November 2017

Return on Investment in Emergency Preparedness

Phase 2 of a United Nations inter-agency project to develop a toolkit for the humanitarian community

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Abstract

The shift towards multi-year humanitarian funding in high-risk contexts presents an opportunity to make better investments against emergency risks. However, to optimize resource allocations, the humanitarian sector must be able to quantify and compare the potential impacts on future emergency response of competing preparedness interventions.

In 2014, the United Nations Children's Fund (UNICEF) and the World Food Programme (WFP) formed a humanitarian preparedness project, funded by the United Kingdom's Department for International Development (DFID). As part of this *Ready-to-Respond* project, they launched a research initiative aimed at developing a methodology and toolkit to forecast return on investment (ROI) generated by emergency preparedness in relation to time and cash expended on subsequent emergency response scenarios.

Phase 1, a pilot study conducted by the Boston Consulting Group (BCG) and published in 2015, produced a methodology and a prototype spreadsheet-based ROI tool, and provided proof of concept.

Phase 2, described here, broadened the partnership to include the Office for the Coordination of Humanitarian Affairs (OCHA) and the Office of the United Nations High Commissioner for Refugees (UNHCR), and was conducted by Pricewaterhouse Coopers (PwC).

PwC refined and expanded both the methodology and the ROI tool's functionality to analyse more variables, including qualitative ones. They produced user support materials to guide assemblage of the required data and facilitate data input.

Eighty-four preparedness investments (35 from Phase 1 and 49 from Phase 2) were analysed to inform development of the methodology and tool. Each was tested for impact on emergency response models for the relevant country.

Across the diverse, multi-agency sample portfolio, despite considerable differences in the ROI of different types of investments, the median savings-to-investment ratio was US$ 1.5 per US$ 1 invested, and the mean gain in response time was 14 days.[1] Many preparedness interventions were also shown to reduce carbon emissions. Results represented significant value for money

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[1] These results excluded some very high ROI outliers. When retained, the outliers distorted the average savings-to-investment ratio to US$2.60 per US$1 invested.

and offered powerful evidence in favour of investing in emergency preparedness.

1. Introduction

A paradigm shift in humanitarian finance is needed. Today's model, weighted towards emergency response, must become more proactive and risk-centred. Although the humanitarian sector has made advances in risk forecasting and preparedness, it is still not equipped to systematically quantify and compare the impacts of investments in emergency preparation on future emergency response.

This gap frustrates preparedness planning and fund-raising at agency, partnership and donor levels. It represents an obstacle to achieving durable results, and to accomplishing the goals advocated by the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Reduction 2015-30.[2,3]

In 2014, UNICEF and WFP launched a DFID supported research initiative to produce a toolkit to systematically measure the return on investment of emergency preparedness in high-risk contexts. It initially focused on producing metrics associated to cost savings, in terms of time and money.

Phase 1 of the study was conducted by the Boston Consulting Group (BCG) in 2014-15.[4] It examined a portfolio of programme and operational preparedness investments made by UNICEF and WFP in 2014. These were in three pilot countries: Chad, Madagascar and Pakistan. Joint humanitarian risk analysis of the likelihood, timing and scope of future emergencies in those countries over time horizons of up to 10 years yielded a range of crisis scenarios that would

[2] The United Nations (2015) *Transforming Our World: The 2030 Agenda for Sustainable Development*, pp14-28 and 37-38. Available at: https://sustainabledevelopment.un.org/post2015/transformingourworld/publication

[3] UNISDR (2015) *Sendai Framework for Disaster Risk Reduction 2015-2030*, p12. Available at http://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

[4] The Boston Consulting Group (2015) *UNICEF/WFP Return on Investment for Emergency Preparedness Study, Final Report*. Available at http://www.humanitarian-preparedness.org/evidence.html

necessitate emergency response. The team formulated pairs of comparative response scenarios for each crisis: one, with relevant preparedness investments from 2014 in place; the other, without. They developed a methodology, and produced a prototype spreadsheet-based tool, initially for use by UNICEF and WFP, to calculate the return on investment (ROI) generated by preparedness interventions against the first emergency.

The results provided proof of concept: the ROI of preparedness could be calculated in terms of time and costs. [5] All humanitarian preparedness investments examined with BCG demonstrated either time or cost savings – most delivered both. The average savings-to-investment ratio was over 200 percent in the event of the next emergency occurrence. In other words, US$1 invested beforehand saved more than US$2 in future response costs[6]. Time savings averaged 10 days.

