INPUT PAPER

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COST-BENEFIT ANALYSIS OF LIVESTOCK PROTECTION IN DISASTER RISK MANAGEMENT

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Background

With nearly 50 years' experience in helping people to help animals in disasters, the World Society for the Protection of Animals (WSPA) collaborates with governments to strengthen disaster risk reduction capacity in health and emergency management. Protecting livestock is crucial because it protects the livelihoods of livestock producers and guarantees food security for millions of people. It also is a way of insuring people against hard times and providing economic opportunities (such as the sale of milk, manure, and other outputs). Animal-related income streams are critical to underlying causes of risk and provide economic and social well-being in the world's poorest and most vulnerable regions.

This paper reports on original research undertaken by WSPA to analyze costs and benefits of livestock protection in disaster risk management (DRM). It was prepared by Economists at Large Pty Ltd. The research provides a solution-based example of how disaster risk reduction can be developed and strengthened through robust risk assessments, and through researched methods for cost-benefit analysis, as highlighted by the Hyogo Framework for Action (HFA) This cost-benefit analysis research provides a tool for reviewing national progress and ongoing monitoring on risk for key partners involved in disaster reduction.

The case study presented here contributes to research on the implementation of HFA Priority 2 (Identify, assess and monitor disaster risks and enhance early warning) and Priority 3 (Use knowledge, innovation and education to build a culture of safety and resilience at all levels). More specifically, it refers to Core Indicator 1 (National and local risk assessments based on hazard data and vulnerability information are available and include risk assessments for key sectors) and Core Indicator 3 (Research methods and tools for multi-risk assessments and cost-benefit analysis are developed and strengthened). The case study presented outlines how the introduction of regional multi-risk factors within national assessments can be incorporated into existing frameworks and in turn provides solutions to move forward the HFA Priorities and Indicators listed above.

Capacity for Risk Assessment

The study looked at elements that contribute significantly to the capacity of the Mwingi District in Kenya to support the livelihoods of livestock producers during disasters. The tools developed as a result of this study allow the international DRM community to add recommendations to the risk assessment agenda. The study suggests a way to measure the exposure of assets that are important to communities and therefore to address key vulnerabilities.

Addressing Gaps and Understanding Community Vulnerabilities

When a disaster strikes, the international community must meet the immediate needs of the people whose lives have been affected. Providing the tools for recovery—including tools intended to protect animals—forms a vital element of effective DRM that will enable communities to rebuild in the medium and long term.

The majority of the world's poor rely on animals for their livelihoods and food security: 70 percent of the world's poor—also the group most vulnerable to the impacts of disasters—own livestock and derive much of their income and diet from animals (Campbell and Knowles

2011). The loss of livestock and working animals can therefore leave whole communities facing a significant second disaster in the form of long-term debt, dependency, food insecurity, and malnutrition. Building upon previous research undertaken for the *Global Assessment Report* and on community-based DRM, the research presented below provides an innovative assessment tool and impact indicator to determine the effect of livestock loss on economic livelihoods. This research can be used to address these livelihood and food security gaps in current models.

Results and Analysis

In 2011, in response to long-running drought conditions, WSPA began an operation in Kenya's Mwingi District intended to increase the likelihood that animals in the area would survive until the next rainy season.

WSPA also carried out a cost-benefit analysis that focused on the household income impacts to owners of livestock who brought their animals to the Mwingi operation for treatment. (Issues such as indirect costs and benefits of the intervention in relation to other regions and industries will be considered in more detailed analysis of future interventions.) WSPA postintervention response reports were used to assess the number of animals reached and the total cost of WSPA's intervention.

