

Lecture 8: Earmarking and Financial Funds

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This lecture is based on the following sources:

“Impacts of Funding Systems on Humanitarian Operations,” T. Wakolbinger and F. Toyasaki, Chapter 2 in *Humanitarian Logistics*, M. Christopher and P. Tatham, Editors, Kogan Page, 2011.

“Impacts of Earmarked Private Donations for Disaster Fundraising,” F. Toyasaki and T. Wakolbinger, *Annals of Operations Research* (2011), in press.

“An Analysis of Impacts Associated with Earmarked Private Donations for Disaster Relief,” F. Toyasaki and T. Wakolbinger, Computational Management Science Conference, Vienna, Austria, July 28-30, 2010.

According to Wakolbinger and Toyasaki (2011): Funding systems and financial flows play an important role in humanitarian operations.

They directly and indirectly affect the scope, speed, effectiveness and efficiency of disaster response.

Despite the importance, constraints imposed by funding systems are often not considered in models of humanitarian supply chains.

Hence, the interdependencies of financial flows and material flows should be explored in the context of humanitarian relief operations.

The Humanitarian Funding System

Humanitarian Assistance: the aid and action designed to save lives, alleviate suffering and maintain and protect human dignity during and in the aftermath of emergencies (Global Humanitarian Assistance (2008)).

Sources of Humanitarian Assistance

- Public sources
- Official sources

Intermediaries

- Multilateral agencies like the World Bank
- International organizations
- Non-governmental organizations (NGOs)

Providers of Aid

- International aid agencies
- Local NGOs
- Community-based organizations

The Role of NGOs

In 2005, between 48% and 58% of all known humanitarian funding flowed through NGOs.

NGOs receive their funding from three sources:

1. Public fundraising (estimated annual average of \$2 billion)
2. Government agencies (estimated at \$1.2 to \$2 billion in 2004)
3. Channeled UN funds (estimated at \$500-800 million in 2004)

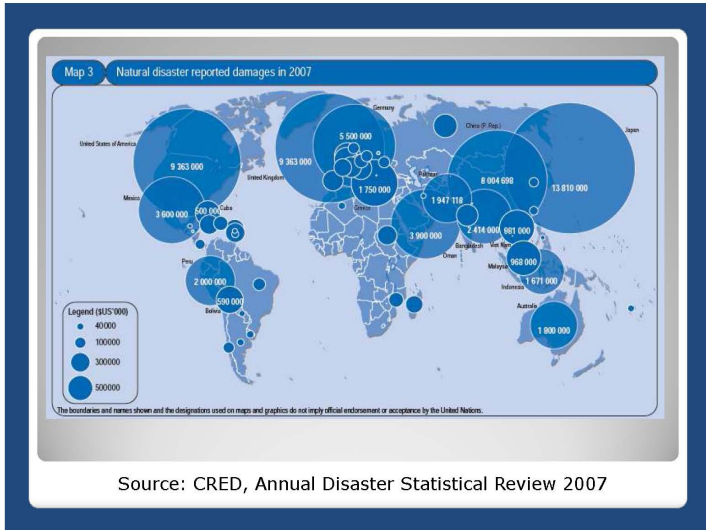
Many of the larger NGOs are trying to increase the proportion coming from private sources.

Source: Feinstein International Center (2007)

- Current funding systems are one of the causes of inefficiencies in humanitarian operations (Thomas and Kopczak (2005)).
- The current funding systems cannot meet needs. Only about 30% of needs were not met each of the last three years (Development Initiatives (2009)).
- The need is expected to increase.
- The occurrence of disasters is expected to increase five-fold over the next 50 years (Thomas and Kopczak (2005)).

- The number of aid agencies with a changing structure is increasing
- Earmarking is increasing
- Donors are more informed and demanding.

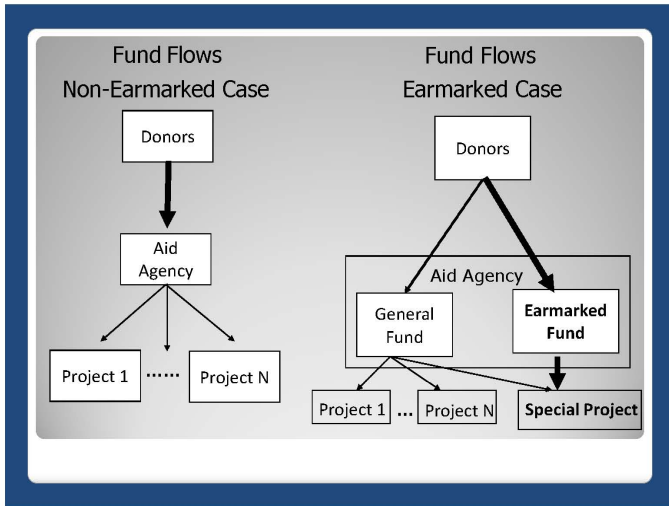
Natural Disaster Damages



What Are the Challenges

Aid agencies need to decide how to respond to these issues.

This requires understanding the relationship between funding and humanitarian operations: “The need to develop better understanding about how different financing mechanisms affect impartial, timely and predictable response.” Good Humanitarian Donorship Initiative 2007.