The second phase of research aimed to refine and expand the methodology to:

- encompass a more diverse range of indicators, including greenhouse gas savings;
- calculate ROI over longer time horizons and multiple emergency occurrences;
- facilitate and simplify the process of comparing scenarios and quantifying returns; and
- increase the evidence base established in the initial findings.

In 2016, WFP and UNICEF were joined by OCHA and UNHCR. Phase 2 of the study, again supported by DFID, was conducted by Pricewaterhouse Coopers (PwC) and was completed in 2017. The resulting toolkit includes a spreadsheet-based tool that allows users to contrast investment options with the status quo, producing results that can be used to build a business case for a portfolio of investments designed to achieve maximum collective impact.

[5] The tool has the benefit of being applicable to development and humanitarian investments taking place in high risk contexts.

[6] In some cases the savings on investments associated with infrastructure were as high as $7.70 to $1 over 10 years. Overall, this represented a $5.2 million saving over 10 years (using a 10% discount rate), and over $200,000 saving in the first year.

2. Method

The sample portfolio

For the purpose of developing and testing the methodology, a portfolio of 49 investments was identified from existing or planned OCHA, UNHCR, UNICEF and WFP preparedness initiatives in Myanmar, Niger and Uganda. The 49 investments from Phase 1 (in Chad, Madagascar and Pakistan), were consolidated into 35 interventions under the portfolio categories used during Phase 2, bringing the total number to 84.[7] Examples of the types of investments analysed can be found in Annex A.

The country teams provided details about the potential risks for which the preparedness projects were designed, in terms of the type of emergency, its frequency, duration and intensity, and the number of affected people.

Categorization of investments

The addition of OCHA and UNHCR to the partnership broadened the portfolio's range. To allow comparison of interventions, the investment categories in Phase 2 were revised. The new categories were:

- **Data systems**
- **Infrastructure/process pre-positioning**
- **Long-Term Agreements (LTAs)/Programme Cooperation Agreements (PCAs)**
- **Skills**
- **Supplies, equipment and capacity pre-positioning**
- **Coordination**

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[7] The reduction from 49 to 35 interventions reflected a change in the methodology. In Phase 1, BCG analysed each type of supply item separately. In Phase 2, PwC grouped the Phase 1 items by country of deployment, and analysed supply pre-positioning for each group, not each item. No findings or data were removed in the transition between methods.

Data gathering and ensuring comparability

For each investment, the following quantitative and qualitative information was collected:

- **Financials** — the total expenditure required to establish, maintain and operate a distinct emergency preparedness action; the investment use (the number of times, and frequency at which, an asset produced by an investment can be deployed, including continuous use); discount rates; and ownership of the investment, including share allocations between partners and other stakeholders.

- **Time horizon** — the amount of time during which an investment's ROI is being calculated.

- **Geographic scope** — the spatial area of an investment's intended use.

- **Emergency preparedness goal** — the activities involved in the investment, their tangible effects, and their impacts expressed in terms of how their outputs contribute to improved humanitarian response (per OECD-DAC humanitarian evaluation criteria).

- **Investment type** — the investment's categorization according to the Phase 2 list shown above in "Categorization of investments".

To ensure comparability, the team produced a user-guide featuring checklists and datasheets to help users build the required narratives and assemble the related indicators.

When testing the methodology, a discount rate of 10 percent was applied to all investments, regardless of the rate actually used by each agency.[8] The use of a relatively high discount rate was requested by DFID, and ensured that results would be conservative.

[8] A discount rate is used to determine the current value of future cash flow. This is the interest rate at which the streams of cash inflows and outflows associated with an investment are discounted to allow for the timing of these cash flows. In the private sector, the discount rate is frequently based on the weighted-average cost of capital to the firm. In most public investment appraisals, the discount rate has tended to follow current prevailing private sector interest rates, at times adjusted downwards to take into account the lower risk associated with government borrowing. In the humanitarian sector, this adjustment depends on the financial profile of the specific organization, and should be tailored according to the organizational approach or donor policy.

Savings indicators

In Phase 2 the ROI tool's functionality was augmented to compute 5 indicators:

1. **Time savings** — changes in the time between an emergency being declared and the start of response efforts.

