

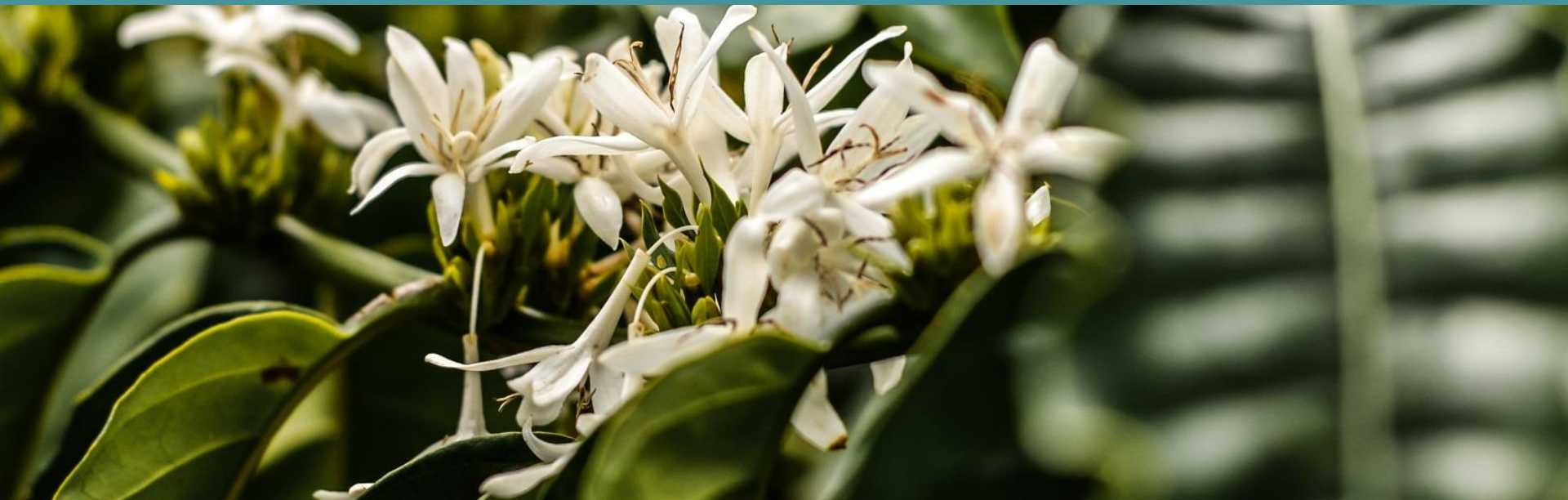
# Peak coffee?



RESEARCH PROGRAM ON  
**Climate Change,  
Agriculture and  
Food Security**



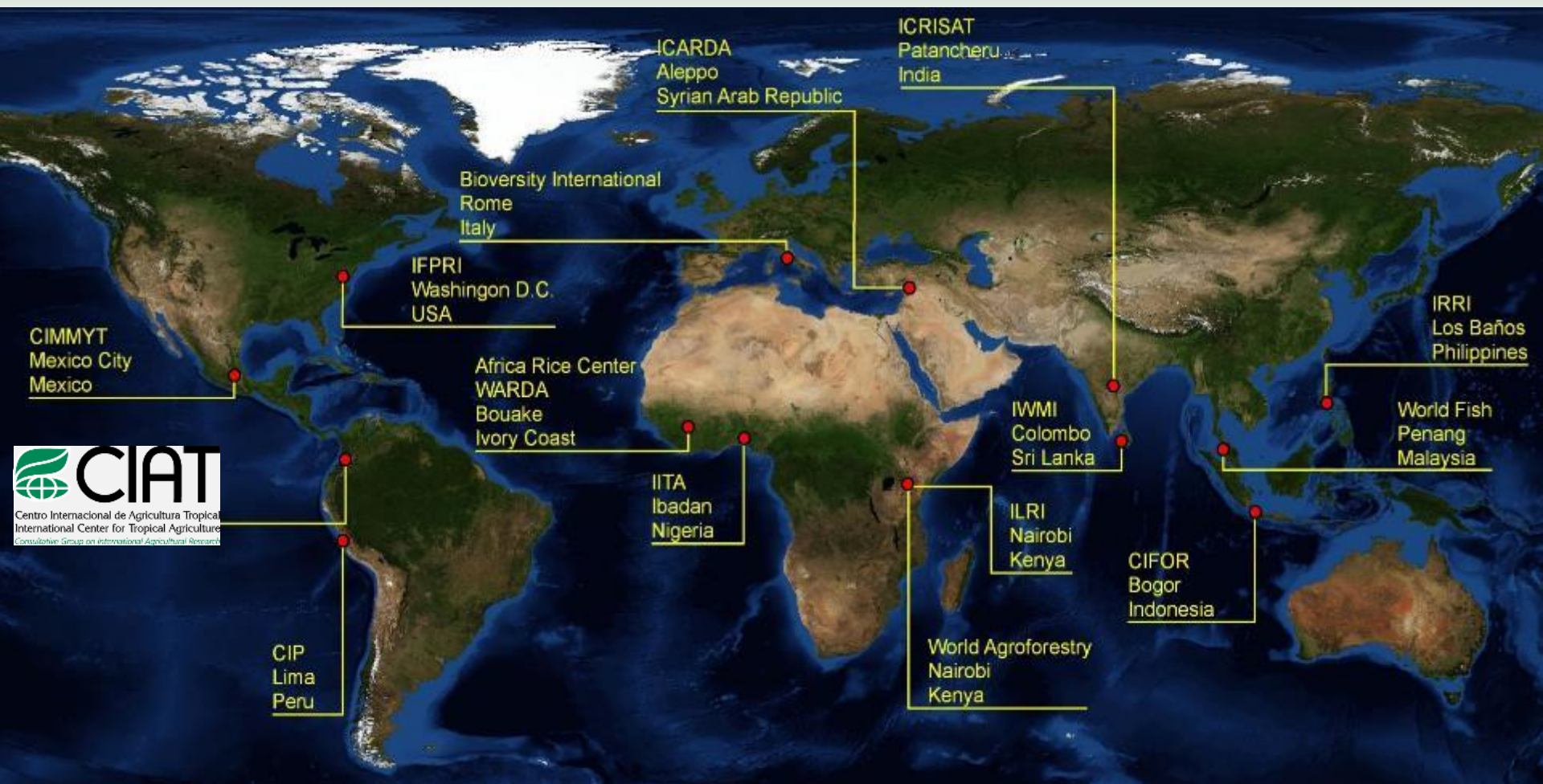
## Die Folgen des Klimawandels für Arabica Kaffee



