

# Crisis Prevention and Management in the Face of Climate Change

- A System's Analysis of Swedish Societal Resilience

Masteruppsats – Work in Progress, presentation Åre Risk Event 2016

# Upplägg

- Bakgrund
- Ansatser
- Fokus på systemanalys
  - Principer
  - Applicerat
- Underrättelseanalys

# Bakgrund

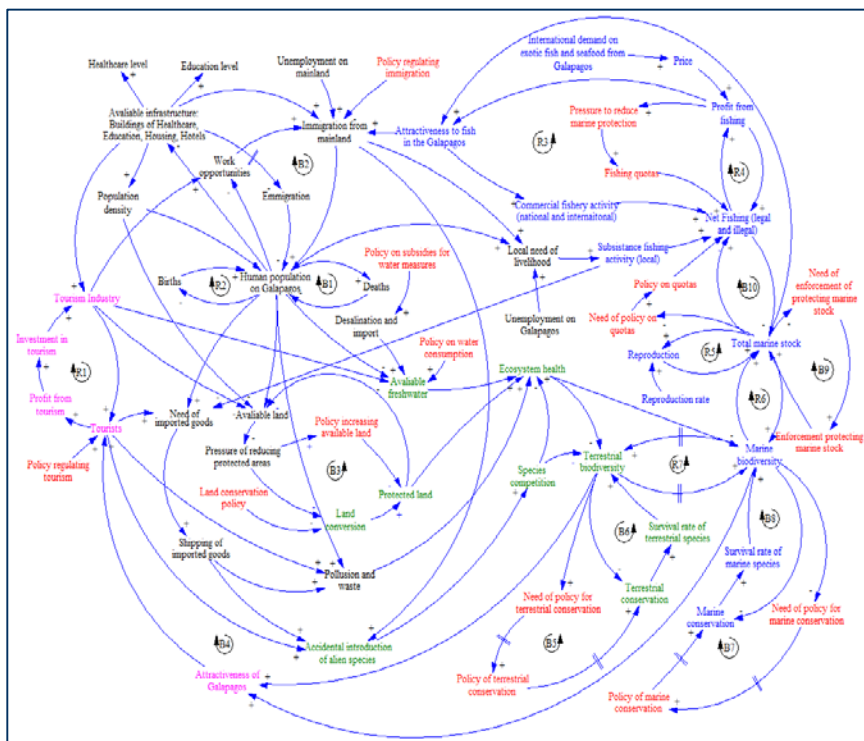


Figure 1. CLD over the Galápagos interlinked terrestrial, marine and human systems.



Myndigheten för  
samhällsskydd  
och beredskap

Datum  
2016-03-31

Diariénr  
2015-954

## Ansvar, samverkan, handling

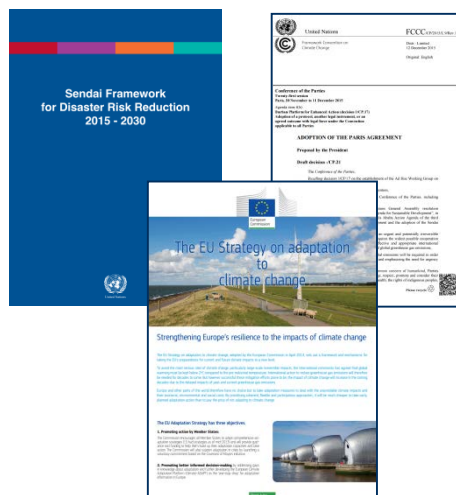
Åtgärder för stärkt krisberedskap utifrån erfarenheterna från skogsbranden i Västmanland 2014 (Ju2015/1400/SSK)

