



# Cost-Benefit Analysis study

## Zambezi Region – livelihoods preparedness intervention



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- the University of Namibia's Department of Economics, which validated and tested the robustness of the data collection tools (cost-benefit analysis model and questionnaire) and data collection workshops and training of the Namibia Red Cross fieldwork team, volunteers and beneficiary communities
- government officials from the Ministry of Agriculture and local government, for sharing their insights into the National Disaster Management Policy and Plans
- the Namibia Red Cross team, for mapping out the study area and identifying the relevant communities, as well as for participating in data collection. The National Society also provided the relevant institutional and logistical support
- the communities of Lisikili, Katima, Kanono, Isize, Kwena and Namalubi, for participating in the interviews and providing information on the activities that they are involved in peer reviewers, among them the IFRC, Namibia Red Cross and the Planning Monitoring Evaluation and Reporting Department.



# Executive summary

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The Zambezi River is an important direct source of livelihood and economic activity for the inhabitants of southern Africa who reside along its river basin. Namibia is one of the seven countries that are mostly affected by recurring flood and drought disasters in southern Africa, and a beneficiary of the Zambezi River Basin Initiative (ZRBI). The initiative presents a suite of mitigation and adaptation strategies that were introduced by the IFRC in 2009. It presents a shared vision that is aimed at strengthening synergies while maximizing the impact of its interventions in an integrated and holistic manner for the communities that reside and derive livelihoods from the Zambezi River.

Donor funds have been invested in support of the initiative; however, no assessment of the impact of the investment has been undertaken since its launch. It is against this background that this cost-benefit analysis (CBA) study was undertaken in May 2015. It was primarily conducted to measure the impact and economic return of the investment committed.

The study is the first of its type under the ZBRI CBA assignment. The focus of the study was on food security and disaster preparedness interventions for Namibia's selected communities in Lisikili, Katima, Kanono, Isize, Kwenya and Namalubi. The study deployed qualitative and quantitative tools using a CBA model and participatory community and individual interviews to measure the impact of activities undertaken by beneficiary communities. Case studies to showcase the impact of the review were also compiled.

A benefit-cost ratio (BCR) of 3.7 was achieved for the period 2009 to 2014. This demonstrates a positive net impact and economic return on resources invested in the ZRBI for the country. The study noted the importance of CBA as a complementary decision-making tool for future investment, and thus should be integrated into future food security and disaster preparedness interventions. In this way, resilience capacity will be strengthened as well as the future development of high-impact disaster risk reduction (DRR) community projects along the Zambezi river basin.

# Abbreviations and acronyms

<b>AIDS</b>	Acquired Immuno Deficiency Syndrome
<b>BCR</b>	Benefit-cost ratio
<b>CBA</b>	Cost-benefit analysis
<b>CHF</b>	Swiss franc
<b>DRR</b>	Disaster risk reduction
<b>ECHO</b>	European Commission - Humanitarian Aid and Civil Protection
<b>HIV</b>	Human Immuno Virus
<b>IFRC</b>	International Federation of Red Cross and Red Crescent Societies
<b>N\$</b>	Namibia dollar
<b>SAPRCS</b>	Southern African Partnership of Red Cross Societies
<b>SARO</b>	Southern Africa Regional Office
<b>ZRBI</b>	Zambezi River Basin Initiative

# Introduction and background

According to some experts, climate change will affect the Zambezi river basin more severely than any other river system in the world (*International Rivers*, 2012). Unavoidably, the incidence of flooding, drought and levels of disease naturally increase, which would further threaten the already vulnerable lives and livelihoods of communities residing along the river basin. Poor communities, especially women, children, as well as the elderly, sick and disabled, remain vulnerable to the impacts of sudden disasters and emergencies.

Since 2009 the International Federation of Red Cross and Red Crescent Societies (IFRC) and seven southern Africa countries have been collaborating in the area of disaster risk reduction (DRR) and building community resilience among communities under the Zambezi River Basin Initiative (ZRBI). This initiative represents a shared vision among Southern Africa Red Cross National Societies. The programme was initiated at the Southern African Partnership of Red Cross Societies (SAPRCS) to optimize operations and maximize the impact of Red Cross interventions in an integrated and holistic manner.

Facilitated by the IFRC's Southern Africa Regional Office (SARO), the initiative has four components, namely disaster risk management, food security, health and organizational development. It was launched with a budget of 8.6 million Swiss francs (CHF); however, just 19 per cent of the pledged support was catered for until 2011 and the recorded spending for this period was CHF 1.02 million (IFRC, 2013). Of these funds, 2,251,775 Namibia dollars (N\$) was allocated to Namibia for related programmatic interventions.

The initial focus of the ZRBI was on increasing capacity to implement disaster preparedness as a first assessment showed a lack of relevant capacity and skills at National Society level. The agreed implementation timeframe is outlined below.

Since the launch of the ZBRI in 2009, no quantitative assessment of the programme interventions and resource efficiency has been undertaken. This cost-benefit analysis (CBA) study is the first of its type under the ZRBI. The Zambezi region of Namibia is one of the most affected regions on the Zambezi river basin. It is within the context of the vulnerability and risk faced by the region that resources have been deployed and why Namibia has been selected as the first country for a CBA study.