Led by



- A global partnership that unites organizations engaged in research for a food secure future
- 15 research centers engaged in 15 CGIAR Research Programs



## **Peak coffee!?**

**Werden wir auch in 20 Jahren noch Kaffee trinken?**

**Wo wird unser Kaffee herkommen?**

**Welche Lösung gibt es für das Problem?**



# Die Zukunft der Kaffeeproduktion



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Agriculture and  
Food Security



Picture: N. Palmer

# Die Kaffeepflanze



- *C. arabica*
  - „Arabica coffee“
  - Origin Ethiopian Highlands
  - Cool tropical climate
  - Heat sensitive
- *C. canephora*
  - „Robusta coffee“
  - Origin in Congo Basin
  - Hot-wet tropical climate
  - Frost sensitive



# Erste Auswirkungen



- Rust crisis in Central America
- Increased night time temperatures a likely cause

Food Sec. (2015) 7:303–321  
DOI 10.1007/s12571-015-0446-9

ORIGINAL PAPER

## The coffee rust crises in Colombia and Central America (2008–2013): impacts, plausible causes and proposed solutions

Jacques Avelino • Marco Cristancho • Selena Georgiou •  
Pablo Imbach • Lorena Aguilar • Gustavo Bornemann •  
Peter Läderach • Francisco Anzueto • Allan J. Hruska •  
Carmen Morales

# Erste Auswirkungen



- Coffee berry borer incidence increased
- Higher temperatures result in higher reproduction rate

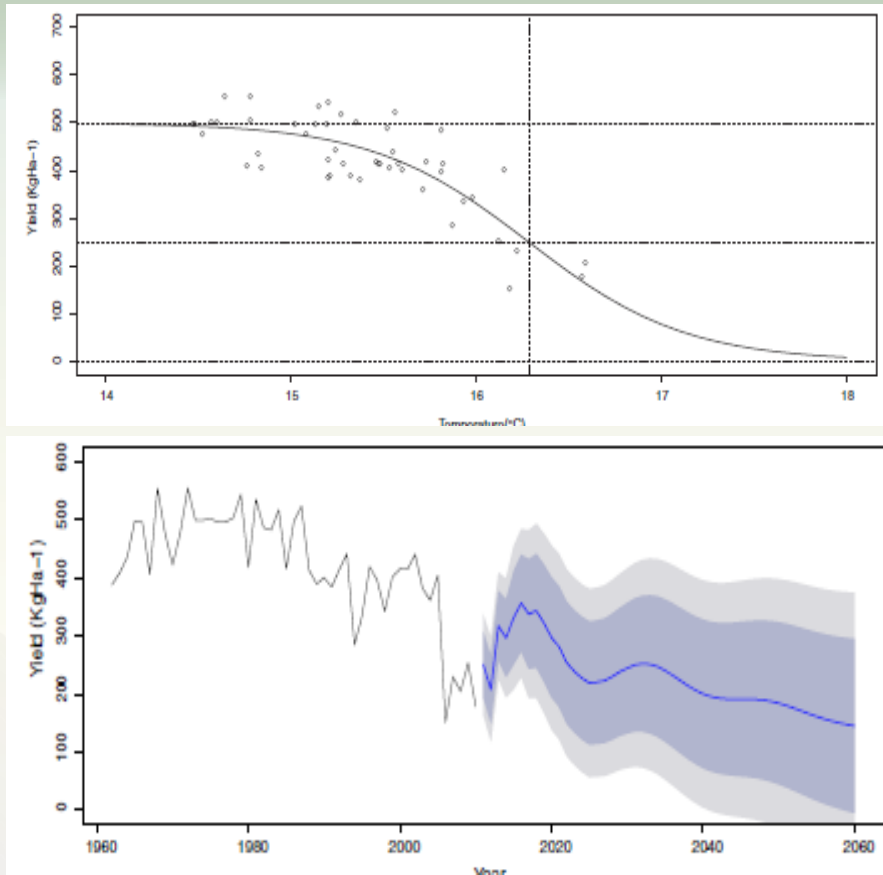
OPEN ACCESS Freely available online

PLoS one

## Some Like It Hot: The Influence and Implications of Climate Change on Coffee Berry Borer (*Hypothenemus hampei*) and Coffee Production in East Africa

Juliana Jaramillo<sup>1,2\*</sup>, Eric Muchugu<sup>2,3</sup>, Fernando E. Vega<sup>3</sup>, Aaron Davis<sup>4</sup>, Christian Borgemeister<sup>2</sup>, Adenirin Chabi-Olaye<sup>2</sup>

# Erste Auswirkungen



- Yields were reduced in Tanzania
- Every 1°C increase reduces yields by 137 kg/ha



## *Coffea arabica* yields decline in Tanzania due to climate change: Global implications

A.C.W. Craparo<sup>a,\*</sup>, P.J.A. Van Asten<sup>b</sup>, P. Läderach<sup>c</sup>, L.T.P. Jassogne<sup>b</sup>, S.W. Grab<sup>a</sup>

<sup>a</sup> School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, P/Bag 3, WITS, 2050, South Africa

<sup>b</sup> International Institute of Tropical Agriculture (IITA), P.O. Box 7878, Kampala, Uganda

<sup>c</sup> International Center for Tropical Agriculture (CIAT), Cali, Colombia