# Den framträdande bilden

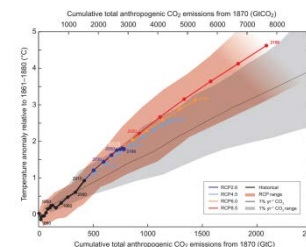
## Identifierade risker



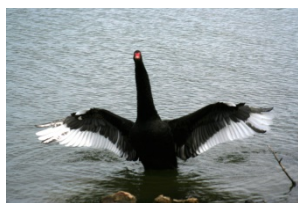
## Åtaganden



## Trender



## Oidentifierade risker



## Aktörer



## Resiliens?

**Bildkällor:**  
 Skogsbrand: [https://www.google.se/search?q=skogsbranden+i+v%C3%A4stmanland&rlz=1C1CHWA\\_enSE6485E648&espv=2&biw=2844&bih=1461&source=lnms&tbn=isch&sa=X&ved=0ahUKEwjX-bbvgPNAhVDYjokHVzrDrQQ\\_AUIBjB#tbs=sur:f&tbn=isch&q=forest+fire&imgcr=5mZPYAX27PjoM%3A](https://www.google.se/search?q=skogsbranden+i+v%C3%A4stmanland&rlz=1C1CHWA_enSE6485E648&espv=2&biw=2844&bih=1461&source=lnms&tbn=isch&sa=X&ved=0ahUKEwjX-bbvgPNAhVDYjokHVzrDrQQ_AUIBjB#tbs=sur:f&tbn=isch&q=forest+fire&imgcr=5mZPYAX27PjoM%3A)  
 Stormfällning: [https://www.google.se/search?q=stormen+gudrun&rlz=1C1CHWA\\_enSE6485E648&espv=2&biw=2844&bih=1412&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiR9obQwqPNAhXEJ5oKHd4Z89UQ\\_AUIBjB#tbs=sur:f&tbn=isch&q=wind+throw&imgcr=5MhnKY6j6EbkBM%3A](https://www.google.se/search?q=stormen+gudrun&rlz=1C1CHWA_enSE6485E648&espv=2&biw=2844&bih=1412&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiR9obQwqPNAhXEJ5oKHd4Z89UQ_AUIBjB#tbs=sur:f&tbn=isch&q=wind+throw&imgcr=5MhnKY6j6EbkBM%3A)  
 Svart svan: [https://www.google.se/search?q=black+swan&rlz=1C1CHWA\\_enSE6485E648&espv=2&biw=1420&bih=1438&source=lnms&tbn=isch&sa=X&ved=0ahUKEWj6YfM\\_aLNAhWBJoKHf3dCIUQ\\_AUIBjB#q=black+swan&tbn=isch&tbs=sur:f&imgcr=irJGMMrNnhQxWM%3A](https://www.google.se/search?q=black+swan&rlz=1C1CHWA_enSE6485E648&espv=2&biw=1420&bih=1438&source=lnms&tbn=isch&sa=X&ved=0ahUKEWj6YfM_aLNAhWBJoKHf3dCIUQ_AUIBjB#q=black+swan&tbn=isch&tbs=sur:f&imgcr=irJGMMrNnhQxWM%3A)  
 EU:s klimatanpassningsplan: [http://ec.europa.eu/clima/publications/docs/eu\\_strategy\\_en.pdf](http://ec.europa.eu/clima/publications/docs/eu_strategy_en.pdf)  
 Parisöverenskommelsen: <https://unfccc.int/resource/docs/2015/cop21/eng/09r01.pdf>  
 Sendai Framework for DRR: [http://www.preventionweb.net/files/43291\\_sendaiframeworkfordren.pdf](http://www.preventionweb.net/files/43291_sendaiframeworkfordren.pdf)  
 CO2-emissions: [https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIARS\\_SPM\\_brochure\\_en.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIARS_SPM_brochure_en.pdf)

# Teoretisk ansats och metodik

- Systemanalys och *system dynamics*
  - Konceptuell modellering
- Underrättelseanalys
- Kognitionsvetenskap

# Komplexa system är...

- Dynamiska (dynamisk komplexitet jmf. kombinatorisk)
- Tätt sammanlänkade
- Styrda av feedbacks (positiva och negativa)
- Ickelinjära
- Självorganiserande
- Adaptiva
- I ständig utveckling

Referenser:

Meadows, D. (2009). *Thinking in Systems – A Primer*. Earthscan, London.

