



Potsdam Institute for
Climate Impact Research

Presentation by Dr. Benjamin Leon Bodirsky

The first Copernican revolution



Refracting telescope
(1609)



Compound optical microscope
(1595)

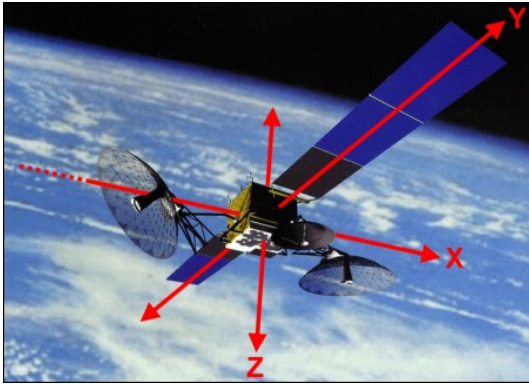
The second Copernican revolution



A macroscope

The second Copernican revolution

Bird's eye perspective



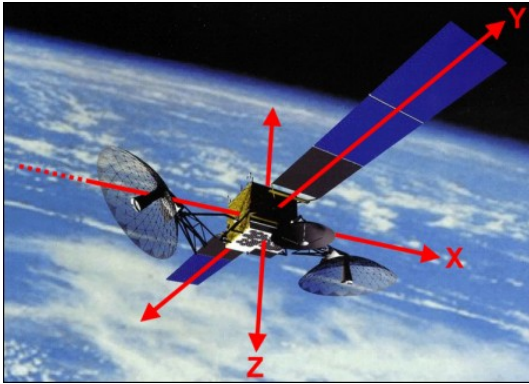
A satellite

Schellnhuber, 1999, *Nature*

Illustrations:
wikimedia commons (left, middle), own (right)

The second Copernican revolution

Bird's eye perspective



A satellite

Mimicry



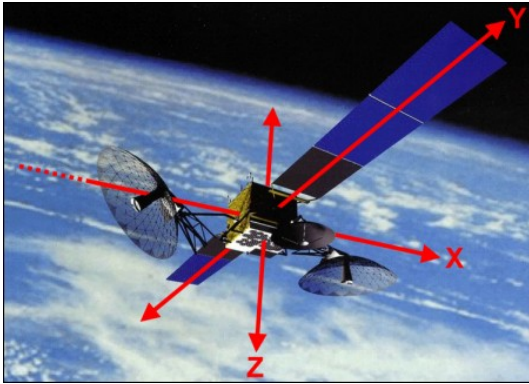
Biosphere 2 experiment

Schellnhuber, 1999, *Nature*

Illustrations:
wikimedia commons (left, middle), own (right)

The second Copernican revolution

Bird's eye perspective



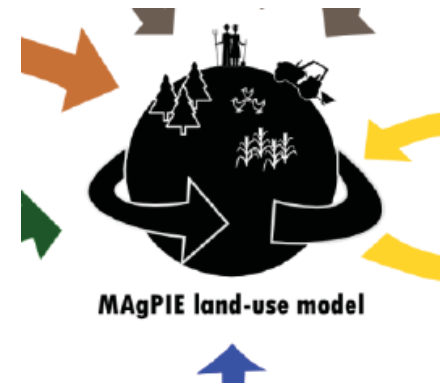
A satellite

Mimicry



Biosphere 2 experiment

Digital mimicry



A computer model

Schellnhuber, 1999, *Nature*

Illustrations:
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Figure 26 THE WORLD MODEL