Over a one-year time period, the intervention designed to protect livestock generated $2.74 of benefits in the form of avoided losses for every $1.00 spent. If the time period is extended to three years, the benefit-cost ratio increases to $6.69 in benefits for every $1.00 spent (table 1).[1]

Table 1. Livestock Protection Intervention in Mwingi

1. Intervention details

Treatments provided	Number	36,452
Animals treated	Individual	20,707
Animals saved	USD	10,354
Cost of Intervention	USD	39,968
Cost per treatment	USD	1.10
Cost per animal	USD	1.93

2. Estimates and discount rate

Annual Income of Livestock Saved	USD/annum	136,925
Discount Rate	%	25%

1. Basic intervention details based on WSPA's intervention report documents.

2. Estimates of the annual potential income of the animals saved by the intervention.

3. Net present value estimates over 1, 3 and 5 years.

4. Benefit-cost ratios over 1, 3 and 5 years.

3. Net present value over 1,3 and 5 years   **4. Benefit/Cost Ratio**

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[1] Details are in Economists at Large (2013), which is the full report on which this input paper is based and is annex 1 to this paper.

NPV 1 Year	USD	109,540	2.74
NPV 3 Year	USD	267,278	6.69
NPV 5 Year	USD	368,230	9.21

Source: Analysis based on Behnke and Muthami 2011; Mutembei 2011a, 1–25; and Mutembei 2011b, 1–19.
Note: Data in panel 1 are based on WSPA's intervention report documents (Mutembei 2011a, 1–25, Mutembei 2011b, 1–19).

The results suggest the following:

The net present value depends on the duration over which income is attributed to the intervention and on the discount rate. In light of this result, which is typical for a cost-benefit analysis, duration could be based either on the average length of ownership for animals or on the animals' expected lifespan (depending on their estimated age at the time of the intervention). The discount rate could be based on available rates of finance to rural communities, such as through banking, microcredit, or informal lending markets.

The greatest return on investment is from cattle, given their high economic contribution.

Goats offer a lower return on investment. They are often owned by poor families, however, and are included in the analysis out of a concern for fairness and in keeping with WSPA's values. (See annex 1, Economists at Large [2013].)

Capacity Building

The data presented above were collected in Kenya during the 2011 East Africa drought. The analysis sought both to understand the economic impact of livestock operations on local and regional economies and to create an applicable and scalable risk reduction model that would assess vulnerabilities and return on investment strategies within livestock-dependent communities.

As explained in more detail in annex 1, Economists at Large (2013), future studies could better measure risk assessment impact if trained field workers involved in interventions collected consistent data on the following:

- Number of individual animals treated, not just treatments provided
- The health of each animal, with a corresponding qualitative description—for example, a grade of 1 to 5, with information on what each grade means in terms of the intervention's importance for the animal's productivity and, ultimately, survival
- Proxies for health of animals based on production quantities or ability to undertake drought work
- Economic conditions resulting from disaster, including cost of feed and water, market prices of animals, and market prices for any outputs (such as manure, hides, meat, milk)
- The implications of losing livestock to livelihoods, including qualitative assessment of attitudes toward the importance of the intervention.[2]

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[2] For more information on this point, see Campbell and Knowles (2011).

Culture of Resilience

Based on the research described here, WSPA is developing a framework for estimating the impacts on communities and households of losing livestock in a disaster. Losing livestock has real economic consequences, given animals' critical role in economic productivity, community livelihoods, and food security. The research described above can be used to improve the alignment of national and local risk assessments with core indicators. Better alignment will help decision makers and policy makers make a stronger case for disaster resource allocation designed to strengthen disaster resilience and reduce disaster loss by the use of tools to appropriately map livestock loss in a multi-risk analysis.

Conclusion

The research conducted provides a good-practice approach to addressing livelihood protection and food security gaps within vulnerable communities. The data gathered can be modelled to conduct national and local risk assessments, thereby empowering key decision and policy makers within the international DRM community. The approach supports the case for disaster resource allocation while ultimately strengthening disaster resilience and reducing disaster loss.

It should be noted that although this study moves the two HFA indicators forward, the framework failed to include details that would improve the livelihood protection and food security components of livestock-reliant communities. This element should be considered as part of post-2015 discussions.

References

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