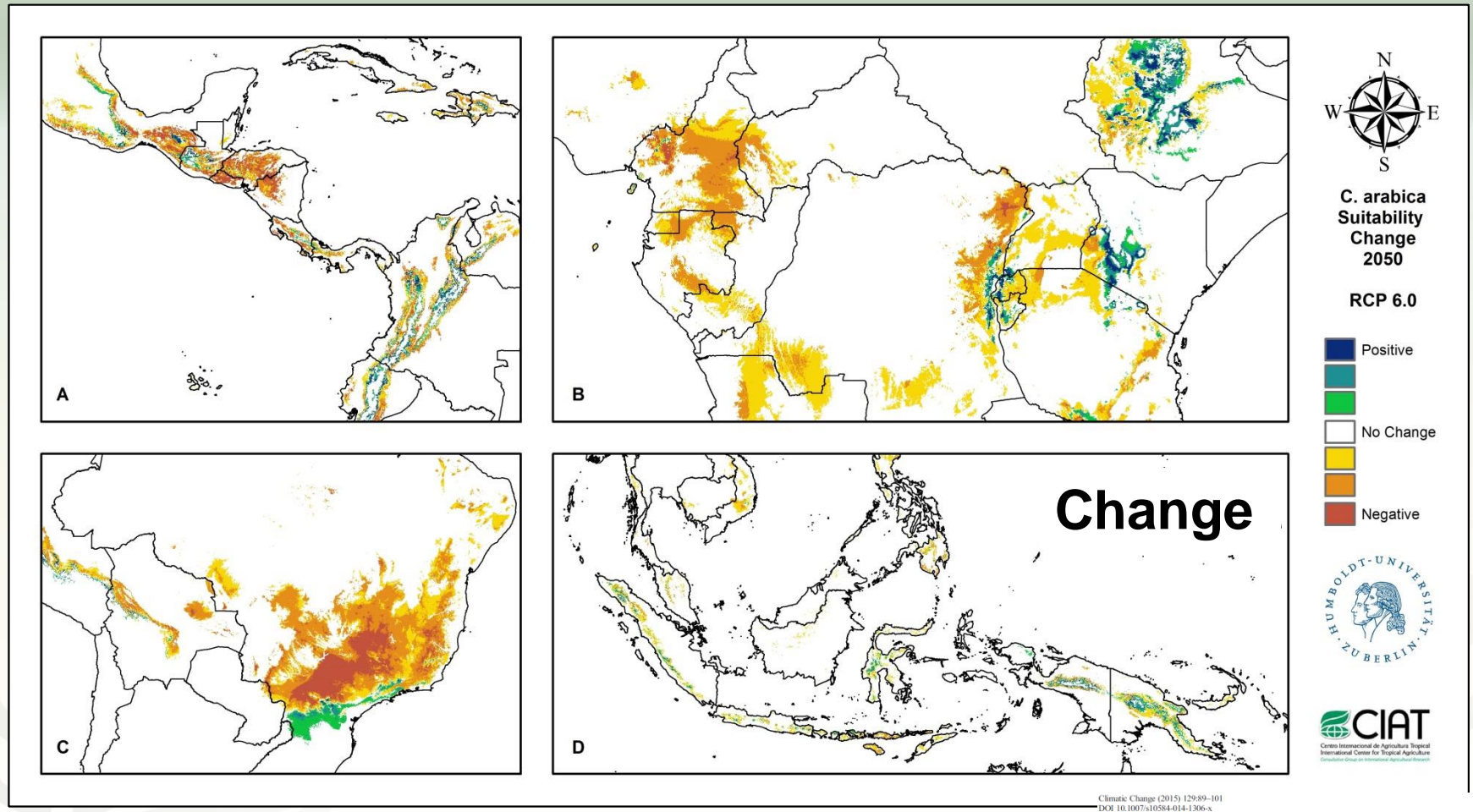


# Erste Auswirkungen



- “The climate has become unpredictable, it rains less and very irregularly, my yield has decreased and I have more pest and disease problems.”
  - Don Pedro, Nicaragua, Madriz, January, 2010
- Income uncertainty results in increased migration

# Klimaprojektionen - Arabica



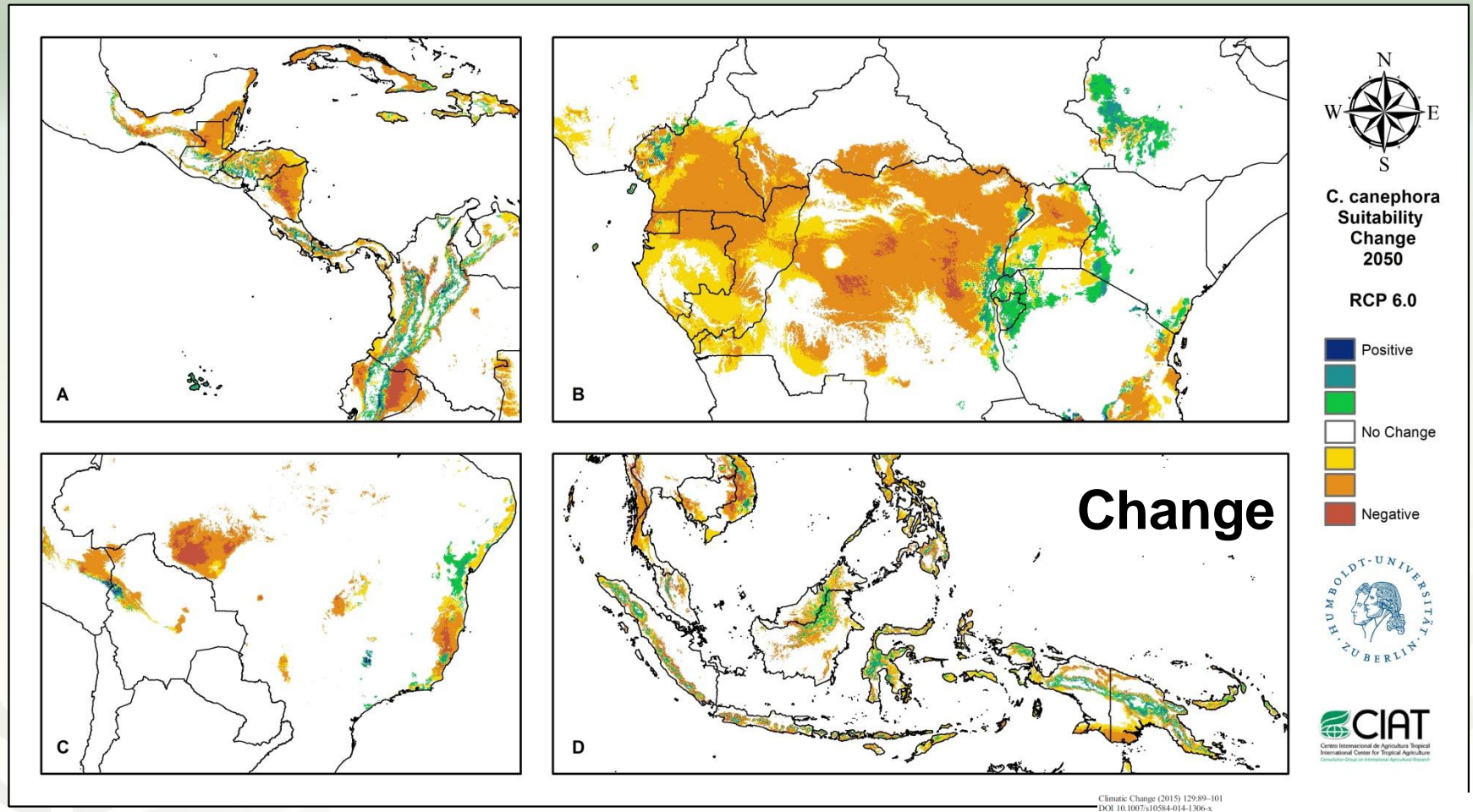
A bitter cup: climate change profile of global production  
of Arabica and Robusta coffee

