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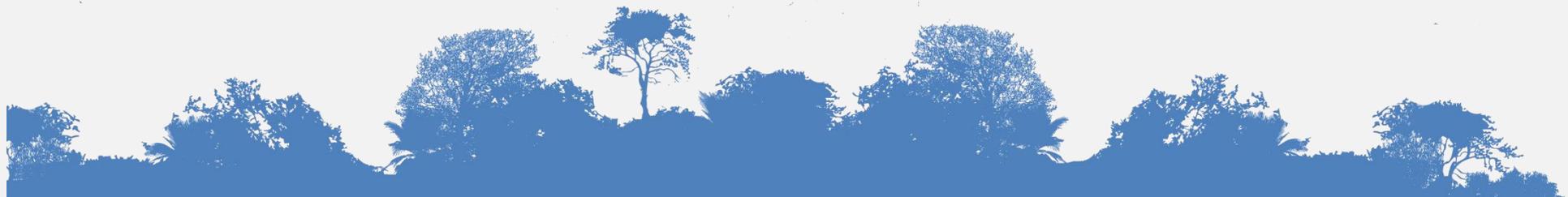
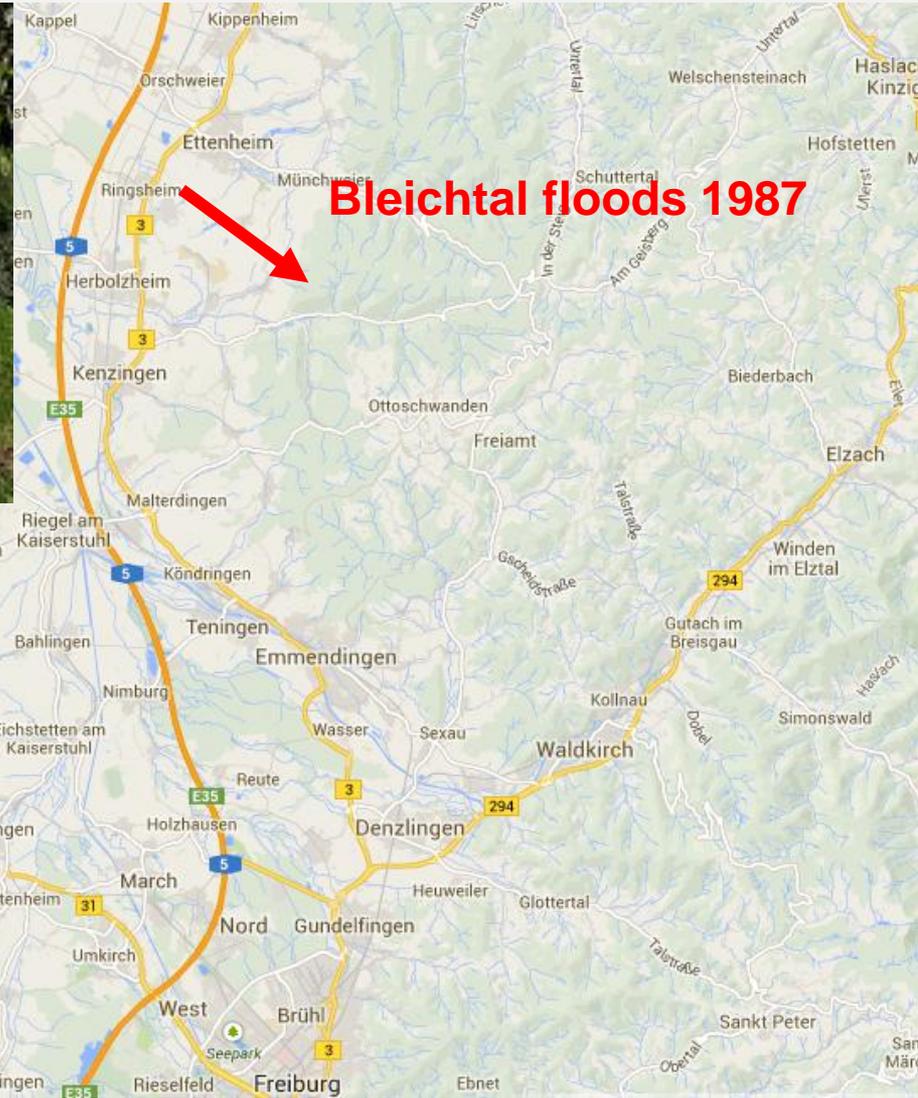
# Forests and floods: drowning in fiction or thriving on facts?