The food security and livelihoods component of the ZRBI was the main driver of the CBA study. However, due to the interconnectedness of the components, the study naturally included the preparedness and mitigation as well as the health components of the initiative as social secondary activities and trickle-down positive effects of livelihoods and food security.

## Objectives of CBA study

The overall objective of the study was to provide quantitative analysis to complement the documented qualitative benefits of the ZBRI in Namibia with a view to informing future decision-making and investment of donor funds optimally into programme-related development interventions. Such a study, when undertaken, provides the economic rationale for the selection and prioritization of humanitarian inter-

**Figure 1: ZRBI implementation timeframe**

2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Launch</b>	<b>Phase I: Start-up</b>			<b>Phase II: Expansion</b>		<b>Phase III: Consolidation</b>		<b>Phase-out</b>
Following planning since 2008, the ZRBI was launched in late 2009.	"The building of capacity through a participatory approach to crafting objectives. This phase [...] the rate of adoption at which ZRBI target groups take new ideas and new techniques." Phase I is subject of this review.			"Drawing on lessons from Phase I, proved innovations and capacities are expanded to adjacent areas of the ZRBI."		"[...] modifications are made in strategy and objectives as deemed necessary to correct limitations and reflect current realities."		Gradual scaling down of external resources.

Source: Review of Phase I of the Zambezi River Basin Initiative (ZRBI), IFRC 2013

1. CHF 238,788.43, January 2013 exchange rate

ventions in an accountable and transparent manner as resources are directed to areas where development effectiveness is highest.

CBA is an evidence-based quantitative tool useful for informing future resource allocation and deployment by existing and potential donors and other relevant stakeholders to assess the extent of the impact of interventions. In this instance, it is specifically intended to demonstrate the financial and economic value of incorporating DRR initiatives into development planning in Namibia.

CBA measures the costs and benefits associated with undertaking projects and programmes. It also complements financial analysis and is meant to internalize and account for non-market benefits and costs in more detail. It also takes into consideration such variables as environmental costs, biodiversity preservation, disaster preparedness, informal activities (with economic value), social opportunity cost of labour, and opportunity cost of investment.

The study is useful to enable the IFRC and current and potential donors, government, and programme developers/officers, among other stakeholders, to assess whether or not interventions supported have produced positive impacts and if they require further assistance or other stimulus interventions to be deployed to improve impact.

## Box 1: Objectives of participatory community cost-benefit analysis (CBA)

- To quantify the economic value and benefits of the ZRBI food security and disaster preparedness interventions in the Zambezi region of Namibia
- To inform future programming interventions and deployment of resources
- To quantitatively demonstrate the economic viability and multiplier effect of financial investment made in a way that can inform further investment

## Participants and their roles

The main participants in the study were the University of Namibia's Department of Economics, the Namibia Red Cross, communities and relevant government departments. The IFRC provided the overall strategic and technical oversight.

### University of Namibia

In support of the ZRBI's goal of creating partnerships with institutions of higher learning to share information and lessons learnt and best practice, the University of Namibia had an overseeing role. The University had the key responsibility of providing training on the CBA model and the data collection process. It was further involved in the validation and input of the information received and running cost-benefit scenarios and checking the results. The study used the research knowledge and methodologies applied by the University to verify and guide the analytical processes and understanding of the CBA applications in evaluating the overall contribution to economic development. The University team directed the research and data collection processes in the field, and the objective was to build the capacity of the National Society to undertake future participatory CBA processes, while also helping them to gain a fuller appreciation of the role of cost-benefit evaluation in development investment planning.

### Namibia Red Cross Society (National Society)

The National Society is the country custodian and implementing agent of the ZRBI. It also works as the coordinator and point of interface between the communities, the IFRC, Government and other relevant stakeholders. In addition, the National Society provides the necessary human resources to ensure effective implementation of the programme initiatives and the community development support, as well as providing the financial resources to the respective participating communities. As part of the study, the National Society was responsible for data collection including financial information on funds disbursed to communities and costs incurred.

### Communities

Approximately 45,102 inhabitants in the areas of Lisikili, Katima, Kanono, Isize, Kwena and Namalubi of the Zambezi region are involved in preparedness and mitigation, food security and livelihoods as well as health interventions. Communities are divided into cluster villages. They participated in focus group and individual interviews during the study. It was observed that they all joined the programme at different times.



## Government departments

The Government of Namibia has a functional national DRR system that minimizes community vulnerability to hazards and manages the impact of disasters effectively within the context of sustainable development. The Ministry of Agriculture and local government are part of the National Disaster Risk Reduction forum. Programme developers/officers met with them to obtain their policy perspective and confirm their support of the ZRBI.

As part of the preparedness and mitigation initiatives, communities were involved in gaining awareness about floods, and activities included repairing homes ahead of the rainy season using poles, grass and plastering. Such work was done at least prior to the onset of the rains indicating preparedness.