Sterman, J. (2000). *Business Dynamics – Systems Thinking and Modelling for a Complex World*

Sterman, J. (2013). "A Banquet of Consequences. Systems thinking and Modeling for Climate Policy". MITS DM [http://sdm.mit.edu/systems\\_thinking\\_conference\\_2010/presentations/sterman.pdf](http://sdm.mit.edu/systems_thinking_conference_2010/presentations/sterman.pdf)

## Våra mentala modeller tenderar att...

- Inte vara kompatibla med **verkligheten**
- Domineras av **ovetenskaplig** slutlednings(o)förmåga
- Utgå ifrån **korta** och **godtyckligt** valda tidshorisonter
- Ha mycket **begränsade** systemgränser (*system boundaries*)
- Domineras av **undermålig förståelse** för risk, feedbacks, tidsfördröjning, distans mellan orsak och verkan i tid och rum, exponentiell tillväxt, ackumulationer och flöden (*stocks and flows*)
- Bli grumlade av olika **psykosociala processer** och psykologiska "*biases*"

Referenser exempelvis:

Meadows, D. (2009). *Thinking in Systems – A Primer*. Earthscan, London.

Kahneman, D. (2011). *Thinking Fast and Slow*. Farrar, Straus and Giroux, New York.

Sterman, J. (2000). *Business Dynamics – Systems Thinking and Modelling for a Complex World*

Sterman, J. (2013). "A Banquet of Consequences. Systems thinking and Modeling for Climate Policy". MITSDEM [http://sdm.mit.edu/systems\\_thinking\\_conference\\_2010/presentations/sterman.pdf](http://sdm.mit.edu/systems_thinking_conference_2010/presentations/sterman.pdf)

Stoknes, P. E. (2015). *What We Think About When We Try Not To Think About Global Warming*. Chelsea Green Publishing, Vermont.

# Förebygga eller förbereda?



**Bildkälla:**

[https://www.google.se/search?q=v%C3%A5g&rlz=1C1CHWA\\_enSE648SE648&espv=2&biw=1412&bih=838&source=lnms&tbn=isch&sa=X&ved=0ahUKEwi8qa\\_X6qLNAhVCGCwKHQPb-AQ\\_AUIBigB#q=scale&tbs=sur:fm&tbn=isch&imgrc=42mN\\_3RxlP6PGM%3A](https://www.google.se/search?q=v%C3%A5g&rlz=1C1CHWA_enSE648SE648&espv=2&biw=1412&bih=838&source=lnms&tbn=isch&sa=X&ved=0ahUKEwi8qa_X6qLNAhVCGCwKHQPb-AQ_AUIBigB#q=scale&tbs=sur:fm&tbn=isch&imgrc=42mN_3RxlP6PGM%3A)