Christian Bunn · Peter Läderach ·  
Orlana Ovalle Rivera · Dieter Kirschke

# Klimaprojektionen - Robusta



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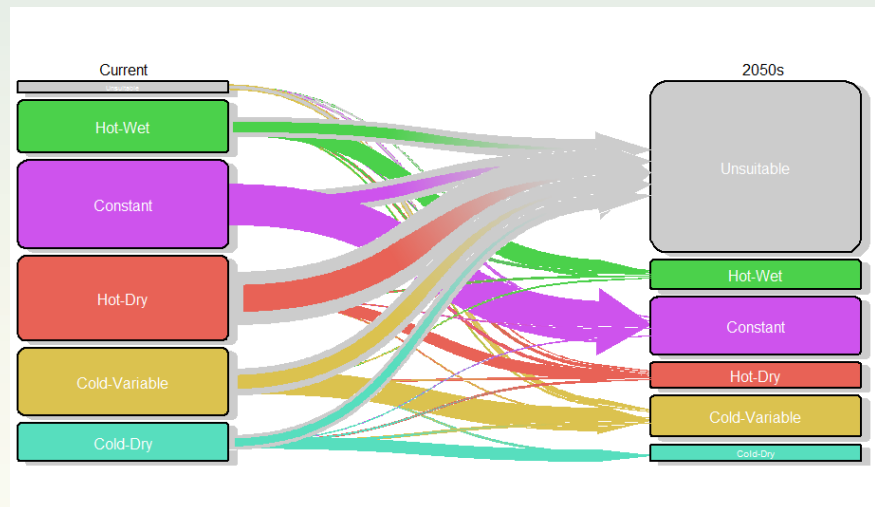


A bitter cup: climate change profile of global production  
of Arabica and Robusta coffee

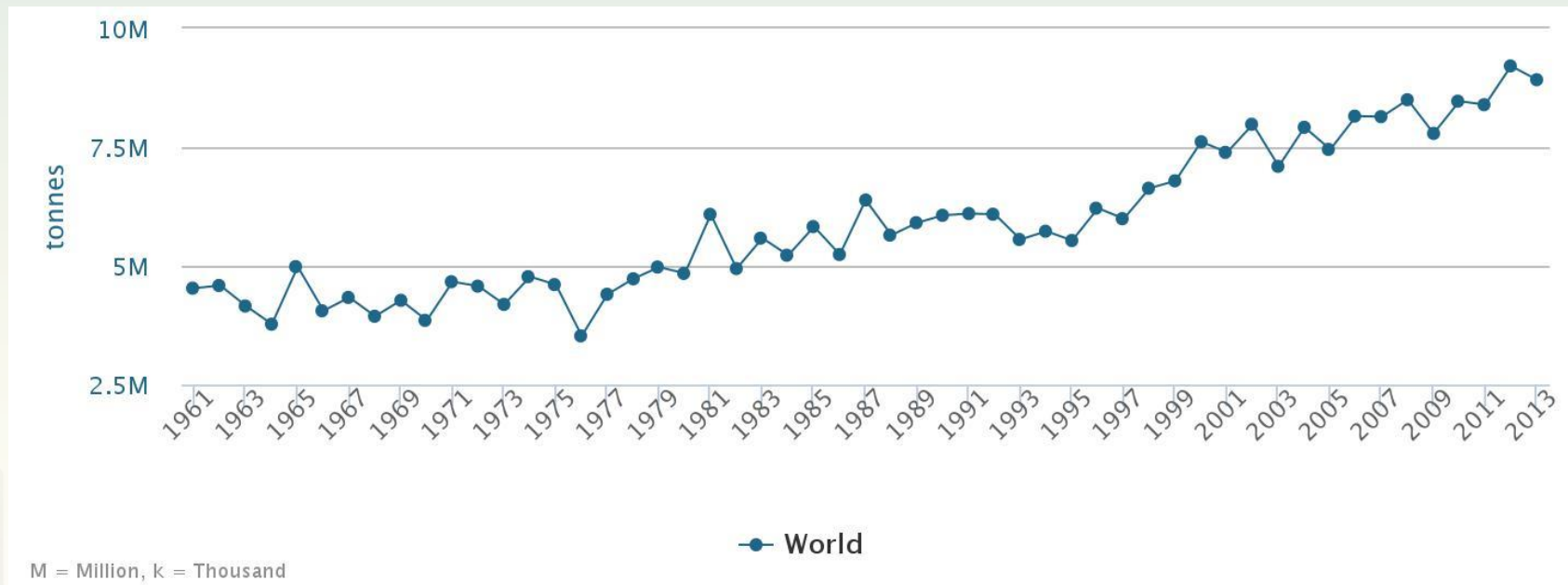
Christian Bunn · Peter Läderach ·  
Oriana Ovalle Rivera · Dieter Kirschke