## General context

The Zambezi River, which stretches over 2,500 kilometres across Angola, Botswana, Malawi, Mozambique, Namibia, Zambia and Zimbabwe, has a flood plain extending over 1,388 square kilometres with 38 million inhabitants. The river benefits the southern Africa region in terms of transport, power generation and tourism, while communities depend on it for livelihoods as they are involved in varied economic activities such as agriculture and fishing, and use of water.

## Figure 2: Map of the Zambezi river basin



Source: Review of Phase I of the ZRBI, 2013

The overall goal of the ZRBI is to reduce the impact of challenges facing communities along the river basin, and to improve the quality of their lives and livelihoods.

The three key components of the ZRBI are DRR, food security and livelihoods, and health.

Organizational development is viewed as a cross-cutting intervention that seeks to increase the capacity to implement disaster preparedness, response and recovery operations. It also aims to bring an understanding of good practices, knowledge management and skills development, while identifying tools and methods for sharing experiences in DRR initiatives to enhance integrated community-based programming.

## Namibia overview

Namibia often experiences heavy rains in the north and north-eastern parts of the country, which result in severe flooding. Since 2000 the country has experienced a total of 22 disasters, which have caused 455 deaths and affected at least 1,788,624 people with an estimated USD 85 million worth of damage (EM-DATA, 2015).

The Zambezi region is one of Namibia's 14 regions and it is located on the extreme north-east of the country. Spanning over 14,785 square kilometres, the region has a population of at least 90,100 inhabitants. In addition to the Zambezi River, the region also has three big rivers, the Cuando, Chobe and Kwan-do, which makes it susceptible to recurring floods. With its tropical climate associated with high temperatures and rainfall between December and March, Zambezi is the wettest region of Namibia and the region's major topographical features include swamps, flood plains, wetlands and forests. The region consists of eight constituencies, which are listed below:

**Table 1: Zambezi region constituencies**

Constituency	Population
Judea Lyaboloma	5,511
Kabbe North	9,559
Kabbe South	8,073
Katima Mulilo - rural	13,285
Katima Mulilo - urban	28,362
Kongola	7,366
Linyanti	7,328
Sibinda	11,112
<b>Total</b>	<b>90,596</b>

Source: Statoids, 2014

From 1982 to 2008, the country reported close to 19 events of natural disasters, which affected about 884,953 people. The floods caused tremendous destruction to infrastructure, homes and property, loss of agricultural production and loss of lives.

In Namibia, the ZRBI commenced in the Zambezi province in 2009, covering Kabbe, Katima, Kongola, Linyati and Sibinda districts. It has a target population of 35,835 beneficiaries, where communities have been progressively joining at different times with some enrolling as late as 2013. Women and children are particularly vulnerable.

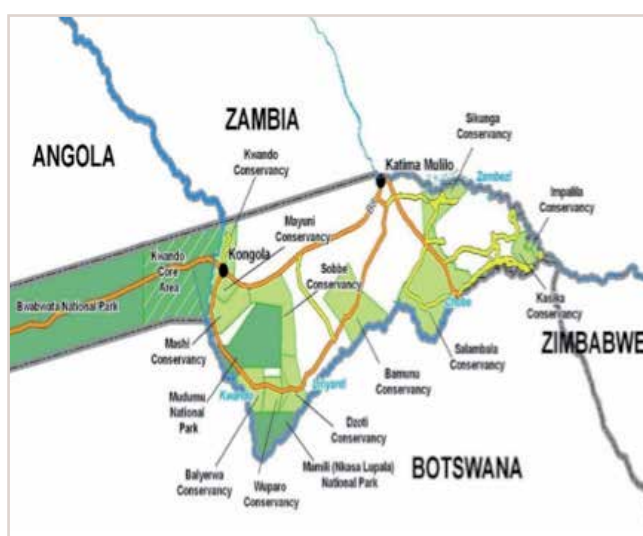


Figure 3: Zambezi region, Source: Google.com

Between 2009 and 2014 Namibia received N\$ 2,251,775 in support of its ZBRI activities, and donations were received from the Spanish Red Cross, the Food and Agriculture Organization and other donors.

**Table 2: Resource allocation to the Zambezi region**

Source of funds	Amount N\$
SCRD	69 746,94
Braces	773 377,93
ZRBI	1 048 120,99
FAO	158 643,49
Dalso	61 307,66
S-LFS	140 577,88
Total	2 251 774,89

Source: Statoids, 2014

## Methodology

A participatory annualized CBA approach was adopted for the study. This method sought to evaluate the economic value added and returns to the affected Zambezi region communities following the eight-year intervention trial. The annualized approach was influenced by data limitations. The method adopted varied from the typical approach that would ideally be applied during the planning stage of a programme.

The study compared the communities' situations both with and without the programme investment. The 'with' scenario attempted to demonstrate the well-being and status of communities with the ZRBI. It specifically measured the avoided direct and indirect macroeconomic as well as the socio-economic benefits and impacts of interventions without which the cost to communities would have been devastating. The 'without' scenario attempted to measure the economic impact and efficiencies in the absence of any interventions.

A community participatory engagement process with the selected communities, National Red Cross Society staff and volunteers was used to collect qualitative and quantitative data. The identified community members were asked to quantify the costs and incomes earned from the various activities they were undertaking. Consideration was given to the direct and indirect benefits and impacts as a result of the numerous activities they were undertaking.