Type: Non-commercial usage with modification

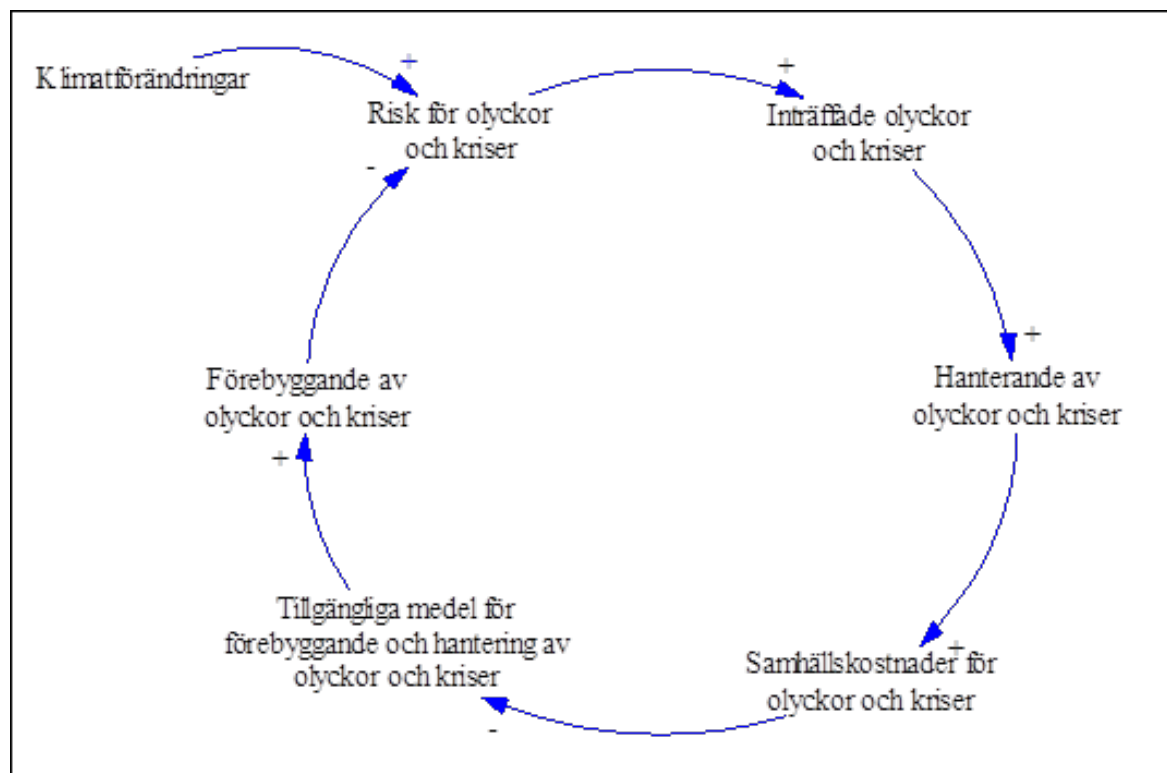
<https://youtu.be/AnTwZVviXyY?t=3m35s>

**Källa för videoklipp:** MIT OpenCourseWare, Published on Jul 28, 2014  
MIT 15.871 Introduction to System Dynamics, Fall 2013. Instructor: John Sterman  
View the complete course: <http://ocw.mit.edu/15-871F13>

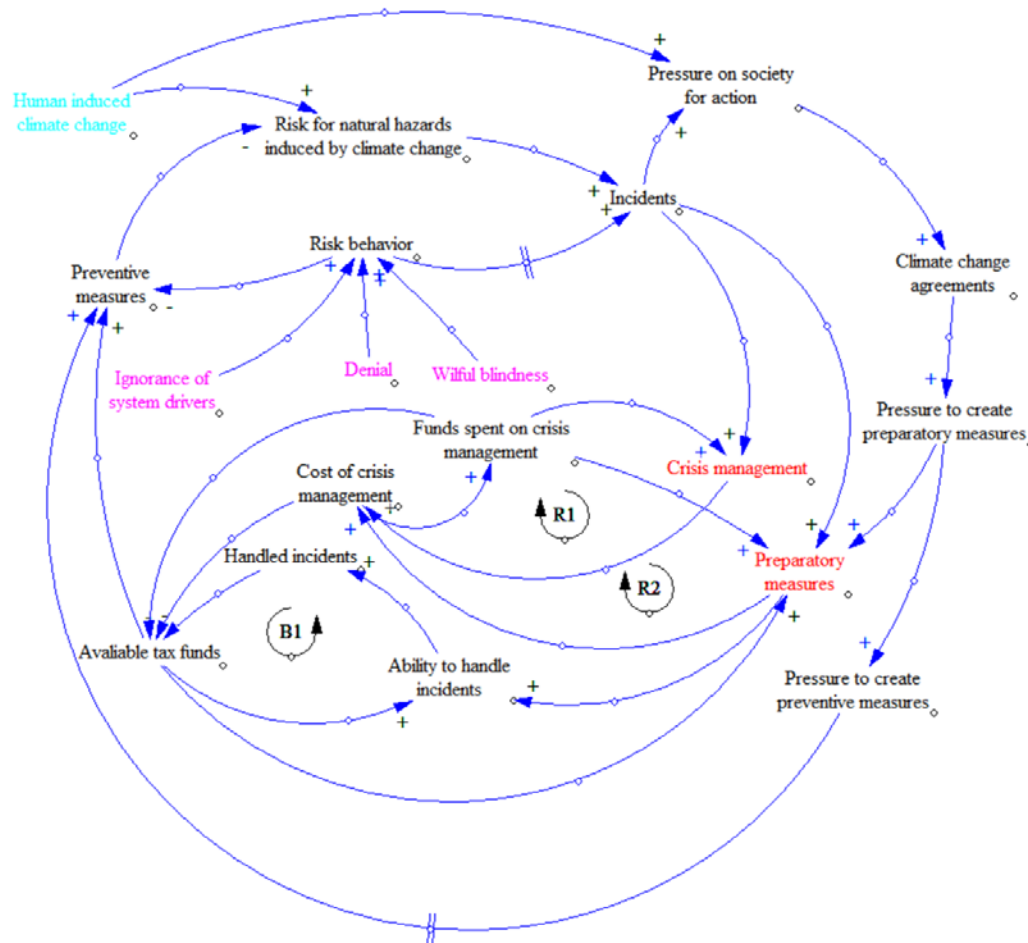
**Notera:** Domino effect cartoon © cartoonbank.com/Coné Nast, artist Arnie Levin. All rights reserved and excluded from the MIT Creative Commons license. Here referred to as the U.S. Copyright Office Fair Use Doctrine, use for non-commercial, non-profit educational purposes (<http://www.copyright.gov/fair-use/more-info.html>).