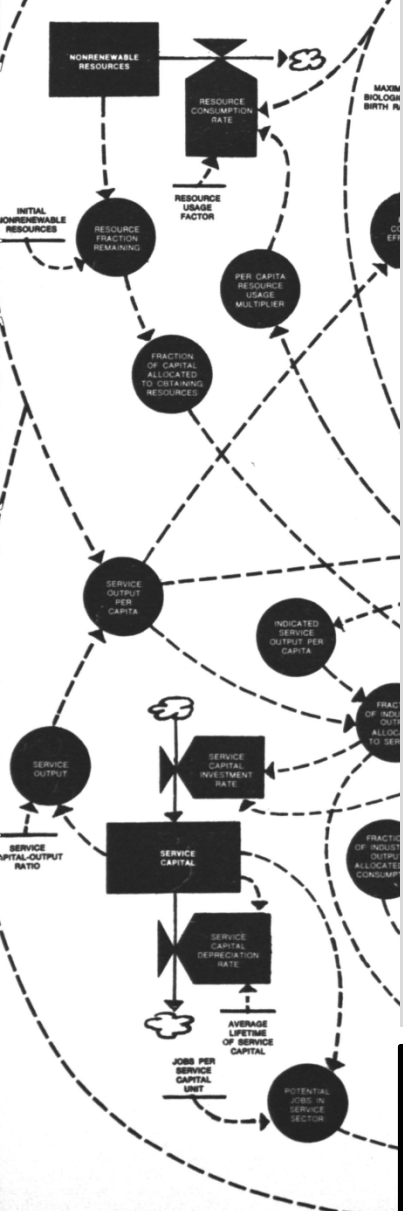
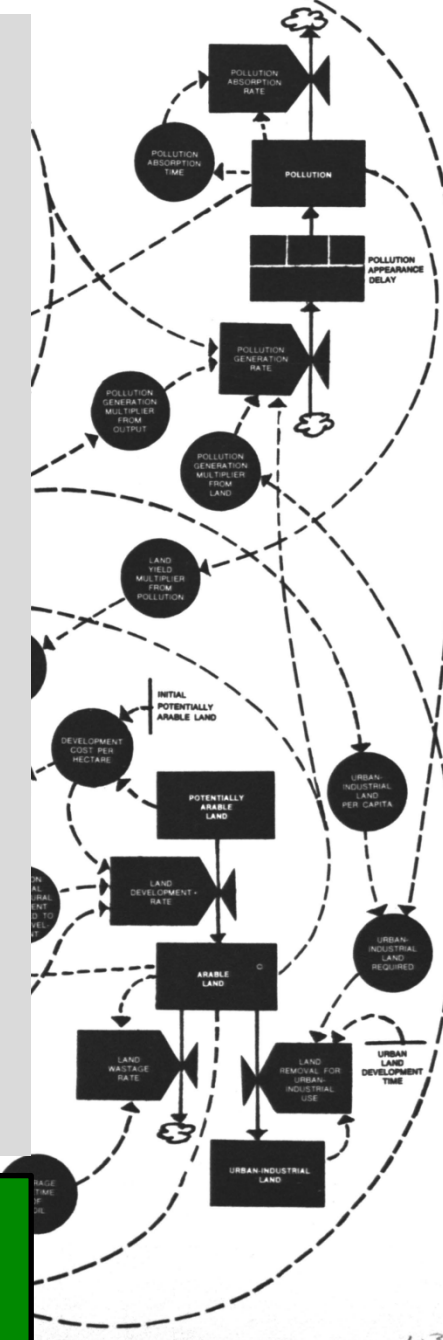
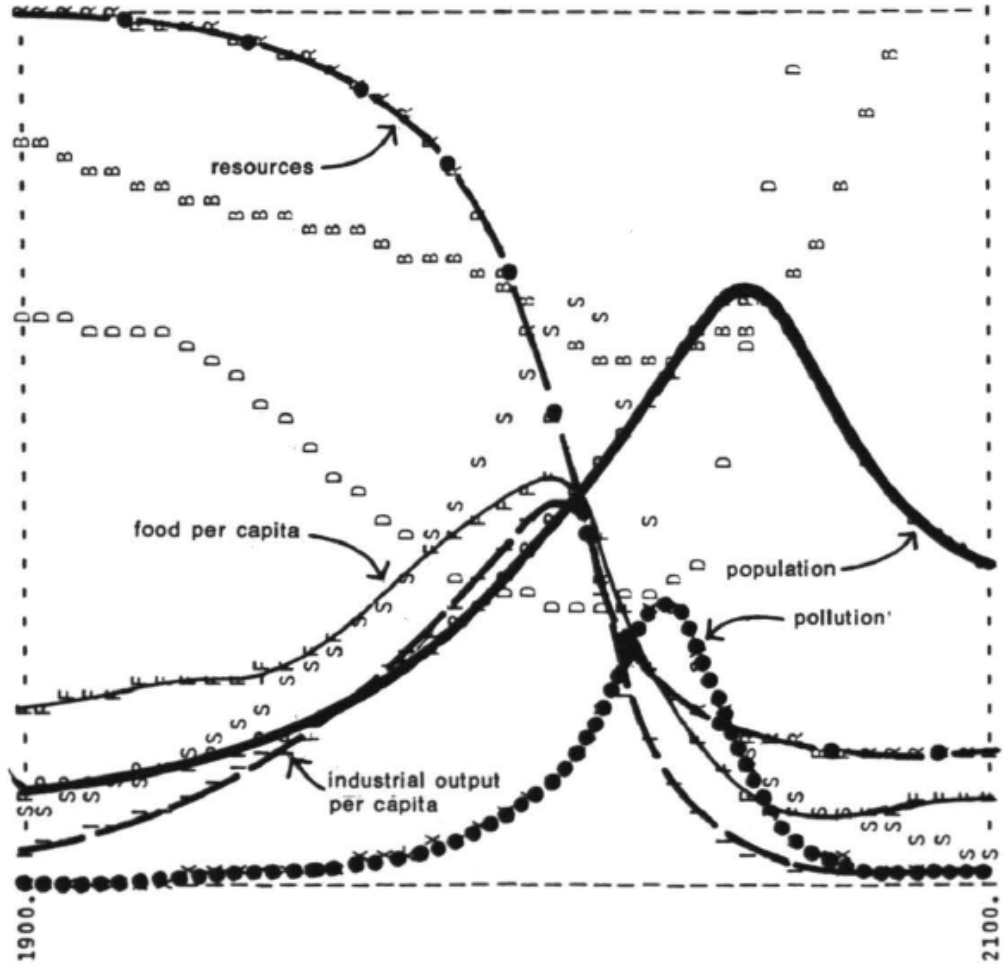


