one day	101	28.5	35.1	35.1
	2days	76	21.4	26.4	61.5
	3days	56	15.8	19.4	80.9
	4 to 5 days	31	8.7	10.8	91.7
	6 to 7 days	17	4.8	5.9	97.6
	More than 7 days	6	1.7	2.1	99.7
	More than 15 days	1	.3	.3	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

How much revenue/ net profit could you have made in the these days that you could not operate as usual?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1,000frw	53	14.9	18.4	18.4
	Between 1,000frw and 10,000 frw	72	20.3	25.0	43.4
	Between 10,001 and 50,000 frw	80	22.5	27.8	71.2
	Between 50,001 and 100,000frw	40	11.3	13.9	85.1
	Between 100,001 and 500,000 frw	38	10.7	13.2	98.3
	Between 500,001 and 1,000,000frw	1	.3	.3	98.6
	More than 1,000,000frw	2	.6	.7	99.3
	refusal	2	.6	.7	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Who supported you in coping with the impacts of the flood, e.g: by lending money, helping to clean up or providing construction material? to circle that are applicable

		Frequency	Percent
Missing	System	355	100.0

Family and friends

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Yes	246	69.3	85.4	85.4
	No	42	11.8	14.6	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Neighbouring businesses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	41	11.5	14.2	14.2
	No	247	69.6	85.8	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Local government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	36	10.1	12.5	12.5
	No	252	71.0	87.5	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Industry or business associations

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Yes	1	.3	.3	.3
	No	287	80.8	99.7	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Insurance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	.3	.3	.3
	No	287	80.8	99.7	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Bank

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	.3	.3	.3
	No	287	80.8	99.7	100.0
	Total	288	81.1	100.0	
Missing	System	67	18.9		
Total		355	100.0		

Central government

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	No	288	81.1	100.0	100.0
Missing	System	67	18.9		
Total		355	100.0		

Have any of the following measures been implemented to protect the business against flooding?

		Frequency	Percent
Missing	System	355	100.0

Moving production inputs, mashinery or products permanently higher above ground

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	149	42.0	42.0	42.0
	No	206	58.0	58.0	100.0
	Total	355	100.0	100.0	

Creating a ditch around the building

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	27	7.6	7.6	7.6
	No	328	92.4	92.4	100.0
	Total	355	100.0	100.0	

Creating a flood barrier (eg. building a small wall, sand bags)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	160	45.1	45.1	45.1

	No	195	54.9	54.9	100.0
	Total	355	100.0	100.0	

Using more water-proof building materials,such as ceramic or concrete

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	5.9	5.9	5.9
	No	334	94.1	94.1	100.0
	Total	355	100.0	100.0	

Storing important goods at a different that is less flood-prone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	1.4	1.4	1.4
	No	350	98.6	98.6	100.0
	Total	355	100.0	100.0	

Obtaining an insurance (eg. standard property insurance, business insurance)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	35	9.9	9.9	9.9
	No	320	90.1	90.1	100.0
	Total	355	100.0	100.0	

Relocation of the business premises

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	14	3.9	3.9	3.9

	No	341	96.1	96.1	100.0
	Total	355	100.0	100.0	

No measure was taken

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	102	28.7	28.7	28.7
	No	253	71.3	71.3	100.0
	Total	355	100.0	100.0	

If you have not taken any measure to protect your business, please indicate why?

		Frequency	Percent
Missing	System	355	100.0

Do not foresee any future floodings to affect the business

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	58	16.3	56.9	56.9
	No	44	12.4	43.1	100.0
	Total	102	28.7	100.0	
Missing	System	253	71.3		
Total		355	100.0		

Impacts of flooding are not significant enough to take action

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	25	7.0	24.5	24.5

	No	77	21.7	75.5	100.0
	Total	102	28.7	100.0	
Missing	System	253	71.3		
Total		355	100.0		

Measures are too expensive

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	18	5.1	17.6	17.6
	No	84	23.7	82.4	100.0
	Total	102	28.7	100.0	
Missing	System	253	71.3		
Total		355	100.0		

No time to deal with this issue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	2.3	7.8	7.8
	No	94	26.5	92.2	100.0
	Total	102	28.7	100.0	
Missing	System	253	71.3		
Total		355	100.0		

Lack of information on how to protect the business

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	.8	2.9	2.9

	No	99	27.9	97.1	100.0
	Total	102	28.7	100.0	
Missing	System	253	71.3		
Total		355	100.0		

Lack of know how to implement the measures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	3.4	11.8	11.8
	No	90	25.4	88.2	100.0
	Total	102	28.7	100.0	
Missing	System	253	71.3		
Total		355	100.0		