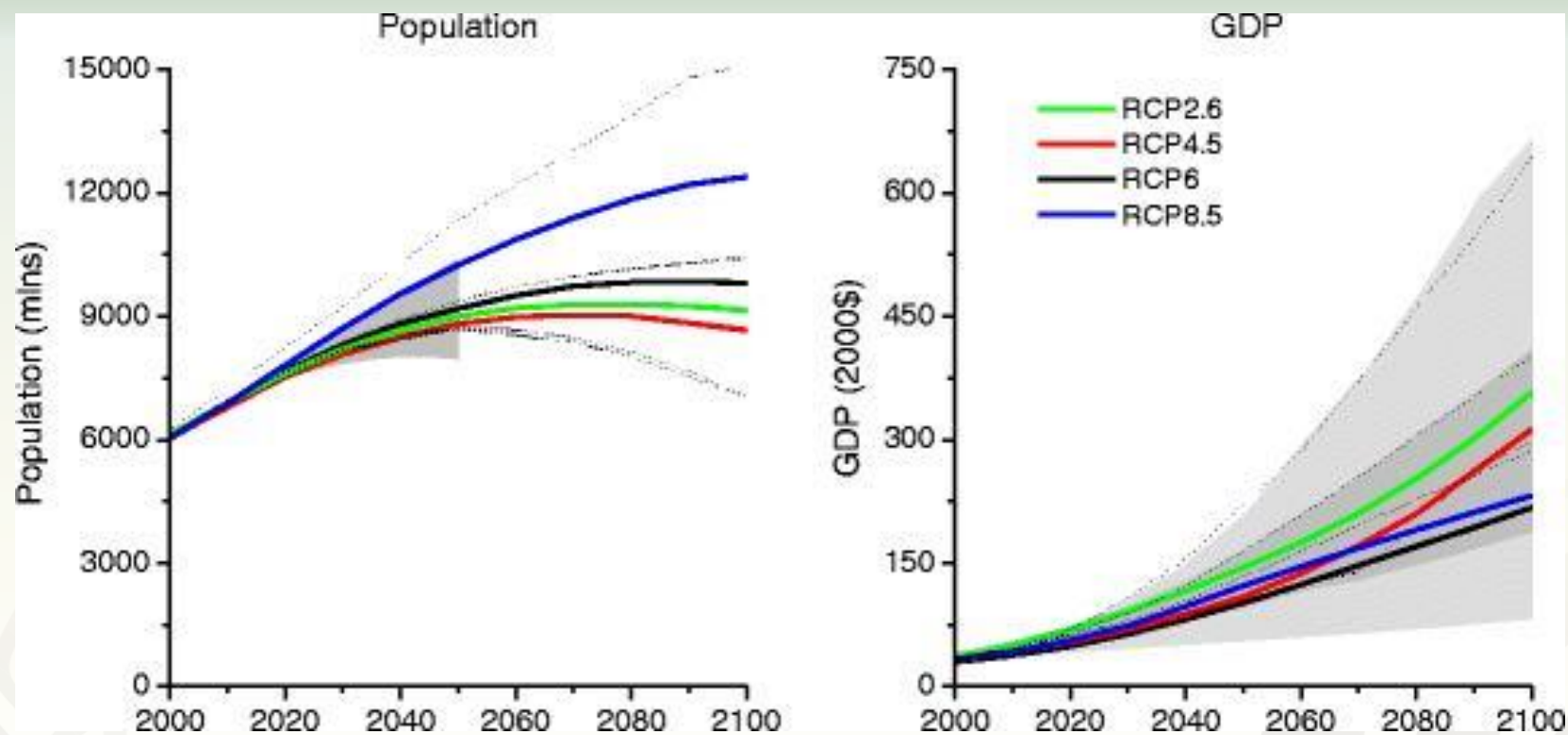
- Etwa 50% der geeigneten Fläche verloren
- Regionen mit trockenen und heißen Bedingungen am stärksten betroffen
- Regionen in Äquatornähe weniger betroffen
- Höhenmigration



## Globale Kaffeeproduktion seit 1960



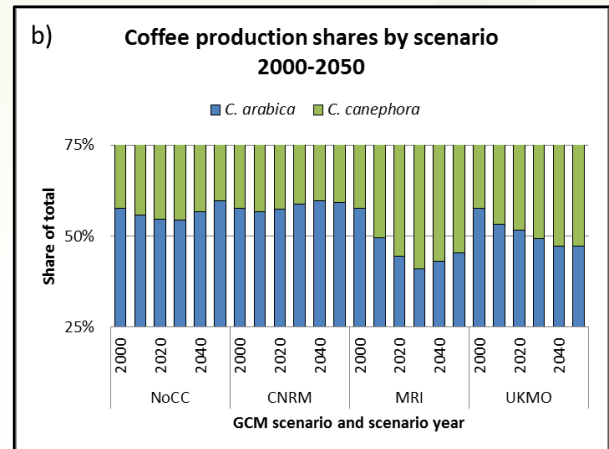
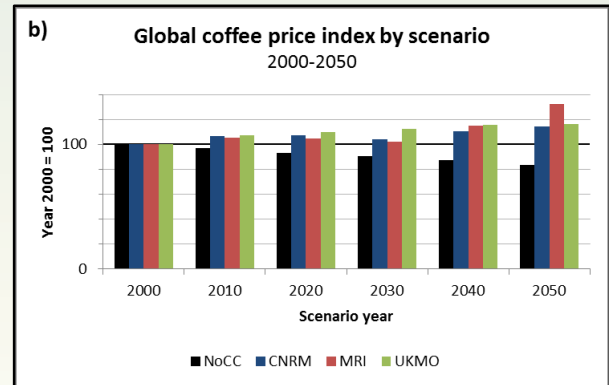
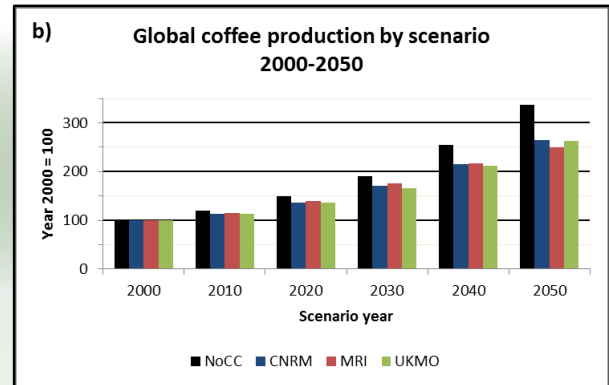
# Klimaprojektionen





# Klimaprojektionen

- Ohne Klimawandel:
  - 3.5-mal höhere Nachfrage
  - Geringere Preise
  - Gleichbleibender Arabica Anteil
- Mit Klimawandel
  - 2.5-mal höhere Nachfrage
  - Höhere Preise
  - Reduzierter Arabica Anteil



# Die Zukunft der Kaffeeproduktion



- 50% geeignete Fläche
- 100% mehr Anbaufläche
- 25% weniger Produktion
- 50% höhere Preise
- Mehr Robusta