Figure 35 WORLD MODEL STANDARD RUN

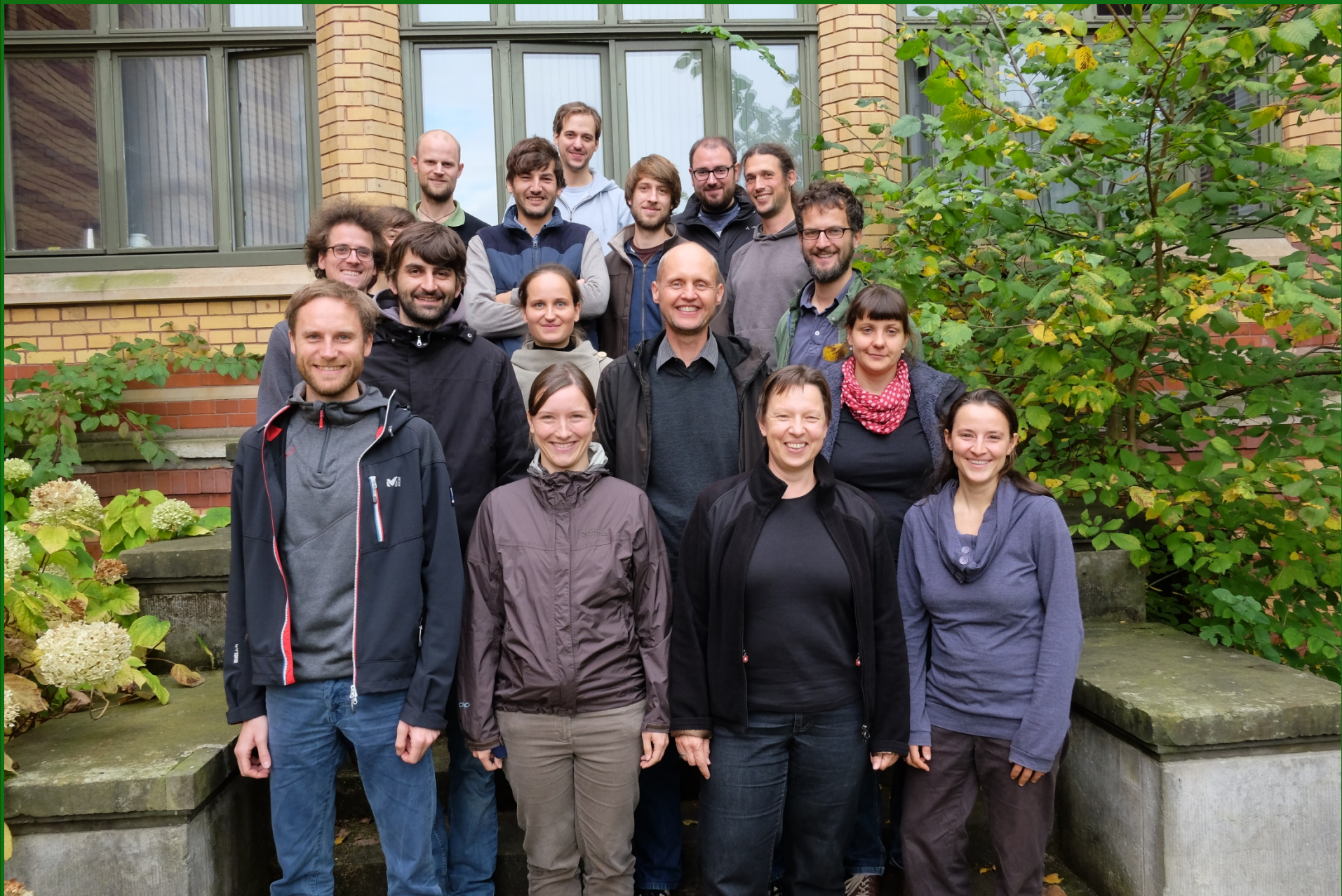


The World3 Model
 „The limits to growth“ (Meadows et al 1972)



MAgPIE

Model of **A**gricultural **P**roduction and its **I**mpact on the **E**nvironment



How will the agro-food system look like in the year 2050 and beyond?

Figure 6: Deaths attributed to 19 leading risk factors, by country income level, 2004.