**Seminar on Forests and Natural Disasters**

**04 November 2013**

**Rotorua**

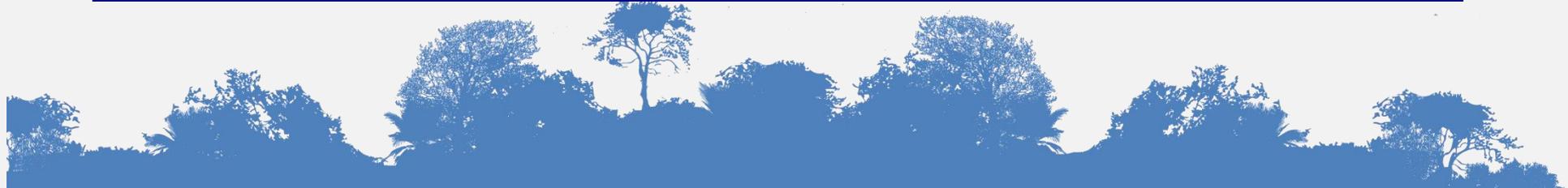




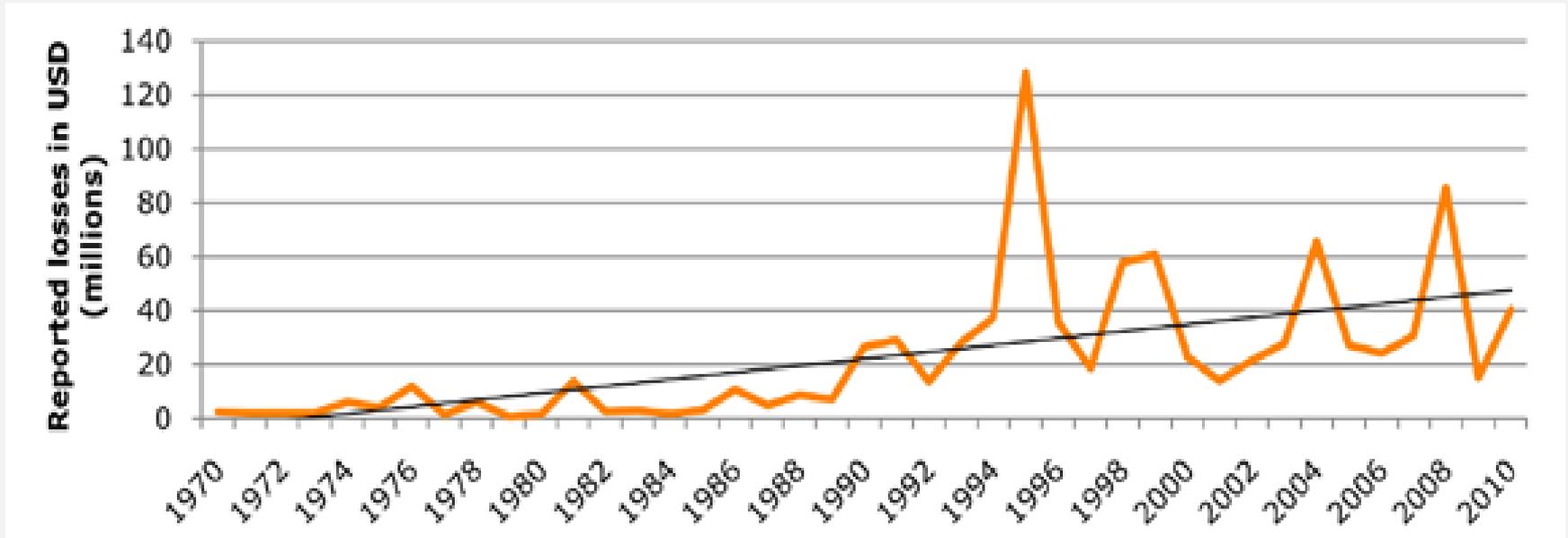
# Disasters in Asia and the Pacific

The Great East Japan Earthquake and devastating tsunami and the Southeast Asian floods that severely affected South-East Asia, particularly Thailand, were major contributors to the staggering **US\$294 billion** in losses from disasters suffered by States in the region during 2011 (**US\$46.5 billion** in Thailand alone). This amount was 80 % of the annual global disaster losses of **US\$366.1 billion**; it is even more striking that the region's single year losses were also 80 % of its total disaster losses from the decade 2000-2009.

**Source: *The Asia-Pacific Disaster Report 2012 (UNESCAP & UNISDR)***



# Economic losses on the rise



**Source: The Asia-Pacific Disaster Report 2012 (UNESCAP & UNISDR)**

# The link between forests and floods!

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# The sponge effect!