The CBA was assessed over a period of six years of implementation using a discount factor of 10 per cent to adjust costs and benefits to present-value terms using 2009 as the base year. In addition to that, several scenarios and versions were run to test the robustness of the model and the benefit-cost ratio (BCR). This was done by varying the discount rate, cost of labour assumptions as well as by extending the programme lifespan by 11 years (2009 to 2020). A stream of benefits over the years was derived from the gross benefit over the respective years from which the associated costs were offset to estimate the net present value (NPV) of benefits.

### CBA model assumptions

Labour costs were equated to incomes earned by programme participants during the relevant time periods. Where possible, benefits were generally

equated to incomes generated by households from related activities, which included direct and secondary benefits. A discount rate of 10 per cent was assumed, and the Namibia Public Works Programme's daily rate of N\$ 26.50 per task completed was used where applicable to derive the monetary value of labour provided under the different interventions.

## Box 2: Study assumptions

- The labour rate payable is that of the Namibia Public Works Programme of N\$ 26.50.
- One week is spent on completing a task.
- Participants spend at least 10 hours a week (40 hours per month) on project tasks while they also work for 12 months on project activities with a possibility of extended periods during disaster seasons.
- At least 200 community members are actively involved in programme activities.
- A discount rate of 10% is assumed, to bring costs and revenue/income to present-value levels.
- The project started in 2009 and this same year was used as the base year.
- Two scenarios of the ZRBI were used to assess the communities' situations: with and without programme investment.

## Data collection

Data was collected for two days following some initial training of the National Society team. The training was intended to give the National Society staff and the volunteers an understanding of the objectives of the CBA study and how it would be beneficial to their future programming activities. It was also meant to familiarize them with the tools and the process of data collection. Primary data was collected over two days through guided individual and focus groups which consisted of volunteers and beneficiary communities in Lisikili, Katima, Kanono, Isizwe, Kwenya and Namalubi. Relevant costs for the disaster preparedness and mitigation, food security and livelihoods as well as HIV/AIDS interventions were identified and measured for the period of the existence of the ZRBI. The costs identified included institutional and programme establishment and operational costs by the National Society, as well as operational costs incurred at community level for the different programme initiatives.

Secondary data was drawn from regional and country-specific reports that were produced since the beginning of the ZRBI. The data was consolidated and decoded into costs and benefits (income) components of the CBA model.

## Tools

The two main tools used were the questionnaire and the CBA model.

### Questionnaire

A questionnaire and data collection sheet were developed and used for focus group participatory meetings and individual interviews (see Annexure 1). The questionnaires consisted of 22 questions which sought to obtain information on costs incurred and income earned from the different programme activities. The questionnaire had a complementary data sheet for recording quantitative data.

### CBA model

An Excel-based CBA model was developed, consisting of eight interactive and illustrative worksheets. Cost data and benefit entry templates (worksheets) were developed to assist the National Society with data entry and decoding of the programme investment (disbursement to communities) and associated institutional and programme-related operational costs.

## Figure 4: Cost-benefit analysis template

### Cost Benefit Analysis Template

#### Cost Data Entry Page

Identify and list all DRB programme components (suggested components to be verified)

Quantify and populate cost components per year

Aggregate programme component costs / year

	2008	2009	2010	2011	2012	2013	2014	2015
<b>Organisational development &amp; institutional strengthening</b>								
Institutional set-up								
Formation of DRM committees and action teams								
Development & operationalisation of PMER system								
Volunteer training, training and management								
Resourcing / staffing								
<b>Total org dev &amp; institutional strengthening costs for year</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Food security / livelihoods programme</b>								
Training of local volunteers								
formation of DRM committees and action teams								
community farms								
farming input support								
Food banks								
labour								
<b>Total food security / livelihoods costs for year</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Preparedness and mitigation</b>								
Early warning systems								
Awareness								
Mitigation work (Identify activities and quantify)								
<b>Total preparedness and mitigation costs for year</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Health &amp; sanitation</b>								
latrines								
new wells								
mosquito nets								
Health and hygiene raising								
Labour								
<b>Total health &amp; sanitation costs for year</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

## Findings

The quantitative aspect of the study achieved a net cost benefit ratio of 3.7.

**Table 3: Zambezi Region Benefit Cost Ratios 2009 - 2014**

Year	Cost Benefit Ratio
2009	
2010	15,1
2011	16,6
2012	2,7
2013	2,0
2014	3,8
Average BCR for period	3,7

Source: Statoids, 2014

This was against a total present value of costs of 4,200,875 Namibian dollars (N\$), net of the total present value of benefit of N\$ 15,354,469. This outcome suggests that there was a net benefit and positive multiplier effect arising from the funds invested into the different Namibia ZRBI programme-related interventions. In other words, every Namibian dollar invested generated 3.7 times worth of benefits. Although the ratio was positive, it appeared understated and to not fully representative of the impact of the interventions on the ground.

This could be attributed to a general lack of information and poor financial record-keeping, particularly by community beneficiaries of the programme. However, measured over a longer period with better record-keeping, the BCR could be improved significantly and more accurately reflect the impact of the ZRBI.



