

# Risk Management and Climate Change

## A question of Insurability

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### A. Introduction

In the recent past, the world has experienced an increasing trend of devastating environmental disasters. The scientific community has agreed that the frequent occurrence of these disasters is closely related to anthropogenic climate change. The victims of environmental disasters often face enormous damages. The Western world frequently tries to cover potential damages by means of insurance. But this only works in very few cases. Existing insurance policies may cover only an insignificant part of the enormous damage. As a result, concern has arisen with respect to the insurability of climate change environmental disasters.

The authors aim at clarifying the question of whether and **under what circumstances it is possible to secure the risks caused by climate change environmental disasters through risk management**. It will also highlight the role of different actors within risk management.

### B. Risk Potential of Climate Change

CRI 1990-2009	Country	CRI score	Death per 100T inh.	Total losses in million US\$ PPP	Number of Events
1	Bangladesh	7.33	5.63	2,068.14	259
2	Myanmar	8.67	14.33	676.35	30
3	Honduras	10.83	5.21	663.57	53
4	Nicaragua	16.17	2.80	263.33	39
5	Vietnam	19.00	0.59	1,861.50	203
6	Haiti	19.67	3.98	164.62	46
7	Philippines	26.83	1.08	684.45	270
8	Dominican Republic	27.67	2.55	185.08	41
9	Mongolia	31.00	0.54	308.65	30
10	Tajikistan	33.50	0.47	311.27	51

Fig. 1: Long-Term Climate Risk Index 2011  
(Source: Harmeling (2010) Global Climate Risk Index 2011. Germanwatch)

The **'Global Climate Risk Index' (CRI)** of the NGO Germanwatch for 2011 affirms that less developed countries are generally more affected by climate change than industrialized countries (Fig. 1). The CRI score analyses the quantified impact of extreme weather events. It looks at impact, results in an average ranking of countries in four indicators.

### C. The Concept of Risk Management

Risk management is the systematic treatment of risks, in other words, risk management are all human activities which integrate recognition of risk, risk assessment and developing strategies to manage it. Risk management helps to reduce an intolerable high risk of an event to an acceptable amount. Risk management can also help to reduce the probability or gravity of a negative outcome of that event. According to the ISO 31000, **risk management is all 'coordinated activities to direct and control an organization with regard to risk'**. The strategies to solve risk include four kinds of different treatments: transferring the risk to another party, avoiding the risk, reducing the negative effect of the risk, and accepting some or all of the consequences of a particular risk (Fig. 2).