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## The Himalayan sponge

The Himalayan forests **normally** exert a sponge effect, soaking up abundant rainfall and storing it before releasing it in regular amounts over an extended period. When the forest is cleared, rivers turn muddy and swollen during the wet season, before shrinking during drier periods.

From: *Myers 1986*



# More conventional wisdom

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## What the media tells us

Bangladesh in grave danger: **deforestation** in Himalayas aggravating floods

Source: *Bangladesh Observer*, 2 June 1990

When the Himalayas were covered in **trees**, Bangladesh suffered a major flood about twice a century: one every four years is now the average.

Source: *UNEP*, 1992



# What's the evidence?

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## Yielding insights into water yields

**No experiments**, with the exception of perhaps one, have resulted in reductions in water yield with reductions in cover, or increases in yield, with increase.

*From: Bosch and Hewlett, 1982*



# What's the evidence?

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## Soil saturation

During a major rainfall event (like those that result in massive flooding), especially after prolonged periods of preceding rainfall, the forest soil becomes saturated and **water no longer filters into the soil** but instead runs off along the soil surface.

*From: FAO and CIFOR, 2005*



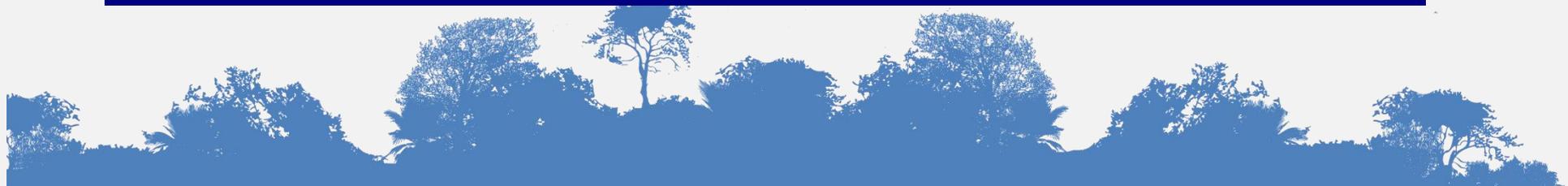
# What's the evidence?

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## The trigger of the logging ban in China

Contrary to conventional wisdom deforestation in the upper reaches of the Yangtze River in China had **no influence** on the floods. A natural forest can absorb about 30 mm of precipitation. During the monsoon season of 1998, daily precipitation of 40-140 mm was recorded and the monthly rainfall reached 800 mm.

From: *Sauer, 1999*



# What's the evidence?

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## An early American view on forests and floods

The forest floor, which has more to do with the fallen rain water than any other part of the forest, can affect its flow only so long as it has not taken up all the water it can hold. That which falls after the forest floor is saturated runs into the streams almost as fast as it would over **bare ground**.

From: *Gifford Pinchot, A Primer for Forestry, 1905*



# What's the evidence?

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## What causes major downstream floods

The **main factors** influencing major flooding given a large rainfall event, are:

- (i) the geomorphology of the area; and
- (ii) preceding rainfall.

From: *FAO and CIFOR, 2005*



# What's the evidence?

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## Not more, but larger floods

There is **no statistical evidence** that the frequency of major floods in Bangladesh has increased from 1890 to the present. ... the areal extent of big events has been increasing since 1950, in spite of the general improvement in the forest situation in at least parts of the Himalayas over recent decades.

From: *Hofer and Messerli, 2006*



# What's the evidence?

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## Beyond Bangladesh

Major floods in Bangkok and adjacent areas have been recorded for the **last 200 years**, with an extreme event on 02 December 1785, and, comparable to the 1983 flooding, in 1831.

From: *Terwiel, 1989*



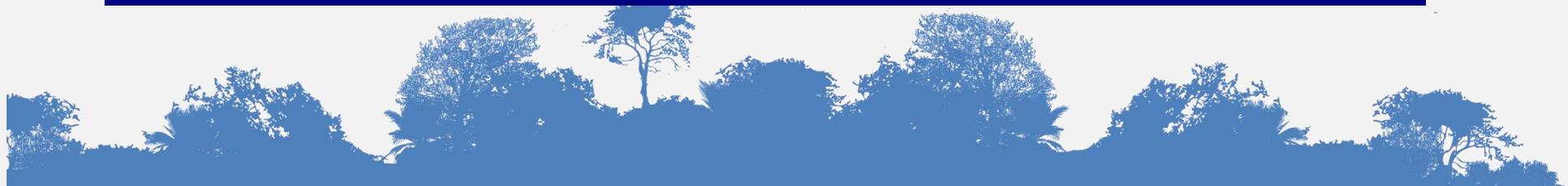
# What's the evidence?