2. **Financial savings** — metrics for financial savings achieved as a result of making the investment.

3. **Greenhouse gas (GHG) savings** — changes in GHG emissions attributable to the investment.

4. **Contribution to response** — a variety of metrics for differences in contribution to the quality of humanitarian response efforts.

5. **Indirect effects** – any spill-over effects attributable to the investment.

Calculating savings

Time

Timesavings are expressed as the difference between the lead-time in the *with* and *without* investment scenarios, per the following formula:

$$\textbf{Time ROI} = \textbf{Lead time}_{\textbf{without}} - \textbf{Lead time}_{\textbf{with}}$$

Time ROI may vary according to risk scenarios. In this case, it is computed as the probability-weighted average Time ROI across all risks.

For hybrid investments, with multiple Time ROIs deriving from different investment components, the tool allows users to specify more than one Time ROI.

Financial savings

Financial savings are expressed, principally, as a simple savings-to-investment ratio (SIR):

$$\textbf{SIR} = (\textbf{Cost}_{\textbf{without}} - \textbf{Cost}_{\textbf{with}}) \div \textbf{Investment}$$

Other related indicators include: the potential number of additional beneficiaries who could be targeted if savings were reinvested; full-time equivalent staff savings; and payback period.

Greenhouse gases

Greenhouse gas (GHG) savings are calculated in terms of carbon dioxide emissions, expressed in metric tons ($MTCO_2e$):

$$\textbf{GHG ROI} = \left(\sum \textbf{MTCO}_2\textbf{e}_{\text{without, year, risk scenarios}}\right) - \left(\textbf{Investment } \textbf{MTCO}_2\textbf{e} + \sum \textbf{MTCO}_2\textbf{e}_{\text{with, year, risk scenarios}}\right)$$

where Σ indicates "the sum of" (carbon emissions)

Other variables

Where quantitative results are required for qualitative indicators, numeric values must be inferred from impacts on other indicators that can be measured quantitatively. For example, the value of information might be calculated in terms of the humanitarian results attributable to more data-driven and informed decisions on beneficiary targeting. Investments in vulnerability assessment systems would be an instance in which such a calculation would be applicable.

Formulae were adopted, adapted or devised, as necessary, and additional spreadsheets and guidance were introduced to facilitate calculation.

One of the new concepts allows users to calculate the number of affected person days saved attributable to US$1 (APDSPD) of investment in a particular intervention:

$$\textbf{APDSPD} = [(\textbf{Days}_{\text{without}} - \textbf{Days}_{\text{with}}) \times \textbf{Number of affected people served by the intervention}] \div \textbf{Investment, in US\$}$$

To ensure clear attribution, APDSPD is expressed as "*n* person-days per US$1 invested *thanks to [the nature of the intervention]*". Please note that this formula varies depending on the investment type and emergency risk profile.

Using the toolkit to test the model and calculate the ROI of the investments

The model integrates the risks of occurrence of specific emergency types within a context, as defined by the Humanitarian Country Team, over a pre-defined time horizon. Financial, temporal, carbon and qualitative impact of each investment can then be projected against a predicted number of emergencies within that timeframe, meaning that investments that could be re-used across multiple crises would have multiplying returns.

Comparative response scenarios are developed for each crisis: one with the relevant investments in place, the other without. The differences are then quantified, either directly or using the toolkit's conversion facilities, to render results in terms of cost, time, and carbon.

3. Results

ROI results were found to be consistent across both project phases, when types of initiatives and contexts were similar. A total investment in preparedness of US$11.1 million generated US$20.3 million in net savings toward the next emergency response,[9] representing a significant increase in the impact of these funds. Savings multiplied for investments that could be reused over subsequent emergency response: For all investments, savings in the first emergency averaged US$2.60 per US$1 invested in preparedness or an SIR of 260 percent. (A conservative, median savings were US$1.48 per US$1 spent or an SIR of 148 percent.) On average, preparedness led to a 14-day reduction in the gap between the occurrence of a crisis and the initial response.[10]

[9] Net savings should be regarded as savings against humanitarian spending. This calculation does not include societal benefits associated with the investments.

[10] This is a conservative estimate because time delays associated with developing appeals and securing pledged funding — typically 3 to 4 months — were not factored in.