**Table 4: Zambezi region cost-benefit analysis 2009 – 2014**

Year	Interventions	Assumptions	Calculated annual BCR
2009	Food security Disaster preparedness Health Capacity Development	200 people involved 40 hours worked per week 12 months One month to complete a task Namibia Public Works Programme rate of N\$ 26.50 paid per task 10% discount rate	-
2010	Food security Disaster preparedness Health Capacity Development	200 people involved 40 hours worked per week 12 months One month to complete a task Namibia Public Works Programme rate of N\$ 26.50 paid per task 10% discount rate	200 people* 40 hours per month* 12 months *26.50 * (2,897,600 - 174,746)*10% <b>BCR: 15.1</b>
2011	Food security Disaster preparedness Health Capacity Development	200 people involved 40 hours worked per week 12 months One month to complete a task Namibia Public Works Programme rate of N\$ 26.50 paid per task 10% discount rate	200 people* 40 hours per month* 12 months *26.50 * (2,991,671 - 1,206,632)* 10% <b>BCR: 16.6</b>
2012	Food security Disaster preparedness Health Capacity Development	200 people involved 40 hours worked per week 12 months One month to complete a task Namibia Public Works Programme rate of N\$ 26.50 paid per task 10% discount rate	200 people* 40 hours per month* 12 months *26.50 *(3,258,489 - 2 829 666)* 10% <b>BCR: 2.7</b>
2013	Food security Disaster preparedness Health Capacity Development	200 people involved 40 hours worked per week 12 months One month to complete a task Namibia Public Works Programme rate of N\$ 26.50 paid per task 10% discount rate	200 people* 40 hours per month* 12 months *26.50 *(5,631,412 - 1,656,194)* 10% <b>BCR: 2.0</b>
2014	Food security Disaster preparedness Health Capacity Development	200 people involved 40 hours worked per week 12 months One month to complete a task Namibia Public Works Programme rate of N\$ 26.50 paid per task 10% discount rate	200 people* 40 hours per month* 12 months *26.50 * 6,370,452 - 772,584) 10% <b>BCR: 3.80</b>
Overall BCR for 2009 – 2014			BCR: 3.70



The results show that the BCR was greater than 1, suggesting that the project benefits exceeded the project costs with a positive return on the initial investment. Food security and preparedness interventions yielded a BCR of 3.7. Therefore, for every Namibian dollar invested, benefits worth N\$ 3.7 were realized. The years 2010 and 2011 had the highest annualized BCR of 15.1 and 16.6 respectively.



Case study - Namibia Red Cross's integrated food security intervention

An extended model with a longer-term timeframe, from 2009 to 2020, demonstrated that a BCR of 9.7 was potentially achievable. However, such an outcome would be dependent on improved record-keeping, data availability, greater uptake of interventions by communities and on allowing sufficient time for the full potential of economic and socio-economic returns of the investment to be realized.

The overall BCR demonstrates a range of cost-effective interventions and the ability of the resources deployed to accrue incremental positive benefits to the communities. Notably, the benefits of the ZRBI translated into improved quality of life and enhanced sustainable socio-economic development. The interventions put in place uplifted target beneficiaries' lives, and it was evident that there was significant value and merit in working with integrated and aligned multi-donor programmes. There was relatively optimal utilization and allocation of scarce capital resources in order to maximize the socio-economic welfare of the communities involved. The interventions also contributed to the financial sustainability of the food security initiatives.

There were positive economic and social benefits and impact from the investment channelled into the food security and disaster preparedness components of

the ZRBI and ancillary activities. The impacts of the project were noted through asset creation and accumulation among the participating households. In addition, the households were now engaged in more economically viable and gainful activities associated with the ZRBI, and this uplifted the families involved and significantly improved their livelihoods.

However, programme-related interventions continued to be negatively affected by supply bottlenecks in the distribution of inputs, animal diseases and the lack of irrigation infrastructure. The poor distribution of vegetable seeds was widely reported by community members who in some instances failed to reach planting capacities. Late planting was also a concern among farmers who largely depended on the erratic rains due to lack of irrigation infrastructure. Livestock mortality arising from animal diseases was noted in communities that were actively involved. Government was seen to be enforcing quarantine measures to prevent the spread of disease. The overall impact of such challenges resulted in inconsistent income patterns and the loss of income and assets.

There was concern about the level of investment and financial resources into the programme-related activities where some community members felt that the interventions failed to trigger replication of activities and relatively wider community participation, sustainability practices and self-sufficiency.

## Food security

There was evidence of an increase in food diversity as a result of the ZRBI. Various groups have even reported a notable reduction in malnutrition. For most participating farmer households, there had been some marked increase in the food security status of communities whereby adequate food stocks had been achieved even during periods of drought and flash floods. Community members reported a marked improvement in food security where they now had readily available fresh vegetables such as the Tusa group, and drought and flood resistant grains were being grown.

Also notable was the knowledge and skills acquired, which has led farmers to practise farming activities all year round. An increasing number of farmers had started looking at farming as a business and cash crops were being grown for sale to other communities. Replication was observed among farmers outside the participating communities, which demonstrated a positive spin-off from the interventions.