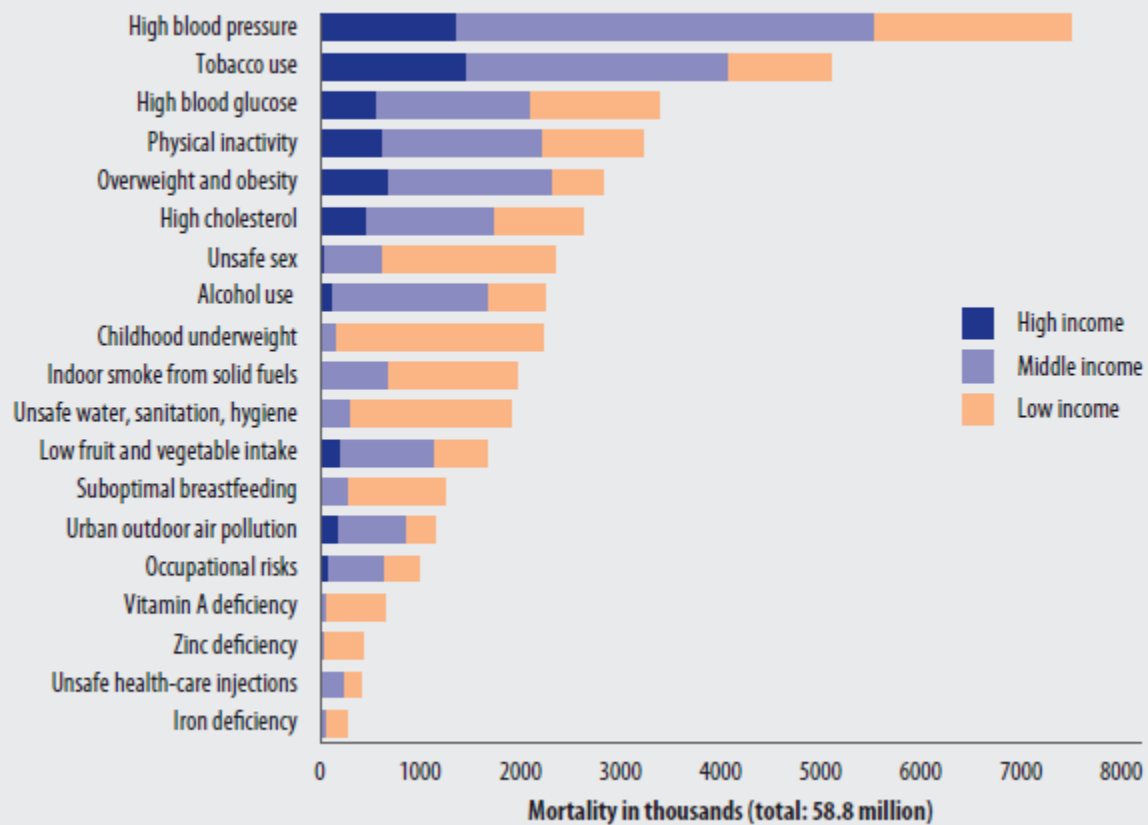