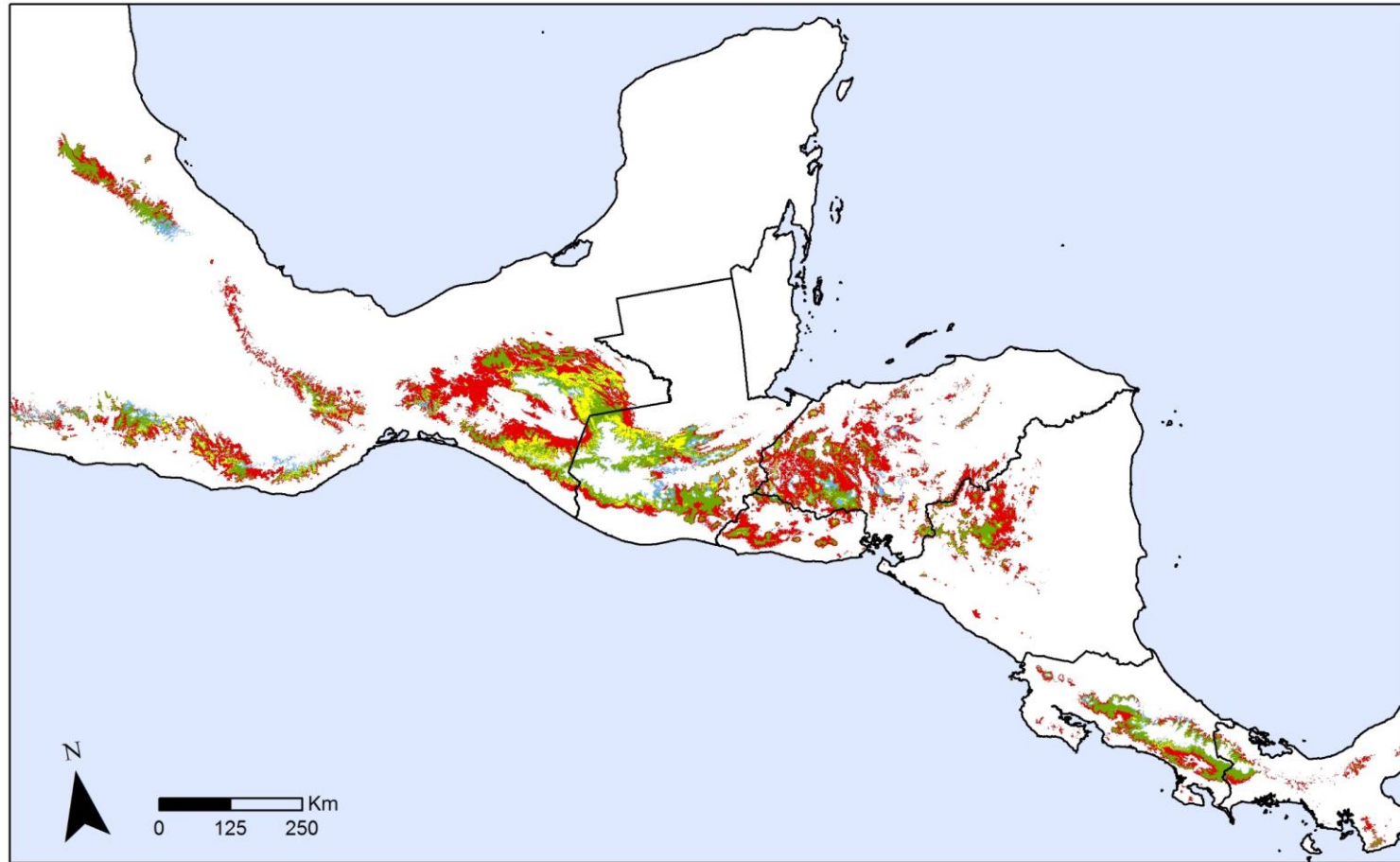
# Welche Lösung gibt es für das Problem?

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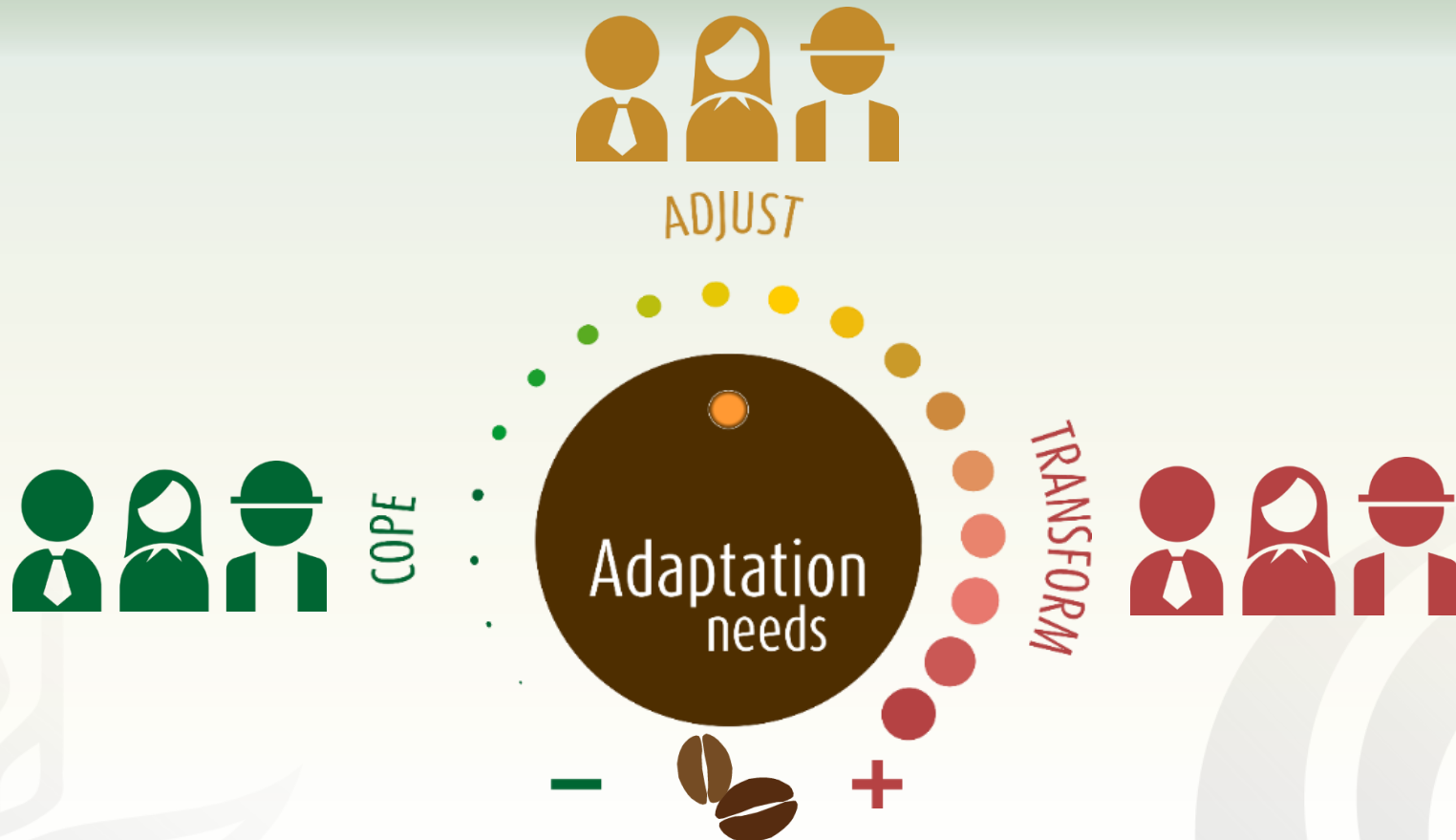