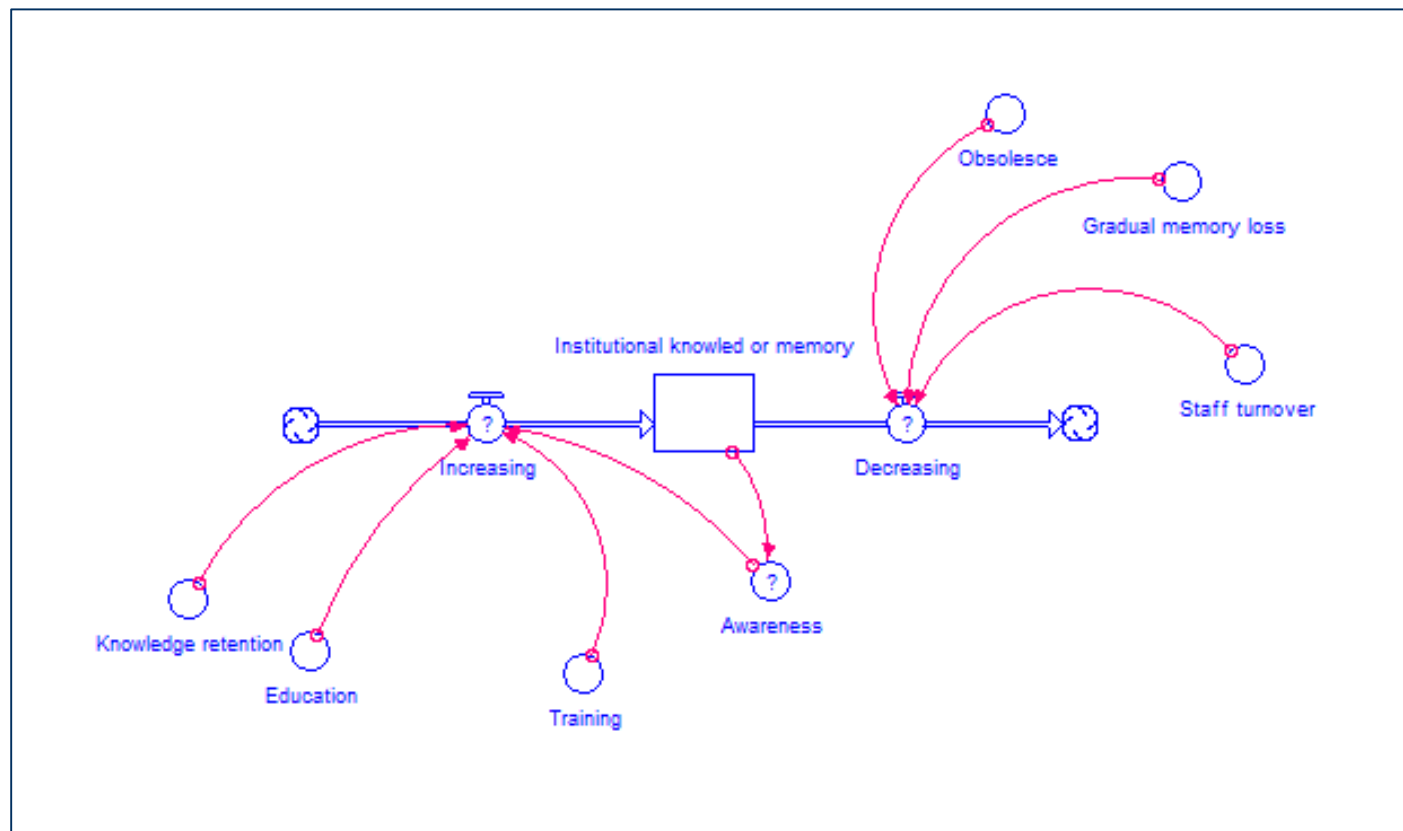
# "Systems Thinking"