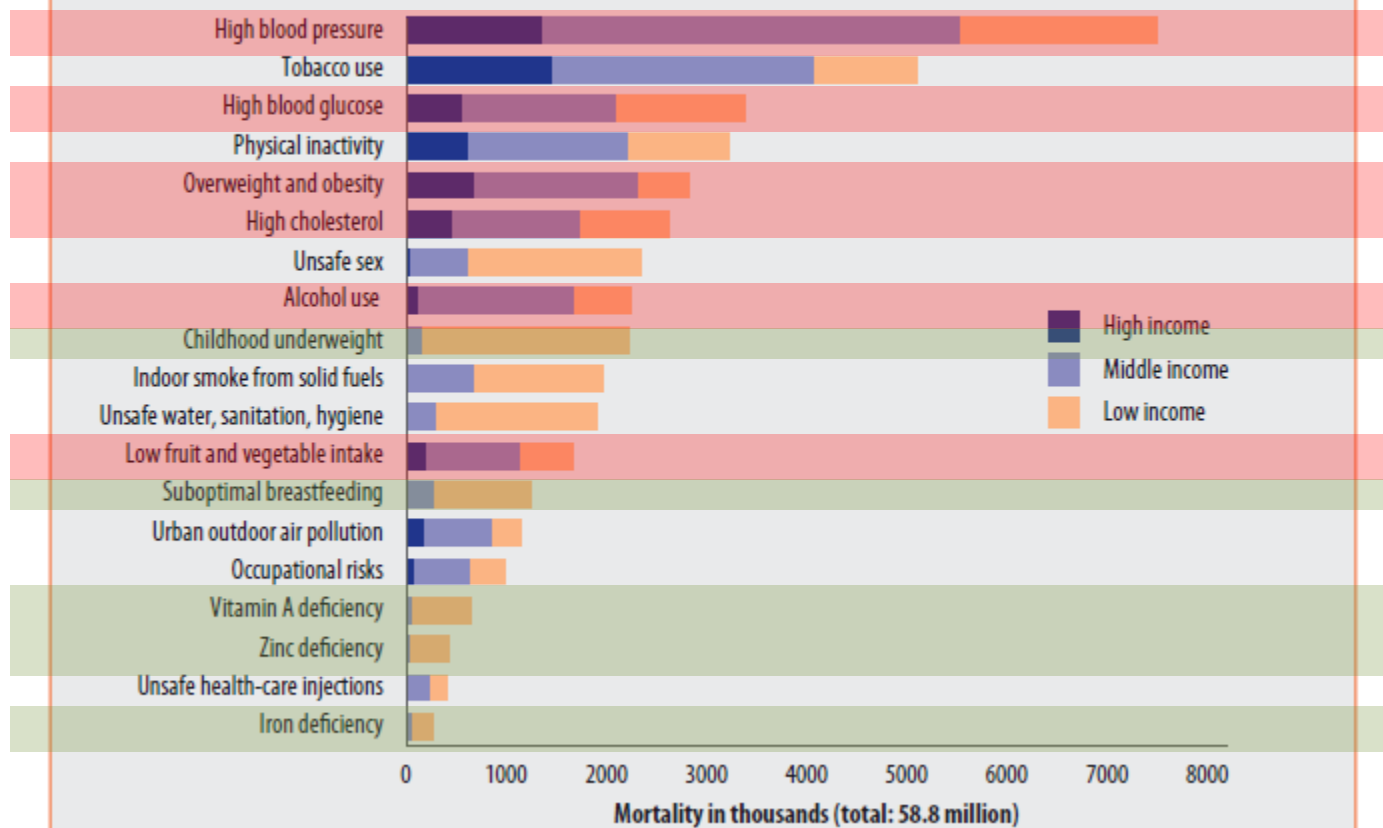