The Namalubi community's main agricultural activities undertaken include vegetable production and cattle rearing. Such activities were seen as a source of hope for people living with HIV.

### Box 3: New world of hope vegetable garden

Led by Martin Mutonga, the Tusa vegetable garden in Namalubi village grows vegetables. The project has instilled some hope to its members who mostly live with HIV. The area is also prone to floods and droughts.

Prior to starting the project, the members received some training on vegetable production following which they identified and cleared and fenced a piece of land. The project members negotiated for some financial and technical support from the Namibia Red Cross and Government agricultural experts respectively. Seeds, chemicals, tools and water tanks were donated, and the community was determined to initiate change in a way that transformed their livelihoods.

*"I never thought in my life we would have such a high-impact project which could transform people's lives and change our own lives. Most of our members rely on the vegetable garden for food and income. This is now a form of employment for most of us,"* admitted Martin.

With the new tools acquired, communities were learning more efficient cultivation practices, though more are required. In this respect, irrigation equipment could give a boost to agriculture and food security. The ZRBI has led to an increase in the standard of living of most of the participating farmers. This was being achieved through the provision of both productive and non-productive assets such as livestock, motorized irrigation pumps, home appliances (televisions), bicycles, better built houses with iron sheets and better building materials. In addition, there has been a reported increase in school attendance and a reduction in waterborne diseases, further contributing to greater productivity.

The goat pass-on project was introduced in the Zambezi region where around 150 goats were procured and distributed to 50 families. The model promotes goat production through the goat pass-on concept to families within the community. This project provides milk, meat and incomes to participating communities.

### Disaster response

Through the ZRBI, communities reportedly acquired more knowledge on disaster preparedness and protection of their assets during emergencies. In some areas there was evidence of community members mobilizing themselves through structures established by the National Society to construct wooden bridges over a stream which otherwise would have meant crossing was impossible during the rainy season. This resulted in increased mobility of community members, especially school children who previously would not have been able to attend school during some days of flooding. Other preparedness and mitigation measures adopted were the construction of drainage furrows to divert run-off water away from houses and the acquisition of a large canoe for use during flooding.

Participating farmers continued to respond to drought and flood disasters through establishing gardens to grow crops for sale and consumption. They had also shown more understanding of issues related to climate change. Their response had seen a rapid shift to planting early-maturing crop varieties and drought-resilient crops like sorghum. Farmers have also adopted early warning on climate-related issues using both traditional and modern climate forecasting techniques. They were also slowly shifting from relief and reconstruction interventions to preparedness, mitigation and resilience.

### Capacity development and awareness

Through the ZRBI, women were now visibly sharing ideas and they showed increased awareness about domestic violence, among other issues. Also notable were the levels of cooperation, with men now pooling their labour resources. There were a number of new activities - such as ploughing, house plastering, peer education, sewing, entrepreneurship, first aid, midwifery (childbirth support) and fish farming - which have emerged and many of these are now being undertaken at a community level.

**Table 5: Impact of interventions ‘with’ and ‘without’ scenario**

Projects	Main interventions	Without intervention	With intervention		
					No. of beneficiaries
RBI (IFRC)	Food security and livelihoods	Food shortages and starvation, poor farming methods and land use, no extension programmes, poor sanitation and lack of knowledge exchange, poor water and sanitation	4 communities Strengthened livelihoods, better farming methods, improved water and sanitation, improved farming methods and interventions, incomes, sustainable livelihoods and food security More awareness and disaster preparedness, communities moved to higher ground	Training	640
	Emergency preparedness and mitigation			Distribution of agricultural inputs (seeds and tools)	860
				Exchange visits	
				Lead farmers support	150
	Health (awareness, hygiene promotion, sanitation and access to clean water)			Marketing	28
				Latrine construction <sup>2</sup>	480
				Distribution of water-makers	2,050 15,000
Spanish (RCD)	Food security and livelihoods	Food shortages and starvation, poor farming methods, subsistence farming and no crop variety	24 villages of which:	Training (farmers)	150
	Disaster risk reduction		4 grow maize	Maize crops (households)	35
			9 involved in gardening	Vegetable gardening (households)	115
			2 fish farming	Fish farming (groups)	3
			9 CDRMC More preparedness, mitigation and adaptation	Community disaster risk management committee (people)	120
				Agricultural inputs	115
				Health (households)	33
				Shelter materials to build houses (households)	10
				Installation of water tanks (gardens)	5
				Exchange visits to Zambia (farmers), and improvement in farming information dissemination and knowledge exchange	9
BRACES (ARC)	Preparedness, mitigation and health recovery	Vulnerability to disasters due to lack of preparedness and early-warning systems resulting in deaths	4 communities	Community disaster risk management committee (people) and better preparedness	60
	Public awareness			5,910	
	Flood-resilient houses (households)			40	
	Community disaster knowledge and attitude			1,182	
	Trainings			68	

Projects	Main interventions	Without intervention	With intervention		
					No. of beneficiaries
DALSO (FAO)	Food security and livelihoods		30 villages	Lead farmers, more food security as a result of more improved interventions and management	28
				Training	366
				Crop production with more varieties	300
				Livestock (goats per household) reflecting more stock asset accumulation and measure of wealth	50
				Inputs; seeds and fertilizers	300
				Marketing interventions allowing access to markets and income generation	300

2. Labour supplied at Public Works Programme rates of N\$ 26.50 per task of work completed

There was evidence of institutional strengthening at National Society and branch level, where training had been provided and the base of volunteers expanded. However, capacity had not increased and National Society staff worked only part-time on the ZRBI activities. Living standards improved for participating communities, and spill-over impact had been noted in nearby non-participating communities.