Combining data sets showed that:

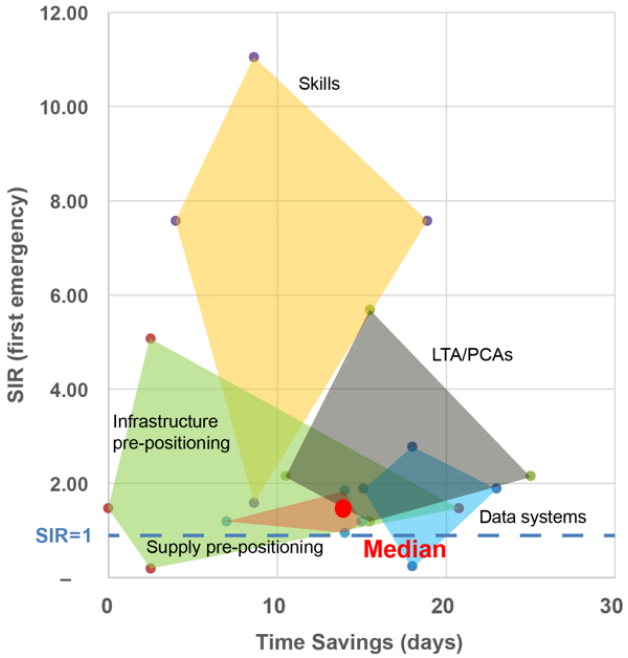
– Skills/training and LTA/PCA investments offer high potential for financial and time returns — partly because, although relatively inexpensive, they can result in large savings.

– Supply pre-positioning of off-shore goods shows consistent returns.

– Data systems improve speed but set up and maintenance costs can temper cost savings.

– Infrastructure results vary but can deliver high cost, time (and carbon) savings.

Figure 1. Summary SIR and time savings distributions



Phase 1 and 2 investments: 57 cases for Time (3 outliers excluded); 63 cases for SIR, 5 outliers excluded.

Thirty-two investments yielded carbon dioxide emissions savings totalling 43,366 metric tons. Of the total savings, 85 percent were in infrastructure pre-positioning and 14 percent were in supply pre-positioning.

4. Considerations

The positive humanitarian returns on investments demonstrated by this study show the benefits of emergency preparedness and the importance and relevance of incorporating ROI analysis into humanitarian investment planning.

At the same time, agencies agree that humanitarian interventions cannot be reduced exclusively to measurable components: aid agencies are committed to humanitarian principles. Comparing specific investments only through metrics is a risky undertaking, as emergency preparedness at country level should be seen as a portfolio of interdependent, and usually complementary, activities. Each activity has value, irrespective of its specific ROI result, and that value is enhanced by it being applied side-by-side with other activities. The use of this tool should be in the spirit of driving responses that are in line with the humanitarian imperative to respond and abide by the humanitarian principles. In fact the tool helps agencies to build the case for more effective ways of delivering effective humanitarian action.

The ROI methodology depends on the availability of data, especially historic data, and on experts who can provide sound assumptions upon which to build conclusions. It also needs further refinement in some areas, such as its application to capacity strengthening of governments work, and how to strengthen its alignment to more traditional financial concepts so that it can better support the discussion on developing new financial models for the humanitarian sector.

All participants to this initiative are aware of these constraints, and are working to either embrace or overcome them. In the meanwhile, they are fortified by the knowledge that the results from this project provide some of the best available evidence of the positive impact of emergency preparedness investment on the cost, timing, quality and carbon emissions of subsequent emergency responses.

They are also aware that by adding the wider societal benefits that are delivered through a well-prepared response, and which are not included in this study, it can comfortably be assumed that the value of the return on the investments would be even higher.

5. Conclusions

The results of the analysis are compelling: a median SIR of 148 percent across these diverse interventions demonstrates, unequivocally, that investing in emergency preparedness yields significant savings in subsequent emergency response. Should donors be willing to invest based on risk, humanitarian actors would collectively be able to better plan, anticipate risks and carry out emergency preparedness investments that would deliver the most effective response.

Faster delivery of essential supplies and services in the critical first days of a new emergency can mean the difference between life and death, and can alter the course of a disaster in terms of whether secondary effects of a crisis can be swiftly addressed to prevent the escalation of suffering.