Figure 6: Deaths attributed to 19 leading risk factors, by country income level, 2004.



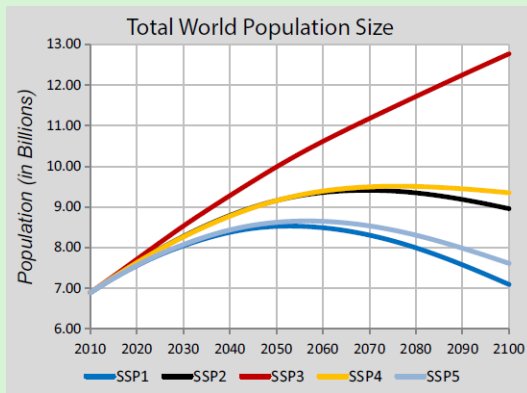


MAgPIE

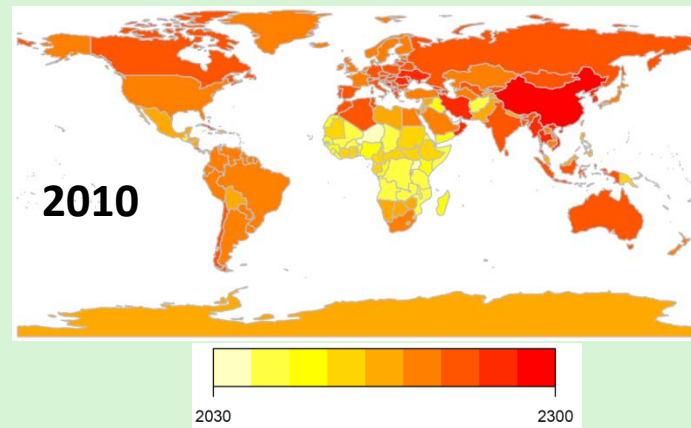
Model of **Agricultural Production** and its **Impact** on the **Environment**



Anthropometric food requirements (standardized bodyweight)



KC and Lutz (2014)



Bodirsky et al (in prep)
Hiç et al (2016)

Global Food Demand

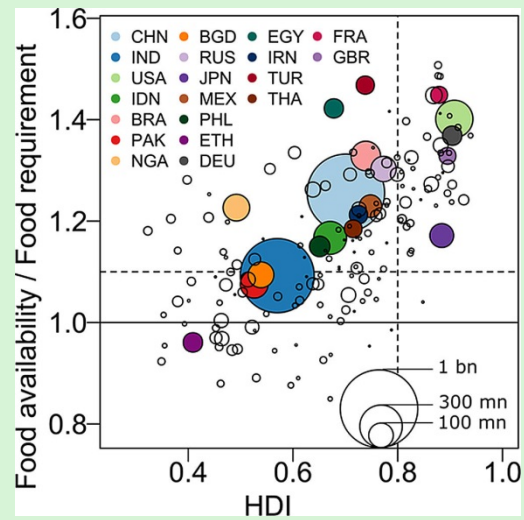
International comparison of per-capita food demand