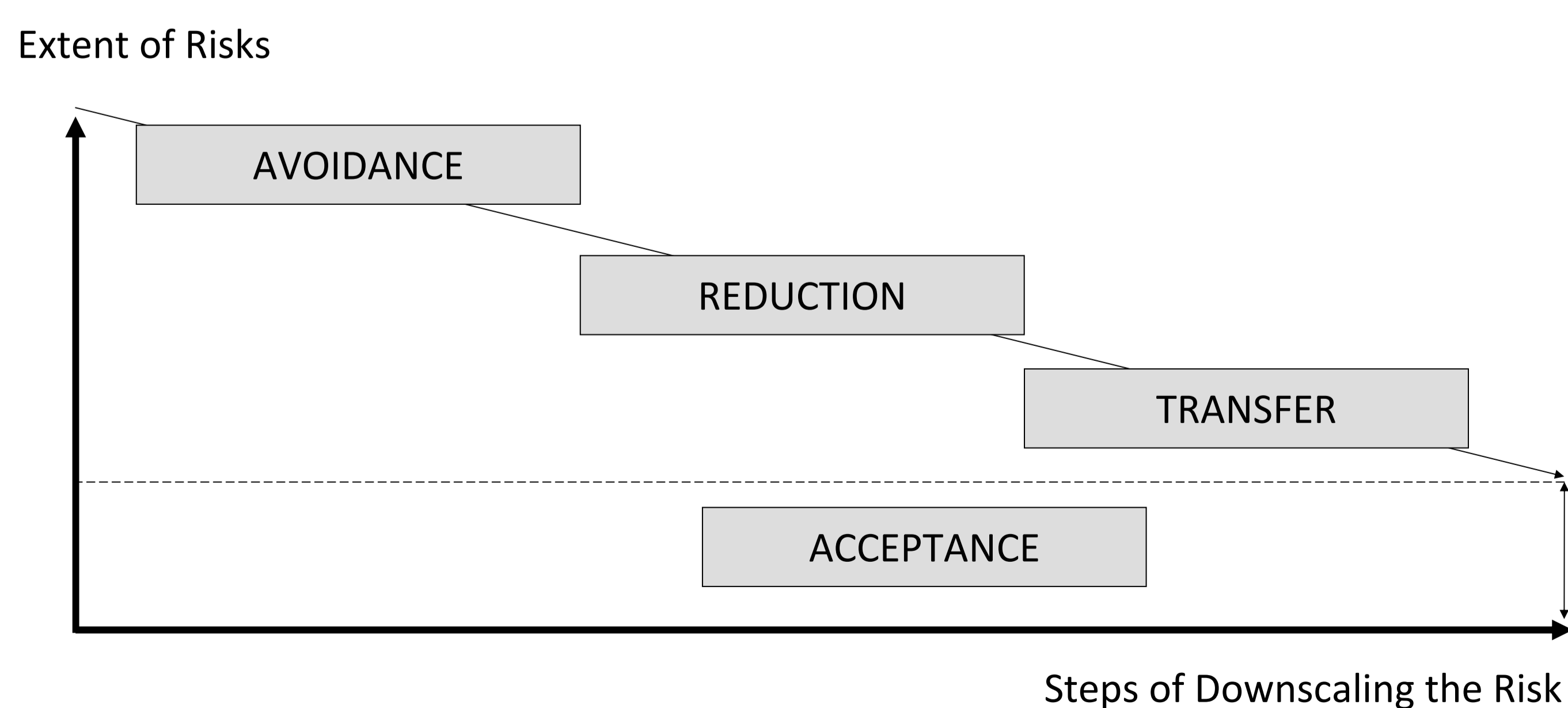


Fig. 2: Treatment of risk in a risk management system according to ISO 31000  
(Source: Own Figure)

Risk transfer is the type of risk treatment that gives answers to the leading question. **Risk transfer means causing another party to accept the risk, typically by contract or by hedging**. Insurance is one type of risk transfer that uses contracts. The leading question is as follows: Can we trade climate risk by insurance?

### D. Can we Trade Climate Risk by Insurance?

Concerning the question about the probability of a catastrophic event and the resulting loss compared to traditional insured risk, the result is that the usual policy pricing methods are inapplicable. Another special point is the market incompleteness. Usually, there is no private insurance offer for certain types of catastrophic risks. One reason for this is **the lack of capacity of the insurance industry money to cope with some catastrophes due to extremely large loss potential**.

### E. Aspects of Solving the Problems

In relation to stakeholders and their options and possibilities to take care of the problem, four aspects should lead to a solution of the problem.

#### 1. The Role of the Governments

Especially in cases where there is no private insurance to cope with disasters of climate catastrophic event, governments could play three main roles. Firstly, as a co-insurer, hand in hand with the private insurance industry. Secondly, the governments could play the role of a re-insurer directly, or they could lend money for primary insurers to fill up capital. The third possibility is to be a holder of resource pools.

#### 2. Impact of Climate Related Parameter Uncertainty on Insurance Contracts

Climate change brings several kinds of catastrophes and damages with it; the insurance industry may have to cope with a variety of special damages. The insurance industry has to analyze the positive and negative implications of climate change on their business, investments and customers. Beside the sustainable insurance contracts, an insurance company like the Munich RE is investing more and more into sustainable funds.

#### 3. National or International Insurance Funds

The question is how to organize 'catastrophe insurance' in a sustainable way. One Solution are national or international Funds. Funds can safeguard private insurers and their customers and they can be an effective tool in case of market incompleteness. It is necessary that the fund has as much money as needed in case of a catastrophe to provide fast direct aid to the catastrophe area.