There are of course caveats. ROI modelling results are only as good as the data used. Risk modelling is inherently imperfect, and assumptions must be made. In this regard, UNHCR found the application of the tool challenging when using their planning time horizon of six months and concluded the methodology did not fit well with its operational model.

ROI analysis is clearly not the sole tool for informing humanitarian strategy; however, it does allow decision-makers to better understand the impact of their plans, making best use of limited resources. While results across the research project yielded some patterns, contextual analysis remains critical as in any other humanitarian approach. Discernment of what can and cannot be calculated, what should and should not be compared, and understanding the full scope of humanitarian principles will remain key to decision making.

Further work will refine models to improve capturing returns from capacity strengthening and coordination investments. It will also endeavour to simplify the methodology, where possible, to improve its usability.

6. Acknowledgements

OCHA, UNHCR, UNICEF and WFP thank DFID, and especially Fergus McBean, for their continued support of this research initiative. They also thank PwC, particularly Pasquale Mari, Lorenzo Newman, Christina Kelling, Patrick Dahmen, Scott Williams, Julie Leonard, Fiona Christine Arnone and Giorgio Garbasso for their contribution to the initiative.

The authors would like to thank all members of the inter-agency Return on Investment Working Group that was established as part of the DFID-funded Ready to Respond project. These were: John Long from OCHA; Anna Dmitrijewa and Barb Wigley from UNHCR; Mari Denby from UNICEF; and Danilo Delfini, Marlies Lensink and Karine Strebelle from WFP. We would also like to thank Mel Schmidt as inter-agency coordinator for the Return on Investment Working Group, and Charlotte Jourdain, technical expert working with the inter-agency Climate Change Working Group under the same project.

The authors also wish to acknowledge the work of all the representatives of UN agencies who participated in field interviews in Myanmar, Niger and Uganda during the development and testing of the methodology described in this document.

Annex A: Examples of sample portfolio investments and outcomes

Location and type of investment	Description of the preparedness investment	With and without emergency preparedness investment in place	Key metrics
Niger **Data systems: Introduction of mobile Vulnerability Assessment Monitoring-system (mVAM)**	mVAM is a household survey carried out by WFP to enhance food security monitoring via a contractor using phone interviews for data collection. Costs factored into this investment include: · WFP full-time equivalent salaries (FTEs) involved in setting up the mVAM system and WFP effort related to training survey interviewers; and · Annual contracting costs for phone survey company, mobile credit to participating households, WFP Technical Assistant Staff, and sensitization missions.	***With the investment:*** In the event of an emergency, phone-based surveys allow WFP to gather data in insecure or remote areas which VAM staff might not otherwise be able to reach using traditional means. mVAM is carried out at regular intervals and, when needed in an emergency/ new displacement in the Diffa region. Surveys are conducted at low cost by desk-based enumerators at a call centre in Niamey. ***Without the investment:*** Day-to-day food security monitoring and rapid assessments are performed by traditional means, collecting data via in-person contacts. Rapid assessments can only take place in limited areas for security reasons (3 to 6 of 12 communes), and understanding of the humanitarian needs will be limited.	· Resource saving = US$199,602 · Time saving = 23 days · GHG saving = 0.77 $MTC0_2e$ · Contribution to response = % of population in need with risk of insufficient immediate response, after 7 days (in "Without" scenario) = 77%

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		Traditional food security or inter-agency assessments may take 1+ months to carry out due to the need to undertake site visits, and they can only cover a limited geographical area. Due to these limitations, such assessments may be biased, and may fail to capture the needs of large parts of the population.	
Niger **Increase in logistics capacity to enable strategic pre-positioning**	The investment consists of changing WFP's logistics strategy in Diffa. 4 low-quality warehouse spaces rented out by WFP in Zinder for EMOP operations, and some old Wiikhalls (MSUs) in Diffa, will be replaced by: · 2 Flospan aluminium depots in Zinder; and · 3 Flospan aluminium depots in Diffa. The investment is US$250,000 for the 5 new depots.	***With the investment:*** In Zinder, goods are now being stored in 2 Flospan facilities within existing WFP spaces. The 2 Flospan depots each have a capacity of 350 mt. The previous warehouses had a utilized capacity of 800 mt. But the investment reduces operational costs because WFP has 2 fewer sites to staff and secure. In Diffa, goods are now being stored in 3 Flospan facilities. There are no associated savings. Temperature-sensitive nutritious items are stored under better conditions, and less spoilage/wastage occurs.	· Resource Savings = 12 FTEs, US$28,496 · Time saving = N/A · GHG saving = N/A · Contribution to response = The investment allows WFP to store 28% of goods under better conditions (versus 0% currently). Each person assisted needs 15 kg of goods per month. The better storage results in approximately 40,000 people being better assisted for one year, every year.