Other, please specify

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	3.4	11.8	11.8
	No	90	25.4	88.2	100.0
	Total	102	28.7	100.0	
Missing	System	253	71.3		
Total		355	100.0		

Other(Specification) [due to a processing error the full answers here are not available anymore, unfortunately]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		342	96.3	96.3	96.3

	I never	1	.3	.3	96.6
	The bus	1	.3	.3	96.9
	Because	1	.3	.3	97.2
	I don't	1	.3	.3	97.5
	In Rwand	1	.3	.3	97.7
	Measures	1	.3	.3	98.0
	Not enti	1	.3	.3	98.3
	Poverty.	1	.3	.3	98.6
	Some are	1	.3	.3	98.9
	We are n	2	.6	.6	99.4
	We are w	1	.3	.3	99.7
	We don't	1	.3	.3	100.0
	Total	355	100.0	100.0	

What are measures for protecting the business from flooding that have not been implented in the business but you might consider to implement?

		Frequency	Percent
Missing	System	355	100.0

Moving production inputs, machinery or products higher above the ground

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	82	23.1	23.1	23.1
	No	273	76.9	76.9	100.0

	Total	355	100.0	100.0	

Create a ditch around the building

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	58	16.3	16.3	16.3
	No	297	83.7	83.7	100.0
	Total	355	100.0	100.0	

Creating a flood barrier (eg:building a small wall, sand bags)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	76	21.4	21.4	21.4
	No	279	78.6	78.6	100.0
	Total	355	100.0	100.0	

Using more water-proof building materials,such as ceramic or concrete

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	91	25.6	25.6	25.6
	No	264	74.4	74.4	100.0
	Total	355	100.0	100.0	

Storing important goods at a different location that is less flood-prone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	20	5.6	5.6	5.6
	No	335	94.4	94.4	100.0

	Total	355	100.0	100.0	

Obtaining an insurance (eg. standard property insurance, business insurance)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	215	60.6	60.6	60.6
	No	140	39.4	39.4	100.0
	Total	355	100.0	100.0	

Relocation of the business premises

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	104	29.3	29.3	29.3
	No	251	70.7	70.7	100.0
	Total	355	100.0	100.0	

Other, please specify

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	25	7.0	7.0	7.0
	No	330	93.0	93.0	100.0
	Total	355	100.0	100.0	

Other(specification)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		328	92.4	92.4	92.4

Relocate people from high risk zone	1	.3	.3	92.7
Canalization of water	1	.3	.3	93.0
Construction of better building like flats. buildings that are a bit far from the roads.	1	.3	.3	93.2
Construction of more rain gutters	1	.3	.3	93.5
Construction of trenches	1	.3	.3	93.8
Enlarge existing rain gutters	1	.3	.3	94.1
For all others we need government support	1	.3	.3	94.4
Improve drainage system	1	.3	.3	94.6
Informing people about weither forecast	1	.3	.3	94.9
Live away from Nyabugogo river with some distance	1	.3	.3	95.2
No any other measure is possible to me	1	.3	.3	95.5
No other measures can be implemented. the rest should be done by government.(Construction of drainage)	1	.3	.3	95.8
None is applicable here	1	.3	.3	96.1
Nothing	1	.3	.3	96.3
Nothing because the trenches were well constructed.	1	.3	.3	96.6

Nothing everything was done by the government	1	.3	.3	96.9
Nothing. The government enlarged a bridge that used to cause flooding.	1	.3	.3	97.2
Nothing.Alot of infrastucture has been put in place hence this minimised flooding	1	.3	.3	97.5
Planting trees	1	.3	.3	97.7
Rain gutters maintenance	1	.3	.3	98.0
Reducing high risk zone	1	.3	.3	98.3
Relocating all the business in the area	1	.3	.3	98.6
Repairing and maintaining existing rain gutters	1	.3	.3	98.9
The government has to re-pair and maintain or reha-bilite existing rain gutters	1	.3	.3	99.2
To dig more rain gutters	1	.3	.3	99.4
To enlarge existing gutters and dry this Nyabugogo Valley	1	.3	.3	99.7
To maintain Nyabugogo valley	1	.3	.3	100.0
Total	355	100.0	100.0	

What useful actions should citizens and other businesses take to reduce the danger and costs of flooding to your business? to circle what is applicable

		Frequency	Percent
Missing	System	355	100.0

Stop cutting trees on the hills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	94	26.5	26.5	26.5
	No	261	73.5	73.5	100.0
	Total	355	100.0	100.0	

Stop throwing garbage on the street or into drainage canals to avoid clogging them

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	328	92.4	92.4	92.4
	No	27	7.6	7.6	100.0
	Total	355	100.0	100.0	