# Auswirkungszonen



Arabica impact zones  
2050s climate

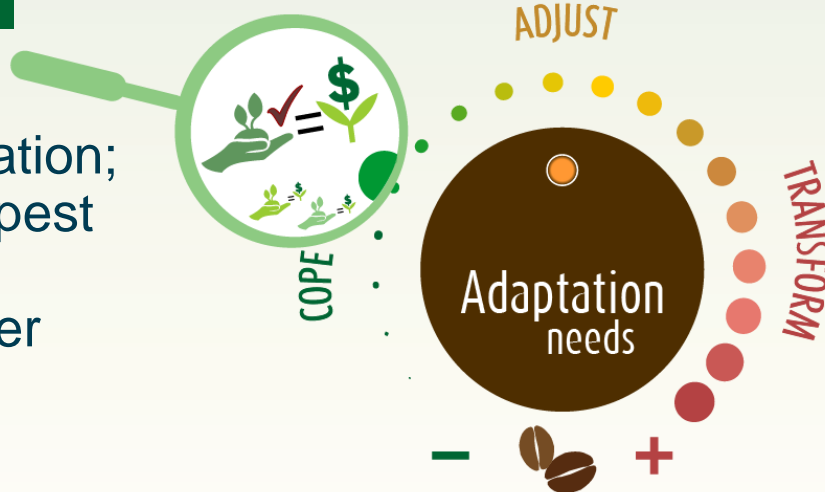
# Lösungen sind ortsspezifisch!



# Coping zone

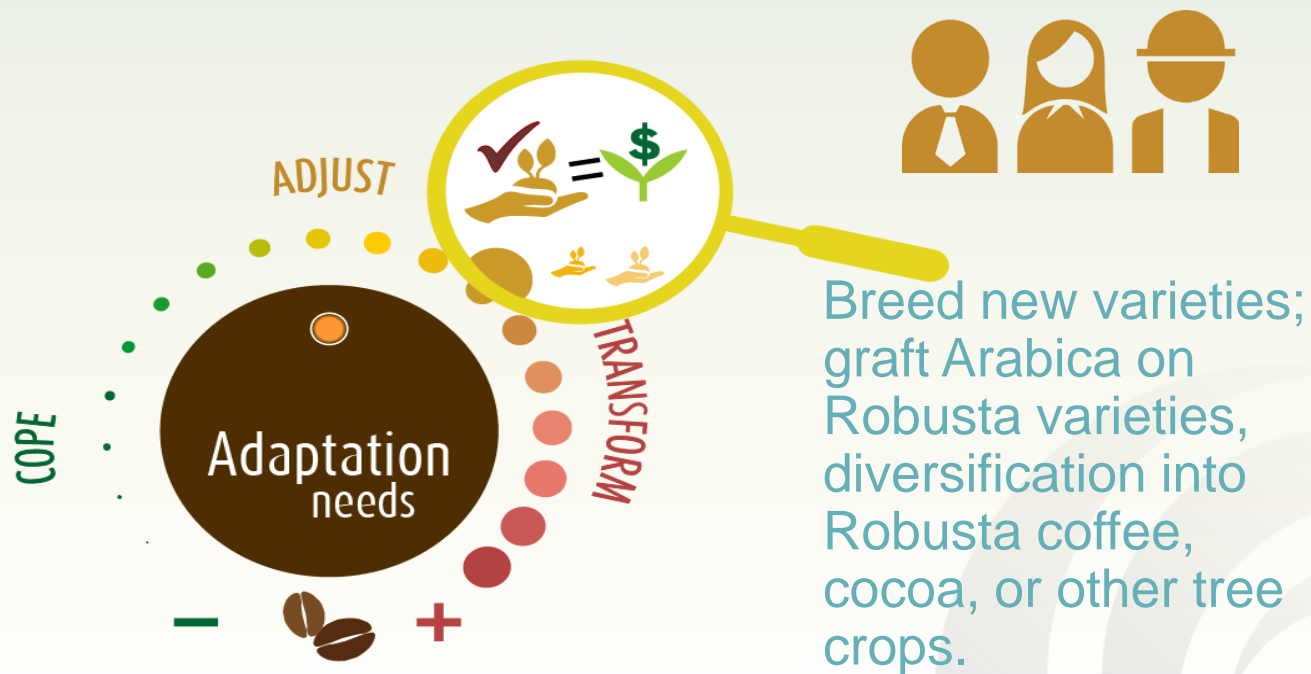


Shade and irrigation;  
improved crop, pest  
and diseases,  
shade, soil, water  
and fertility  
management