		Without the investment: In Zinder, 4 warehouses are rented. Operational costs include warehouse staff and 6 security staff for each warehouse. In Diffa, other warehouses are used. Storage conditions and capacity are inferior.	
Niger **Introduction of a biometrics registration system**	The biometric registration system allows proper documentation to be issued to the Diffa region's population of 800,000, which includes 300,000 Persons of Concern (PoCs) and a host population of 500,000. Because all PoCs are now registered biometrically, humanitarian assistance can be delivered only to them. This reduces fraud because assistance is no longer replicated or distributed to non-POCs. The investment costs US$14,850,000 for the first year, including start-up costs and US$800,000 updates related to the biometric registrations of newly-borns and returnees who have, again, been displaced.	***With the investment:*** Implementation steps are: · The identification process which enrols all people in the Diffa region and grants documentation. · The biometric registration process to all the population, and, for POCs, the distribution of cards that allow tracking the service/supply delivered through an integrated database system. · In case of new influxes of refugees/IDPs/ returnees, the identification process takes place as needed, for a small number of newly displaced only.	· Resource Savings = reduced person days needed to identify people who are newly-displaced population and highly mobile within the Diffa region. · Time saving = Decreased delay in reaching beneficiaries. · GHG saving = 90.92 $MTC0_2e$ · Contribution to response = improved aid distribution accuracy for the 300,000 registered POCs who represent 37.5% of the Diffa region's population.

		Biometric registration and the humanitarian aid delivery tracking system has the following benefits: · Fraud prevention; and · Identification of possible gaps in humanitarian support being provided to PoCs, especially those who are most vulnerable. ***Without the investment:*** Without documentation and biometric registration in place, the process of identification will still be necessary. However, after newly-displaced people are discovered, identification will require more human resources. The risk remains of people obtaining humanitarian aid fraudulently.	
Niger **Water trucking alternatives in Diffa**	This analysis compared three means of providing safe drinking water to humanitarian populations in Diffa. Where limited water sources are available, UNICEF uses water trucking to provide sufficient safe drinking water to affected populations. Water from the trucks is	***With the investment:*** In the event of an emergency, deep or shallow boreholes will be able to serve the population's needs. However, installation of deep or shallow water pumping systems takes a relatively long time, and it takes weeks or months for systems to become fully operational.	· Resource Savings = US$943,000 for deep-water boreholes and US$1,455,000 for shallow-water pumping · Time saving = N/A · GHG saving = aquifers with handpumps save

	emptied into large bladders fitted with taps for community use. To assess longer term and more sustainable water strategies, the research team compared: · Shallow boreholes versus water trucking, wherever feasible; and · Deep boreholes versus water trucking, where shallow boreholes are not feasible.	Until the water from the boreholes is potable, if no other local wells or other water sources are available, water is supplied through water trucking. ***Without the investment:*** Water trucking may serve the needs of the population for the duration of the emergency, with no need to plan or implement a more durable solution.	$MTC0_2e$ annually and the deeper boreholes save 3,640 $MTC0_2e$ · Contribution to response = N/A
Myanmar **Diffusion of standards on emergency and temporary shelters**	This investment includes the drafting in 2014 of documentation translating global shelter standards into Myanmar-tailored minimum standards to be used in the shelter cluster. It also includes disseminating and advocating the standards with partners and government.	***With the investment:*** Partners, and it is hoped, the Government, are expected to procure, and provide materials (including emergency shelters), and construct transitional shelters meeting the standards. This includes partners under the purview of the Shelter Cluster which is activated when natural disasters occur. The majority of emergency and transitional shelter provided should meet minimum standards. ***Without the investment:*** Partners and Government might procure, provide materials (including emergency shelters) and construct different standards	Resource Savings SIR = 39.5 · Time saving = 21 days · GHG saving = 762.95 $MTC0_2e$ · Contribution to response = better protection in terms of safety and dignity; better access; and better social relations due to harmonization and better quality of the shelters.