# "Causal Loop Diagram" (CLD)

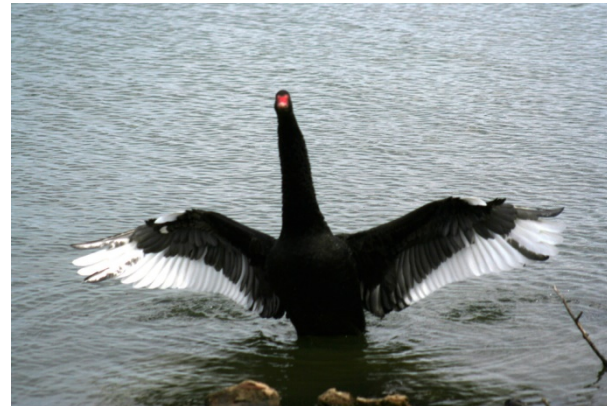


# "Stocks and Flows"



# Beslutsfattande i rättan tid på osäker grund...

Kan underrättelseanalys användas för att underlätta beslutsfattande även för beslut på myndighetsnivå gällande DRR och CCA?



**Bildkällor:**

Donald Rumsfeld. Creative Commons.

[https://www.google.se/search?q=rumsfeld&rlz=1C1CHWA\\_enSE648SE648&espv=2&biw=1420&bih=1438&source=Inms&tbm=isch&sa=X&ved=0ahUKewjQIKOI\\_aLNAhVjP5oKHWtdCI4Q\\_AUIBigB#q=rumsfeld&tbm=isch&tbs=sur:f&imgrc=V6D3UVahNzXAZM%3A](https://www.google.se/search?q=rumsfeld&rlz=1C1CHWA_enSE648SE648&espv=2&biw=1420&bih=1438&source=Inms&tbm=isch&sa=X&ved=0ahUKewjQIKOI_aLNAhVjP5oKHWtdCI4Q_AUIBigB#q=rumsfeld&tbm=isch&tbs=sur:f&imgrc=V6D3UVahNzXAZM%3A)

Black swan spreading his wings. Creative Commons

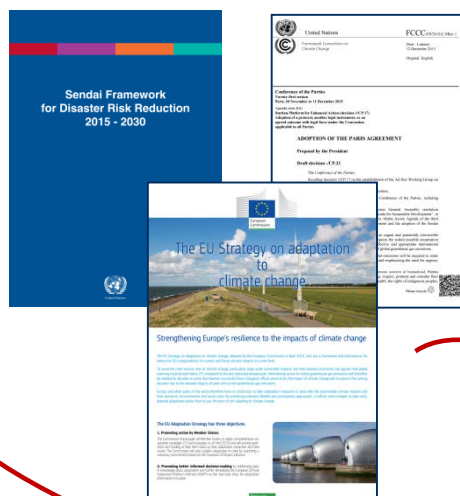
[https://www.google.se/search?q=black+swan&rlz=1C1CHWA\\_enSE648SE648&espv=2&biw=1420&bih=1438&source=Inms&tbm=isch&sa=X&ved=0ahUKewjg6YfM\\_aLNAhWBIJoKHf3dCiUQ\\_AUIBigB#q=black+swan&tbm=isch&tbs=sur:f&imgrc=irJGMMrNnhQxWM%3A](https://www.google.se/search?q=black+swan&rlz=1C1CHWA_enSE648SE648&espv=2&biw=1420&bih=1438&source=Inms&tbm=isch&sa=X&ved=0ahUKewjg6YfM_aLNAhWBIJoKHf3dCiUQ_AUIBigB#q=black+swan&tbm=isch&tbs=sur:f&imgrc=irJGMMrNnhQxWM%3A)

