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## A Fair Approach to Flooding

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# A FAIR APPROACH TO FLOODING

Floods can be some of the most unexpected and devastating natural phenomena. Reducing their risks everywhere is near impossible, whether due to financial reasons or more physical obstacles. **Dr Neelke Doorn** at Delft University of Technology is working to improve policies related to water, with the aim of achieving a better distribution of flood-related risks and benefits between different countries and individuals, while limiting adverse environmental consequences.

The number of floods has increased significantly over the past decade, with catastrophic consequences, both in terms of loss of human lives and damage to the environment. As on-going climate change is likely to increase the risk of flooding further, managing risks in a way that is both just and efficient is becoming increasingly important.

While much risk management so far has focused on optimising costs, the development of efficient solutions also comes with important ethical dilemmas. Managing flood risks also involves questions such as how to fairly distribute safety and predict adverse consequences that can arise from the application of safety measures.

Dr Neelke Doorn has been involved in developing frameworks for flood risk management for more than two decades. Her interest in water governance dates back to her teenage years. 'When I finished high school, I wanted to save the world from flooding, so I started my studies in civil engineering,' she tells us. 'When I finished, I realised that technology is only part of the answer and that we also have to look at how technology is embedded in our society and how it impacts people.'

Due to her varied and extensive academic background, Dr Doorn's research merges ideas from the fields of engineering, philosophy and law, with the aim of developing new models that can be used to ensure more ethical and efficient flood risk management. 'In my work, I try to improve water policy in such a way that risks and benefits are distributed more equally, not only between the people that are currently alive, but also between us and future generations. By avoiding irreversible harm, we can try to leave a liveable planet for future generations as well.'

## Efficiency or Equity?

The traditional approach to water policy, which focuses on preventing risks related to floods, is currently being replaced by an approach that looks at how to minimise their negative consequences. However, focusing only on efficiency, as in ensuring that resources available for flood-risk management in a particular area are used in the most effective way possible, could cause inequalities between areas that are better supported economically and those that have less financial resources. In addition to this, technical applications such as dams and dykes can sometimes provide protection in the place in which they are implemented, but adversely affect safety somewhere else.

'The underlying idea in my research is that flooding poses a distribution problem: flood risks cannot be reduced everywhere, either because that is physically impossible or because we lack the financial resources, so improving safety at some point often reduces the safety at some other points,' Dr Doorn explains. The issue, therefore, becomes how to best use available resources so that optimal solutions are implemented, while also taking into account how these solutions impact on social justice.

Having pursued both engineering and philosophy degrees, when it comes to managing flood risks Dr Doorn is well acquainted with both those frameworks prioritising the efficiency of measures and those emphasising their equity. 'If we need to distribute something, we ideally take both considerations of fairness or justice into account and considerations of efficiency and efficacy,' she says. 'Engineers tend to focus on the latter, philosophers tend to focus on the former. Being both a philosopher and an engineer by training, I wanted to

develop ideas or frameworks in which we can include both considerations of fairness and efficiency.'

## The Ethics of Water

Over the years, Dr Doorn has developed a particular interest in what she refers to as 'water ethics' and 'water justice'. 'To me, water ethics is about the values involved in water management – values like safety, solidarity, health, sustainability, etc. Water justice refers to the distributive aspects involved in water management.'

Water justice relates to how we best distribute water-related risks, as well as the responsibility for preventing these risks. This also includes a number of procedural aspects, such as who is involved in decision-making processes related to flood related threats.

## Irreversible Loss

Sometimes applying measures to reduce the risks of flooding in one particular place can also affect the safety in another place or at a future point in time. This is why Dr Doorn believes that it is important to distinguish between reversible and irreversible measures and consequences.

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For instance, choosing to strengthen dykes or implement ‘harsh’ technological solutions can be irreversible and can eventually lead to regretful consequences such as ecological damage. This is why, sometimes, reversible measures are preferable, as is the prevention of irreversible damage to people and the environment.

Although many policy makers might prefer cost-benefit analyses (CBA), meaning a process of decision-making that takes into account the costs and benefits of a particular measure, these analyses do not always take into consideration environmentalist concerns related to irreversible loss. In this context, irreversible loss refers to the damage that could be done to the environment or ecosystem that, unlike financial loss, cannot be repaired at a later stage.

Dr Doorn believes that policy-making should be done taking possible irreversible adverse consequences into account, in order to minimise these and preserve living conditions for present and future

generations. Implementing protective measures against irreversible loss could help limit the damage done by a natural disaster, even if they come with reversible losses, such as financial ones. In her own words: ‘irreversible losses should be avoided first, even if this comes at the expense of reversible losses.’