Collect rain water in tanks on each premise to reduce overall run-off

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	277	78.0	78.0	78.0
	No	78	22.0	22.0	100.0
	Total	355	100.0	100.0	

Implement flood protection measures together (eg. digging a ditch together or building or building a flood wall)

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Yes	255	71.8	71.8	71.8
	No	100	28.2	28.2	100.0
	Total	355	100.0	100.0	

Help neighboring business if they have been affected by flooding (eg. provide help when cleaning up or providing a small loan)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	49	13.8	13.8	13.8
	No	306	86.2	86.2	100.0
	Total	355	100.0	100.0	

Share information on weather forecasts and disaster warnings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	5.9	5.9	5.9
	No	334	94.1	94.1	100.0
	Total	355	100.0	100.0	

Share information within the community on how to protect premises against flooding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	34	9.6	9.6	9.6
	No	321	90.4	90.4	100.0
	Total	355	100.0	100.0	

Other, please specify

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	7	2.0	2.0	2.0
	No	348	98.0	98.0	100.0
	Total	355	100.0	100.0	

Other(Specification)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		349	98.3	98.3	98.3
	A very g	1	.3	.3	98.6
	Building	1	.3	.3	98.9
	Digging	1	.3	.3	99.2
	Public w	1	.3	.3	99.4
	Stop dig	1	.3	.3	99.7
	Street v	1	.3	.3	100.0
	Total	355	100.0	100.0	

What useful actions should the local government or the central government take to reduce the danger and costs of flooding to your business?

		Frequency	Percent
Missing	System	355	100.0

Provide more information on how to protect premises against flooding

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Yes	278	78.3	78.3	78.3
	No	77	21.7	21.7	100.0
	Total	355	100.0	100.0	

Provide portable flood barriers (for example sands bags)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	86	24.2	24.2	24.2
	No	269	75.8	75.8	100.0
	Total	355	100.0	100.0	

Provide early weather warnings by SMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	110	31.0	31.0	31.0
	No	245	69.0	69.0	100.0
	Total	355	100.0	100.0	

Provide loans for making buildings more flood-proof

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	47	13.2	13.2	13.2
	No	308	86.8	86.8	100.0
	Total	355	100.0	100.0	

Provide loans if businesses have been negatively affected by flooding

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Yes	19	5.4	5.4	5.4
	No	336	94.6	94.6	100.0
	Total	355	100.0	100.0	

Improve the drainage system

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	302	85.1	85.1	85.1
	No	53	14.9	14.9	100.0
	Total	355	100.0	100.0	

Reforest certain areas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	62	17.5	17.5	17.5
	No	293	82.5	82.5	100.0
	Total	355	100.0	100.0	

Make insurance more affordable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	153	43.1	43.1	43.1
	No	202	56.9	56.9	100.0
	Total	355	100.0	100.0	

In the last three years, have you helped other fellow businessmen to deal with flooding with one of the following actions?

	Frequency	Percent

Missing	System	355	100.0

Shared information on how to protect premises from flooding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	355	100.0	100.0	100.0

Shared weather or disaster warnings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	.3	.3	.3
	No	354	99.7	99.7	100.0
	Total	355	100.0	100.0	

Helped to build phyisical protection protect their premises

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	.3	.3	.3
	No	354	99.7	99.7	100.0
	Total	355	100.0	100.0	

Helped them to clean up and rebuild their premises after a flood

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	62	17.5	17.5	17.5
	No	293	82.5	82.5	100.0
	Total	355	100.0	100.0	

Shared production materials or mashinery that other businesses needed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yed	1	.3	.3	.3
	No	354	99.7	99.7	100.0
	Total	355	100.0	100.0	

Shared means of transportation, for example for transporting goods of other businesses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	2.3	2.3	2.3
	No	347	97.7	97.7	100.0
	Total	355	100.0	100.0	

Collect rain water in tanks on my premises to reduce overall rainwater run-off

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	.6	.6	.6
	No	353	99.4	99.4	100.0
	Total	355	100.0	100.0	

Provide a loan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	.3	.3	.3
	No	354	99.7	99.7	100.0
	Total	355	100.0	100.0	

Never provided a help

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	290	81.7	81.7	81.7
	No	65	18.3	18.3	100.0
	Total	355	100.0	100.0	

What were your main motivations for helping other businesses ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	They are my friends or family	10	2.8	15.4	15.4
	They have helped me in the past	1	.3	1.5	16.9
	It is the right thing to do	54	15.2	83.1	100.0
	Total	65	18.3	100.0	
Missing	System	290	81.7		
Total		355	100.0		

Annex 7: Workshop participants

CDKN WORKSHOP ATTENDANCE LIST

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