# Den önskvärda bilden

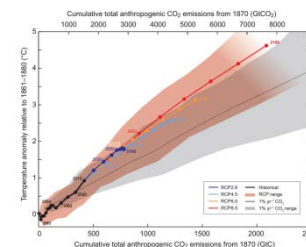
Identifierade risker



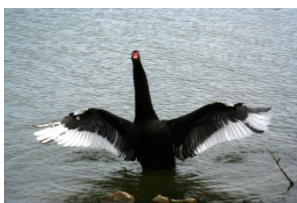
Åtaganden



Trender



Oidentifierade risker



Aktörer



Resiliens!

**Bildkällor:**  
 Skogsbrand: [https://www.google.se/search?q=skogsbranden+i+v%C3%A4stmanland&rlz=1C1CHWA\\_enSE6485E648&espv=2&biw=2844&bih=1461&source=lnms&tbn=isch&sa=X&ved=0ahUKEwjlx-bbvgPNAhVDYjokHVzrDrQQ\\_AUIBigB#tbs=sur:f&tbn=isch&q=forest+fire&imgcr=5mZPYAX27PjoM%3A](https://www.google.se/search?q=skogsbranden+i+v%C3%A4stmanland&rlz=1C1CHWA_enSE6485E648&espv=2&biw=2844&bih=1461&source=lnms&tbn=isch&sa=X&ved=0ahUKEwjlx-bbvgPNAhVDYjokHVzrDrQQ_AUIBigB#tbs=sur:f&tbn=isch&q=forest+fire&imgcr=5mZPYAX27PjoM%3A)  
 Stormfällning: [https://www.google.se/search?q=stormen+gudrun&rlz=1C1CHWA\\_enSE6485E648&espv=2&biw=2844&bih=1412&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiR9obQwqPNAhXEJ5oKHd4ZB9UQ\\_AUIBigB#tbs=sur:f&tbn=isch&q=wind+throw&imgcr=5MhnKY6E6bBM%3A](https://www.google.se/search?q=stormen+gudrun&rlz=1C1CHWA_enSE6485E648&espv=2&biw=2844&bih=1412&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiR9obQwqPNAhXEJ5oKHd4ZB9UQ_AUIBigB#tbs=sur:f&tbn=isch&q=wind+throw&imgcr=5MhnKY6E6bBM%3A)  
 Svart svan: [https://www.google.se/search?q=black+swan&rlz=1C1CHWA\\_enSE6485E648&espv=2&biw=1420&bih=1438&source=lnms&tbn=isch&sa=X&ved=0ahUKEWj6YfM\\_aLNahWBJoKHf3dCIUQ\\_AUIBigB#q=black+swan&tbn=isch&tbs=sur:f&imgcr=irJGMMrNnhQxWM%3A](https://www.google.se/search?q=black+swan&rlz=1C1CHWA_enSE6485E648&espv=2&biw=1420&bih=1438&source=lnms&tbn=isch&sa=X&ved=0ahUKEWj6YfM_aLNahWBJoKHf3dCIUQ_AUIBigB#q=black+swan&tbn=isch&tbs=sur:f&imgcr=irJGMMrNnhQxWM%3A)  
 EU:s Klimatanpassningsplan: [http://ec.europa.eu/clima/publications/docs/eu\\_strategy\\_en.pdf](http://ec.europa.eu/clima/publications/docs/eu_strategy_en.pdf)  
 Parisöverenskommelsen: <https://unfccc.int/resource/docs/2015/cop21/eng/09r01.pdf>  
 Sendai Framework for DRR: [http://www.preventionweb.net/files/43291\\_sendaiframeworkfordren.pdf](http://www.preventionweb.net/files/43291_sendaiframeworkfordren.pdf)  
 CO2-emissions: [https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIARS\\_SPM\\_brochure\\_en.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIARS_SPM_brochure_en.pdf)

Tack för uppmärksamheten!

Emelie Danielsson [emelie.danielsson@natgeo.su.se](mailto:emelie.danielsson@natgeo.su.se)  
Masterprogrammet i miljövard och fysisk planering  
Institutionen för naturgeografi, Stockholms universitet