#### **Resilience**

In her work, Dr Doorn often concentrates on the idea of resilience, which she believes to be of crucial importance for flood risk management. In the context of natural disasters, resilience refers to the ability of a system or society to return to its normal functioning after disruption.

Academics have different interpretations of resilience, but it nonetheless refers to how well society, the ecosystem and individuals involved in a natural disaster are able to recover promptly after natural disasters, such as floods. While some researchers see it as an outcome, or the ability to ‘bounce back’,

some see it as the process of adapting to changing circumstances and transforming accordingly. This way, resilience could be seen as the ability to ‘bounce’ to a ‘better position’.

For Dr Doorn, operationalising the idea of resilience in terms of the ability to ‘bounce to a better position’ is of extreme importance, as it can lead to the development of more effective measures for flood risk management that also contribute to fairness.

#### **Shared Responsibility**

If operationalised and made applicable to real life situations, resilience also involves a shift in the distribution of responsibility in the management of water-related risks. According to the resilience paradigm, flood risk management is a responsibility shared by central governments, private parties and citizens. However, citizens may not always be equipped to assume these responsibilities.



Dr Doorn's research suggests that fairness is an important factor when it comes to distributing responsibility in flood risk management. If repairing damage done after a flood relies on private insurance, this could increase inequality among citizens, as not everyone will be able to afford it. This will in turn have an impact on the distribution of risk levels, making it uneven among members of society. In other words, citizens without private flood insurance would be disadvantaged and would be exposed to greater risks compared to those who can afford it.

According to Dr Doorn, the state should provide basic protection against flooding. The conditions under which citizens can be given a share of responsibilities related to flood risk management are of great interest to her, and she is currently working on a follow-up project that explores this further.

### **A Moral Framework**

In 2013, Dr Doorn was awarded a prestigious Veni-grant for outstanding researchers from the Netherlands Organization for Scientific Research (NWO). Her project, *The Ethics of Flood Risk Management*, explored different moral views on how optimal solutions for the society at large should be balanced against the rights of individuals to be safeguarded against flooding.

Her project's aim was to develop a moral framework that could help judge whether differences in safety level for flood risk management are acceptable, both in terms of equity and efficiency. Dr Doorn highlighted that to do this, both the notion of equity and efficiency should be clearly delineated, so they can be effectively taken into consideration within the context of flood risk management.

Ultimately, Dr Doorn hopes that this new framework, which combines ideas of equity and efficiency that she acquired through the pursuit of her different academic backgrounds, will prove to be a useful tool for future policy-making.

### **A Glance at the Future**

Dr Doorn is currently working with colleagues in Adaptive Delta Management to develop her ideas and operationalise them, so they can become applicable to policy making. Her future work will provide further insight into how citizens can be more involved in decisions related to flood risk management. 'We currently see a trend that the government expects citizens to take a larger responsibility, whether in flood risk policy or in other fields,' she explains. 'My future research will focus on what people actually need to take this responsibility. In other words, under what conditions it is fair to give citizens a larger responsibility.'

Over the next decades, climate change could have serious consequences on the environment, causing greater water scarcity and floods. Even the way water is used in one place could have serious effects on another. The work of researchers such as Dr Doorn will be of crucial importance to developing new ways of counteracting floods and water-related disasters. 'We have to look beyond the local impact here and now and see what we owe to other areas and future generations,' says Dr Doorn. 'I would advise policy makers in the water sector to involve local stakeholders in water management plans. For distributive justice, I would urge water managers to look beyond traditional cost-benefit analyses and see whether no irreversible harm is done by certain measures, either to human beings or the eco-system at large.'



# Meet the researcher

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Dr Neelke Doorn's academic background has roots in Civil Engineering (Delft 1997, BSc and MSc), Philosophy (Leiden 2005, BA and MA) and Law (OU 2016, LLB and LLM). From 1998 to 2007, Dr Doorn worked as a research engineer at the hydraulic research institute WL I Delft Hydraulics (now Deltares). After obtaining her PhD in 2011, with a thesis entitled 'Moral Responsibility in R&D networks', she became assistant professor at Delft University of Technology, where she is now an associate professor. Dr Doorn's research primarily focuses on water, with a particular interest in moral and environmental issues involved in technological risks and water governance. She looks at water-related issues from the angle of resilience, which she considers to be a very important paradigm for flood risk management. In 2013, she was awarded a prestigious Veni-grant for outstanding researchers from the Netherlands Organization for Scientific Research (NWO).

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