#### 4. Encourage Sustainable behavior of the Consumer and the Populace

Can the insurance customer be driven to take action to reduce the negative effect of climate change or the climate change by itself to reduce losses? This idea is to compensate responsible behavior of customers when they reduce their loss potential or when they exhaust CO<sub>2</sub> emission they get a discount on premium. A big problem is the high density of population in some flooding-prone areas. With a sustainable urban land use planning and relocation, the government can take action to prevent the people not to construct any buildings in dangerous areas.

### F. Conclusion

Extent of Risks

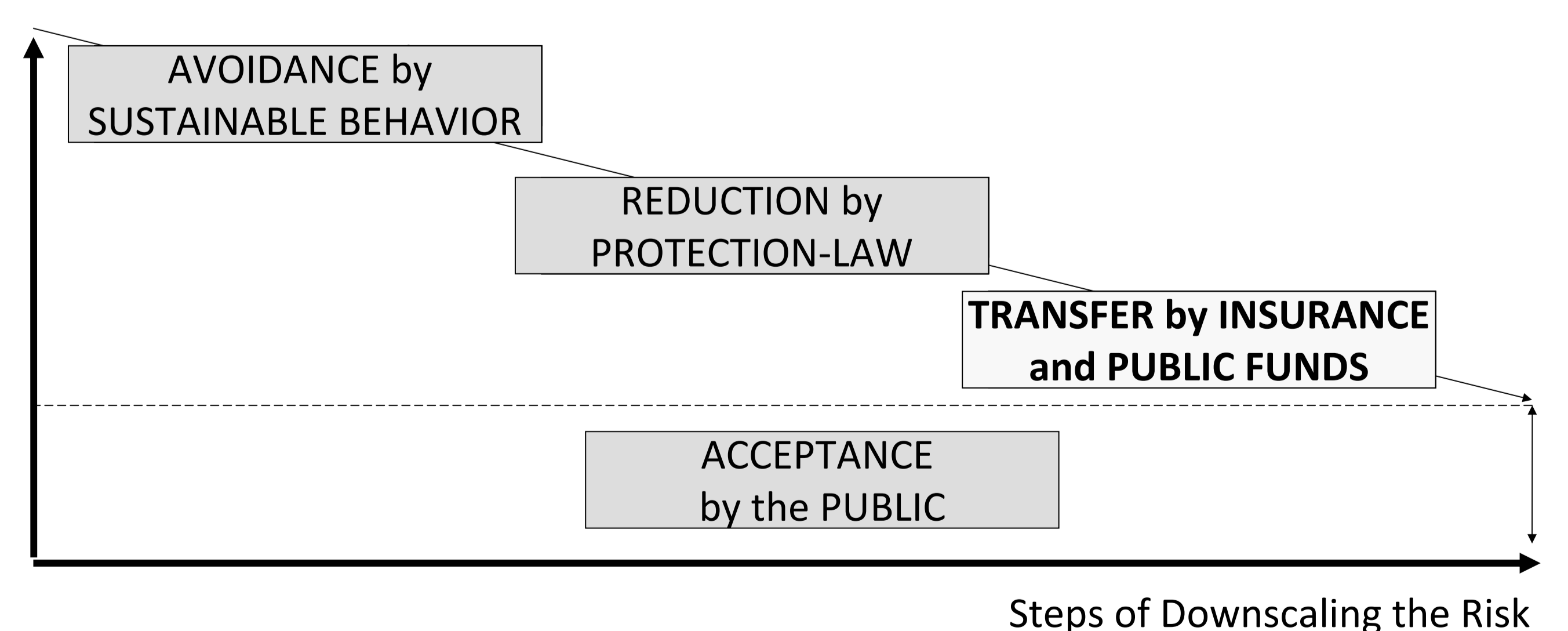


Fig. 3: Treatment of climate-related catastrophe risks according to ISO 31000  
(Source: Own Figure)

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