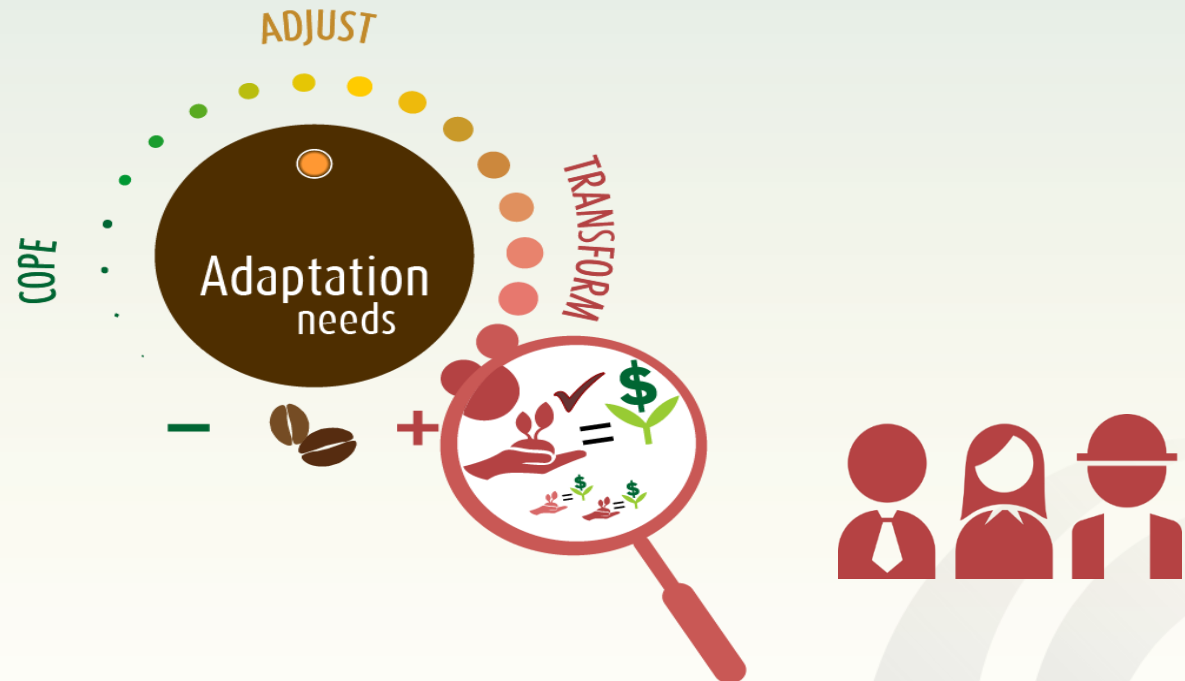




# Adjustment zone

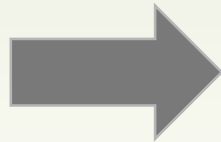


# Transformation zone

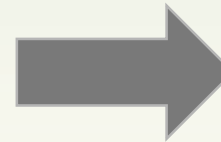


Move from diversification to replacing crops, emigrate to other region, off farm employment

# Impact zone specific portfolios



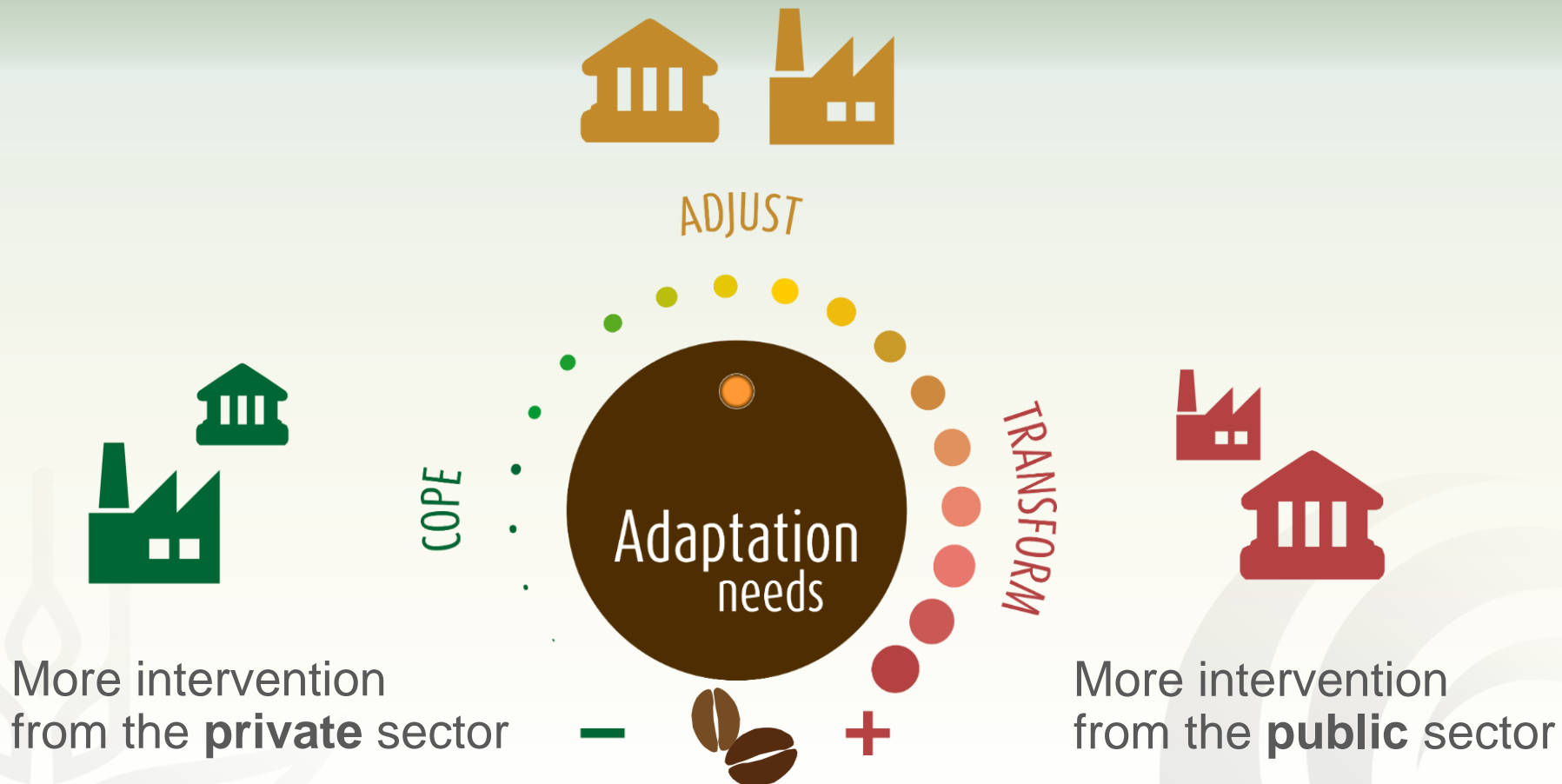
**Tailored CSA  
investment plans**



**Different sources  
of investment**



# Public-private partnerships



# Die Zukunft der Kaffeeproduktion



- Es muss **jetzt** gehandelt werden
- Wissenschaft leitet Anreize zu Anpassung von Wertschöpfungsketten
- Kooperation ist unbequem aber notwendig
- Das Thema wird uns kontinuierlich begleiten

# Die Zukunft der Kaffeeproduktion



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Agriculture and  
Food Security



Picture: N. Palmer



# Vielen Dank!



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Agriculture and  
Food Security**



## Präsentation Kaffeeröster-Tagung, Hamburg C. Bunn et al., 19/04/2016