Source: F. Toyasaki and T. Wakolbinger, "An Analysis of Impacts Associated with Earmarked Private Donations for Disaster Relief," Computational Management Science Conference, Vienna, Austria, July 28-30, 2010

Quantitative Modeling To Answer Some Fundamental Questions

“Impacts of Earmarked Private Donations for Disaster Fundraising,” F. Toyasaki and T. Wakolbinger, *Annals of Operations Research* (2011), in press, is the first paper that analyzes the optimal fundraising strategies in the context of fundraising for disaster relief operations:

- It studies the trade-off between size and flexibility;
- It addresses under which conditions earmarking of donations is beneficial for donors, NGOs, and policy makers.

Donors maximize utility:

- Increasing in donations but at a decreasing rate
- Substitution effect between donations to general fund and special fund

NGO maximizes impact of projects conducted:

- Increasing in donations to general fund
- Increasing in donations to special fund but at a decreasing rate

Earmarking Case

Donor's Objective Function

$$\max_{d_1, d_2} \alpha_1 d_1 + \alpha_2 d_2 - \frac{\delta d_1^2 + 2\beta d_1 d_2 + \delta d_2^2}{2}.$$

Optimal Donation Levels

$$d_1^* = \frac{-\delta\alpha_1 + \beta\alpha_2}{\beta^2 - \delta^2},$$

$$d_2^* = \frac{\beta\alpha_1 - \delta\alpha_2}{\beta^2 - \delta^2}.$$

Optimal Utility

$$U_e^{d^*} \equiv \frac{\delta(\alpha_1^2 + \alpha_2^2) - 2\beta\alpha_1\alpha_2}{2(\delta^2 - \beta^2)}.$$

Non-Earmarking Case

Donor's Objective Function

$$\max_{d_3} \alpha_1 d_3 - \frac{\delta d_3^2}{2}.$$

Optimal Donation Level

$$d_{ne}^* \equiv d_3^* = \frac{\alpha_1}{\delta}.$$

Optimal Utility

$$U_{ne}^{d^*} \equiv \frac{\alpha_1^2}{2\delta}.$$

Earmarking Case

Aid Agency's Objective Function

$$\max_{p_e} p_e \times (d_1^* + d_2^*) - (p_e \times d_2^*)^2 \theta - \kappa p_e^2.$$

Optimal Size of Solicited Population

$$p_e^* = \frac{(\beta^2 - \delta^2)(\beta - \delta)(\alpha_1 + \alpha_2)}{2\kappa(\beta^2 - \delta^2)^2 + 2(\beta\alpha_1 - \delta\alpha_2)^2\theta}.$$

Total Funds Raised

$$D_e^* \equiv \frac{(\beta - \delta)^2(\alpha_1 + \alpha_2)^2}{2\kappa(\beta^2 - \delta^2)^2 + 2(\beta\alpha_1 - \delta\alpha_2)^2\theta}.$$

Non-Earmarking Case

Aid Agency's Objective Function

$$\max_{p_{ne}} p_{ne} \times d_3^* - \kappa \times (p_{ne})^2.$$

Optimal Size of Solicited Population

$$p_{ne}^* = \frac{\alpha_1}{2\kappa\delta}$$

Total Funds Raised

$$D_{ne}^* \equiv \frac{\alpha_1^2}{2\kappa\delta^2}$$

Donors always prefer being given the option of earmarking donations.

- Each representative donors donation amount and utility are always larger in the earmarking case than in the non-earmarking case.

Aid Agency's View

Increased donor interest in donating money always encourages the aid agency to contact more donors when earmarking is not allowed.

Increased donor interest in donating money might lead to fewer donors who should be contacted when earmarking is allowed.

In general, allowing for earmarking of donations tends to be beneficial for aid agencies if target fundraising goal of special project is high.

However, allowing for earmarking of donations tends to be NOT beneficial for aid agencies if

- Donors willingness for donation to the special project is relatively high, compared to target fundraising goal for special project
- Fundraising costs are low.

Allowing for earmarking of donations leads to increased fundraising activities (i.e., solicitation of donations) if

- Target fundraising goal for special project is high
- Donors interest in donating money is relatively low, and
- Fundraising costs are high.

Allowing for earmarking always achieves a lower fundraising cost percentage than not allowing for earmarking.

Impact of Uncertainty Concerning Amount of Donations

In the non-earmarking case, the aid agency's

optimal level of solicited population,
the expected donation amount, utility level,
and fundraising cost percentage

are the same in the case with certainty and the case with uncertainty concerning donation amounts.

In the earmarking case, the

optimal level of solicited population,
the expected donation amount, utility level,
and fundraising cost percentage

are lower in the case of uncertainty than in the case of certainty concerning donors donation amount.

Recommendations

It is imperative that aid agencies use the available resources in the most efficient and effective way, due to the increasing demand for disaster relief and the fact that resources are limited.

The misallocation of resources is partly caused by aid agencies' difficulty in determining the optimal allocation of resources. Those working for aid agencies often are not aware of the value of logistics, modeling, and information systems and, therefore, do not invest sufficiently in these areas.

Many of the existing models may not capture financial constraints.

Recommendations

Donors provide resources for aid agencies and have a strong influence on the allocation decisions that aid agencies make.

Donors can directly impact allocation decisions by earmarking donations for certain emergencies or activities.

They can also provide incentives that guide aid agencies towards a certain decision.

Currently, donors frequently explicitly and implicitly give incentives for aid agencies' behavior that leads to too many resources being allocated to direct response instead of to preparedness and reconstruction. Similarly, too many resources may be provided for emergencies getting a lot of media attention while others are largely neglected.

Aid agencies, donors, and even UN agencies are increasingly aware of the shortcomings of the current funding systems.

Operations research and operations management tools can contribute to establishing sound humanitarian funding systems.