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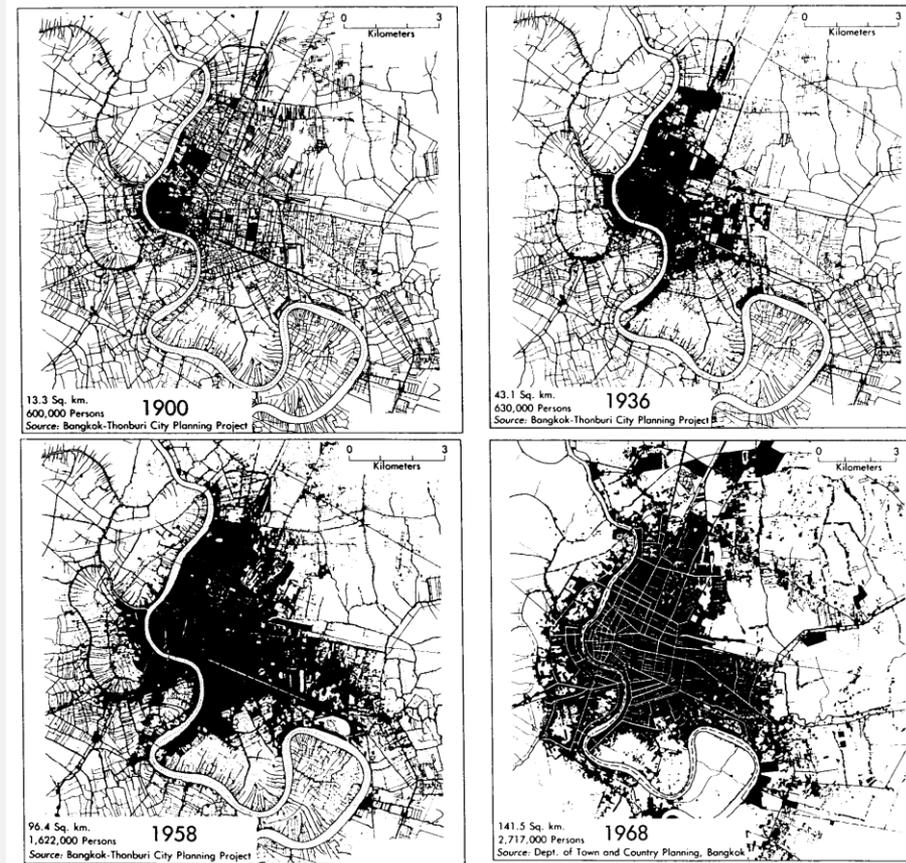
## From waterways to roads

Floods were once part of the ecological system that brought fertile sediments to the floodplains of Bangkok which were the best areas for rice growing in Thailand. During the past decades, it has become clear that **enormous changes in the man-made environment** have become the primary cause of floods.

From: *Thongchai Roachanakanan, 2012*



# Urbanization in Bangkok



**Source:**  
**Sternstein, 1982**



# Flood plains

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## Recognising the dilemma!

Within river systems, flooding is the **natural way** to discharge the water arising from large rainfall events. There is no problem at all until man decides to use some of the natural flood plain for his own use, and chooses to protect against inundation. We then face the dilemma of protecting against a natural hazard for the benefit of mankind that has chosen to live and work in flood plains.

*From: Learning to live with rivers, Institute of Civil Engineers, 2001*



# Land subsidence

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## Going under

Pumping of groundwater is one of the main causes for land subsidence, which has resulted in **deeper flooding and longer water logging.**

*From: Pramote Maiklad 1999*



# Realistic expectations

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## Forest and soil conservation for local benefits?

Effective watershed management consistently yields significant environmental services (especially at the local level), including high-quality freshwater supplies. The influence of watershed management practices on stream-flow patterns is small, and is mainly limited to watersheds up to 500 sq km in area. Forests alone will **not be able** to protect entire river basins from catastrophic events.

*From: Lauterburg 1993*



# Can floods be controlled or prevented?

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## Can floods be controlled?

“Flood control” is a common expression... But one **cannot** control floods; at best one can manage their detrimental effects. The words “flood control” are therefore not used in this report.

*From: Mekong River Commission, 2001*



# What can be done!

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## **Integrated** floodplain management

Land-use planning measures

Structural measures

Flood preparedness measures

Flood emergency measures

*From: Mekong River Commission, 2001*





**Thank you for your attention!**

## **Forests and floods**

Drowning in fiction or thriving on facts?

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