		of shelters, a portion of which would be at lower quality, potentially lower cost. Materials, such as tarpaulins, would not be of the same quality. Items of poor quality are often destroyed or suffer from wear and tear, leading to worse humanitarian outcomes and need for replacement. Affected communities are discontent due to inequality resulting from differing levels of quality of shelter options. There are substantial delays in delivery for many shelter materials.	
Myanmar **Emergency stock pre-positioning**	This investment includes: · Pre-positioning of emergency stock; and · An agreement between UNICEF and WFP to share storage space in Myitkyina. Pre-positioning includes key UNICEF emergency response items, including ready-to-use therapeutic food (RUTF), long-lasting insecticidal nets (LLIN), Aquatabs (for water treatment), and oral rehydration salts (ORS), etc. This total investment includes the following costs:	***With the investment:*** Emergency goods are pre-positioned off-shore in a Yangon warehouse, having been transported via sea from suppliers (mainly, by way of Singapore). Emergency supplies are pre-positioned to meet the immediate needs of 20,000 people. When an emergency occurs, goods are immediately available to beneficiaries via implementing partner distributions, thus reducing lead times and improving humanitarian outcomes.	· Resource Savings = US$7,419 · Time saving = 12.4 days · GHG saving = N/A · Contribution to response = 784,000 Affected Person Days Saved

	· Emergency supplies; · Warehousing; and · Transport.	With this investment, the implementing aid agency co-shares spaces in Myitkyina with a partner, thus benefiting from significant cost savings. ***Without the investment:*** Off-shore emergency supplies would arrive from UNICEF's Copenhagen supply division via air. Two supply items are available in local markets. Emergency WASH kits and tarpaulins, would still be procured locally and delivered via truck. This would result in a longer response time and higher transport costs. Procurement prices would be the same. Flying in or shipping goods in these conditions also risks clogging ports and airports, causing additional lead times for partners and the agency's regular programming.	
Myanmar **MSU (mobile storage unit) pre-positioning**	15 mobile storage units (MSUs) are pre-positioned in Yangon, each of which has a surface area of 320 m^2, with capacity equivalent to 300 mt of rice. MSUs are purchased from the nearest United Nations Humanitarian Response Depot (Subang, Malaysia). The time needed to pre-position the MSUs from Subang to Yangon is around 1.5 to 2 months. This time span	***With the investment:*** MSUs have been pre-positioned in Yangon, and when an emergency strikes they can be deployed in the areas where the emergency has occurred or is about to occur. If MSUs were going to be deployed in the Delta region and in Mandalay, it would	· Resource Savings = US$74,883 · Time saving = 42 days · GHG saving = 73.75 $MTC0_2e$

	covers procurement, travel, customs clearance, and delivery to WFP's warehouse in Yangon.	take one day to transport them from Yangon. If MSUs were going to be deployed in Sittwe (Rakhine), the time needed for transport depends on the season and the type of transport used. If transported by truck it would take around 4 days. ***Without the investment:*** In the case of a large-scale emergency (which does justify / gets funding to airlift assets to Myanmar), MSUs are purchased from the United Nations Humanitarian Response Depot in Dubai, or the one in Subang, and are transported to Myanmar via air. The total time needed to receive the MSUs in Myanmar — including procurement, travel and customs — is 10 days (3 days for procurement, 1 day to finalize the purchase, 1 day for travel, and approximately 5 days for clearance). MSUs arrive in Yangon and are then transported to the emergency site via truck/ship as in the "with" scenario.	· Contribution to response = 11,486,052 Affected Person Days Saved
Uganda **PCAs with partners**	The implementing agency has initiated emergency contingency or standby programme cooperation agreements (PCAs) with approximately 30 relevant	***With the investment:*** When an emergency occurs, services foreseen under partnerships can be	· Resource Savings = US$71,764