Other areas of capacity building included local volunteer training, formation of disaster risk management committees and action teams. In addition, early-warning mechanisms for communities had been established and reinforced and there was improvement in health and hygiene-related community infrastructure such as wells and latrines. Mosquito nets were also procured.

## Challenges

A number of challenges were identified during the study, mostly relating to data issues. They specifically linked to data disaggregation (breakdown of observations), data quality and the quantification of income and benefits.

**Data disaggregation** - Apportioning of costs and benefits relating to specific interventions proved to be difficult. As a result, costs and benefits were consolidated and aggregated to incorporate all interventions. Costs and benefits were then calculated on an annualized basis.

**Data quality** – The quality of data used was compromised as not all the funds invested into the ZRBI were directed towards the interventions reviewed under the CBA study. On the one hand access to National Society financial information was a challenge, while, on the other hand, financial record-keeping by communities was generally poor and non-existent in some instances. This made the process of quantification and validation of the costs and benefits difficult, and only estimates could be used, while in some instances there was heavy reliance on qualitative impact information which is always difficult to attach a monetary value. To some extent the lack of information at a community level could be due to the high degree of illiteracy among participating communities.



**Quantification of data** - Communities could generally not quantify the monetary value of the different activities they were involved in, and some members resorted to guessing, making it difficult to calculate a realistic BCR. Similarly, most of the benefits were not easily quantifiable, which caused the likelihood of understated outcomes. Therefore, some data was inaccurate and did not represent the full impact of results on the ground.

## Recommendations

The positive BCR outcome achieved for the ZBRI interventions in affected communities in Namibia should be used to demonstrate the impact and multiplier effect of the initial investment, and should, therefore, be used to support the mobilization and consolidation of additional financial resources to strengthen and deepen integrated resilience interventions.

The use of the CBA model should be prioritized as a key future planning tool for the programming of disaster preparedness and food security interventions, as well as to enable investment and resources to be optimally and efficiently directed to ensure integrated food security and preparedness interventions for the ZRBI. In this way, capacity will be broadened and greater resilience among communities will be developed. In this regard, there should be improved and more consolidated record-keeping.

There should also be provision for constantly reviewing the economic value added and benefits of the food security and disaster preparedness interventions based on the qualitative and quantitative data collected.

The CBA for the ZRBI food security, health and DRR components should be a participatory community-based process where communities play an important role in the planning of practical and income-generating activities that are attractive to potential donors.

Environmental degradation is a cost. As more communities become increasingly involved in farming, sustainable land use and farming practices should be adopted. The use of chemicals should gradually be replaced by organic fertilizers and pesticides that are environmentally friendly and consistent with the overall climate-change objectives.

## Conclusions

The BCR is a useful planning and decision-making tool that can be used to assess the financial and economic impacts generated by investment and resources in resilience interventions for the ZBRI. This tool should be used to inform future programming activities, decision-making and deployment of resources by donors and other relevant stakeholders. However, the quality of the data used should be clear and simple to achieve accuracy.

A participatory community-focused CBA is therefore a useful planning and decision-making tool which can be used to measure benefits, value and return of investment in resilience interventions and associated resources. It complements financial analysis and is meant to internalize and account for non-market benefits and costs in more detail as it takes into consideration such variables as environmental costs, biodiversity preservation, disaster preparedness, informal activities (with economic value), social opportunity cost of labour, and opportunity cost of investment in other competing developmental interventions. CBA should be used as part of an integrated development planning framework and decision-making process towards building and strengthening resilience. However, it must not be used in isolation, but as a complementary tool.

Community buy-in, acceptance and ownership of the interventions proved to be critical success factors driving the disaster -resilience interventions. Community focused processes are equally important during planning and implementation of relevant interventions. Effective and consistent record-keeping has a positive bearing on the benefits and overall impact of proactive resilience building.

The ZRBI preparedness interventions contributed to social inclusion and participatory approaches which created and strengthened sustainable community development and resilience.

Multi-donor and stakeholder partnerships developed synergies that benefited the various interventions and their impact. An integrated holistic approach to implementation and execution of interventions was seen to result in multiple community-focused benefits.

The results achieved under the economic value-added study were an indication of the benefits generated



by the investment and could be adopted as a sound basis for further investment into building, deepening and sustainability of resilience interventions. Although the benefits associated with investment in preparedness and food security were significant and had a multiplier economic effect across communities, caution should be taken not to spread and widen the scale as this tends to dilute the benefits and limits the results.