	governmental and non-governmental partners. The agreements ensure that in the event of a humanitarian crisis, UNICEF is able to quickly shift gears in implementing emergency programs with existing partners. This means a significant reduction in operational response time for children affected by humanitarian situations. One of these agreements was examined under the analysis described here.	activated following a 5-day finalization period, without cumbersome legal arrangements. The aid agency is also able to pre-position emergency supplies in partner warehouses at no additional cost, meaning that humanitarian operations are less expensive and faster by an additional day. The agency also has the benefit of rich needs-assessment baseline information on populations in Uganda's emergency hot spots, since updated data on this is submitted by partners as part of their proposal package to work with the agency. ***Without the investment:*** Partnerships would need to be established on an *ad hoc* basis during the onset of a new crisis. Engaging implementing partners after the emergency hits brings significant delays (15 days plus 5 days finalization). All warehousing costs for pre-positioned emergency supplies would also fall upon UNICEF at a price of $4.89 per m^2.	· Time saving = 15 days · GHG saving = N/A · Contribution to response = 3,795,000 Affected Person Days Saved due to faster delivery of lifesaving emergency supplies.
Uganda	The WFP warehouse in Tororo has 3 sections, each equivalent to 2,737.39 m^2, giving a total area of 8,212 m^2. The investment		· Resource Savings = US$1,244,576

Advanced Positioning Centre	consists of converting one of these sections to a dedicated advance positioning centre (APC), specifically, a storage area for non-food items (NFIs) to be made available to other agencies and partners. Conversion costs US$395,000. The purpose of the APC is to provide a more effective, efficient and coherent common pre-positioning platform to support humanitarian action in each type of emergency in the Great Lakes Region, not only in Uganda.	***With the investment:*** Partners' goods are positioned in the APC. The most probable scenario is that 4 partners will use the APC. WFP's existing staff at Tororo manage the warehouse. Partners pay US$4.56 per m^2 per month. WFP manages the transport of partners' goods towards emergency areas, ensuring that: goods come from Nairobi; are stored in Tororo; transported on to Gulu for dispatch to the emergency area. The most probable scenario is that 174 truckloads per year are transported from Tororo to Gulu (1 truckload = 69 m^3 = 30.4 mt of CO_2 emissions.) ***Without the investment:*** Each of the 4 partners rents its own warehouse in Kampala. Each partner uses dedicated staff to take care of its warehouse. Staffing may be assumed to be 5 FTEs per partner (considering 1 person per shift x 3 shifts per day x 365 days)/220 work days per person. Partners pay US$5.80 per m^2 per month. Goods come from Nairobi, are stored in Kampala, are then transported to Gulu,	· Time saving = N/A · GHG saving = 518.7 $MTC0_2e$ · Contribution to response = improved coordination

		and then delivered in the emergency area. Note: Trucks from Nairobi to Kampala go via Tororo.	
Uganda **Deployment of emergency personnel**	This investment features the Uganda Country Office's improvement in its ability to rapidly deploy appropriate staff, thanks to the synergies between its internal roster and Emergency Response Teams (ERTs), made possible through Workshop on Emergency Management (WEM) trainings. It relies on the agency HQ's capacity to draw on ERTs that have been previously trained through the WEM. Following the WEM training, respondents are available to the agency for deployments of 2 months' duration each (extendable to 3 months), over a period of 9 months. Deployment may be to anywhere in the world with 72 hours' notice. Training acts as a necessary induction to the ERT roster, and is essential in terms of guaranteeing the agency's operational capacity to respond to emergencies. WEM is complementary with the Uganda Country Office's commitment to maintain an internal roster of staff from Country and sub-offices, who are familiar with the country context, deployable at short notice. These	***With the investment:*** In-country staff are deployed within 24 hours, while ERTs are deployed within 72 hours, providing critical support to the relief work carried out by Country Office staff. The with scenario of this analysis has been built considering the South Sudan emergency in Uganda and the WEM trainees deployed in this emergency. ***Without the investment:*** We assume that without this investment the agency responds with the existing capacity in the location only, while simultaneously recruiting staff. For the purposes of ROI analysis, we assume recruitments are for new staff of the same grade and functional profile as those deployed. The recruitment process requires a minimum of 6 weeks, and may include recruiting staff who are unfamiliar with the organization and/or operating in deep-field emergency situations.	· Resource Savings = US$2,853,959 · Time saving = 41 days · GHG saving = (– 8.61) $MTC0_2e$ · Contribution to response = 17,237,400 Affected Person Days Saved

deployments last for a maximum of 1 month, after which staff return to their regular duty station in-country.	Staff hired for emergency response are assumed to be on six-month temporary contracts. Immediate staffing needs in an emergency are not met for an average period of 6 weeks, with a high risk that new recruits will be faced with a steep learning curve, further slowing down the response.