It is no longer optional to ignore the mainstreaming of disaster preparedness as a sustainable development strategy and overall development plan. This is because the avoided cost of disasters often results in quantifiable and unquantifiable economic value for communities. However, such benefits and development outcomes of spending on such a project as the ZRBI are not always clear or easily quantifiable.

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# Annexure 1: ZRBI field questionnaire

## **Zambezi River Basin Initiative cost-benefit analysis fieldwork questions**

1. How long have you been involved in the Zambezi River Basin Initiative (ZBRI) by the Red Cross?

.....

2. How many family members are involved?

.....

3. Which aspect(s) of the programme are you involved in?

.....

4. What resources/materials have been distributed to you for use? (Indicate monetary value.)

No.	Resource/material distributed	Monetary value	Year of distribution

5. How much time do you and each of the family members involved spend on project activities (training, meetings)?

.....

6. What would you normally do with your time if you were not attending to project activities (fishing, hunting, carpentry, harvest forest products, blacksmith, resting etc.)?

No.	Activity	Monetary value

7. What are the main positive and negative impacts that the project has had on you and your family?

Positive impacts:

.....

Negative impacts:

.....

8. Did the project sink a borehole in your community? ☐ Yes / ☐ No

9. Do you use the borehole? ☐ Yes / ☐ No

10. Were any latrines built in your community? ☐ Yes / ☐ No

11. Do you use the latrines for the intended purpose? ☐ Yes / ☐ No

12. How has the well-being of the community changed as a result of having a borehole and/or latrine, particularly on production?

13. Do you grow any drought/flood-resilient crop varieties? ☐ Yes / ☐ No

14. Name the drought/flood-resilient crop varieties you grow

.....

.....

15. Are there individual/community seed banks and storage facilities? ☐ Yes / ☐ No

16. How many seed banks and grain storage facilities are in your community?

.....

17. Are there any families that have been resettled to higher ground by the project? ☐ Yes / ☐ No

18. How many families have been resettled to higher ground by the project?

.....

19. What land improvement activities have you undertaken?

.....

.....

20. Have you benefited from any form of training by the project? ☐ Yes / ☐ No.....

21. If Yes, how have you used the knowledge/skills acquired from the training by the project?

.....

.....

22. Is there any evidence of community members acquiring assets? ☐ Yes / ☐ No

(If Yes, name some of the assets – e.g., TV, solar panels, house iron sheets, bought livestock, grocery/shop.)

.....

.....

The list of questions above is only a guide to some of the questions that may be asked of communities.

## Annexure 2: illustrative excel cost-benefit analysis model

### Cost Benefit Analysis Template Cost Data Entry Page

	2008	2009	2010	2011	2012	2013	2014	2015
<b>Organisational development &amp; institutional strengthening</b>								
Institutional set-up								
Formation of DRM committees and action teams								
Development & operationalisation of PMER system								
Volunteer training, training and management								
Resourcing / staffing								
<b>Total org dev &amp; institutional strengthening costs for year</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Food security / livelihoods programme</b>	2008	2009	2010	2011	2012	2013	2014	2015
Training of local volunteers								
formation of DRM committees and action teams								
community farms								
farming input support								
Food banks								
labour								
<b>Total food security / livelihoods costs for year</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Preparedness and mitigation</b>	2008	2009	2010	2011	2012	2013	2014	2015
Early warning systems								
Awareness								
Mitigation work (Identify activities and quantify)								
<b>Total preparedness and mitigation costs for year</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Health &amp; sanitation</b>	2008	2009	2010	2011	2012	2013	2014	2015
latrines								
new wells								
mosquito nets								
Health and hygiene raising								
Labour								
<b>Total health &amp; sanitation costs for year</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Identify and list all DRB programme components (suggested components to be verified)

Quantify and populate cost components per year

Aggregate programme component costs / year

# The Fundamental Principles of the International Red Cross and Red Crescent Movement

**Humanity** The International Red Cross and Red Crescent Movement, born of a desire to bring assistance without discrimination to the wounded on the battlefield, endeavours, in its international and national capacity, to prevent and alleviate human suffering wherever it may be found. Its purpose is to protect life and health and to ensure respect for the human being. It promotes mutual understanding, friendship, cooperation and lasting peace amongst all peoples.

**Impartiality** It makes no discrimination as to nationality, race, religious beliefs, class or political opinions. It endeavours to relieve the suffering of individuals, being guided solely by their needs, and to give priority to the most urgent cases of distress.

**Neutrality** In order to enjoy the confidence of all, the Movement may not take sides in hostilities or engage at any time in controversies of a political, racial, religious or ideological nature.

**Independence** The Movement is independent. The National Societies, while auxiliaries in the humanitarian services of their governments and subject to the laws of their respective countries, must always maintain their autonomy so that they may be able at all times to act in accordance with the principles of the Movement.

**Voluntary service** It is a voluntary relief movement not prompted in any manner by desire for gain.

**Unity** There can be only one Red Cross or Red Crescent Society in any one country. It must be open to all. It must carry on its humanitarian work throughout its territory.

**Universality** The International Red Cross and Red Crescent Movement, in which all societies have equal status and share equal responsibilities and duties in helping each other, is worldwide.



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