   = 250 kcal/capita/day of staple crops, animal products or fruits and vegetables





Food Waste

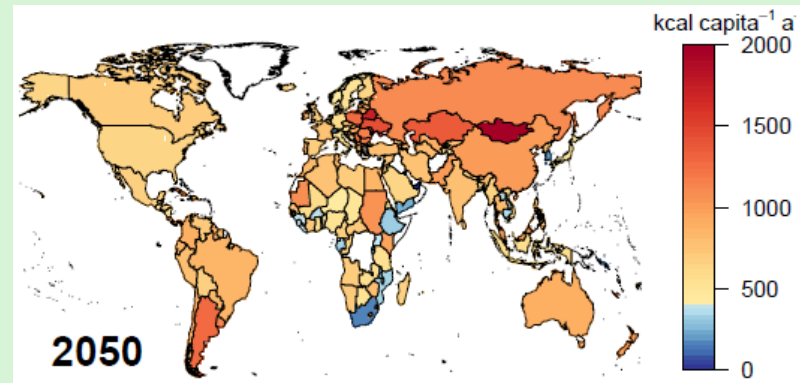
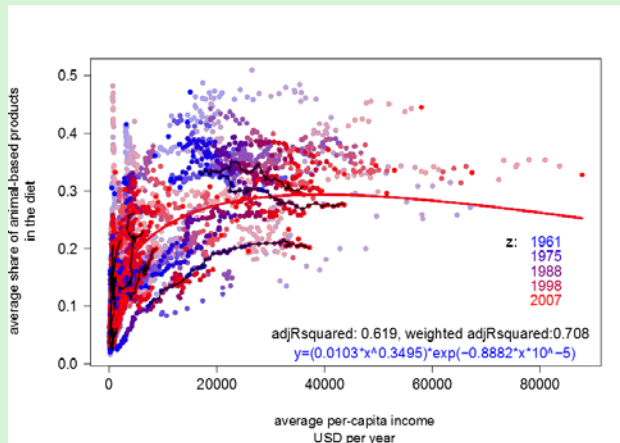


Food Surplus and Its Climate Burdens

Ceren Hiç,[†] Prajal Pradhan,^{*,†} Diego Rybski,[†] and Jürgen P. Kropp^{†,‡}



Food Demand model





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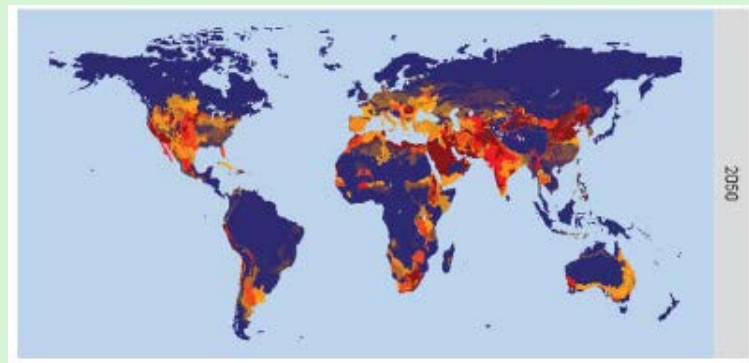
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Estimating change in water scarcity Blue water withdrawal to availability ratio



Crops

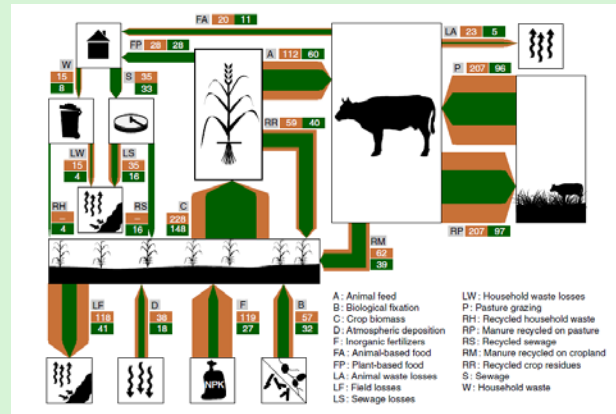


Livestock production and the water challenge of future food supply:
Implications of agricultural management and dietary choices

Isabelle Weindl^{a,b,c,*}, Benjamin Leon Bodirsky^a, Susanne Rolinski^a, Anne Biewald^a,
Hermann Lotze-Campen^{a,d}, Christoph Müller^a, Jan Philipp Dietrich^a, Florian Humpenöder^a,
Miodrag Stevanović^a, Sibyll Schaphoff^a, Alexander Popp^a



Full accounting of nitrogen flows within agriculture

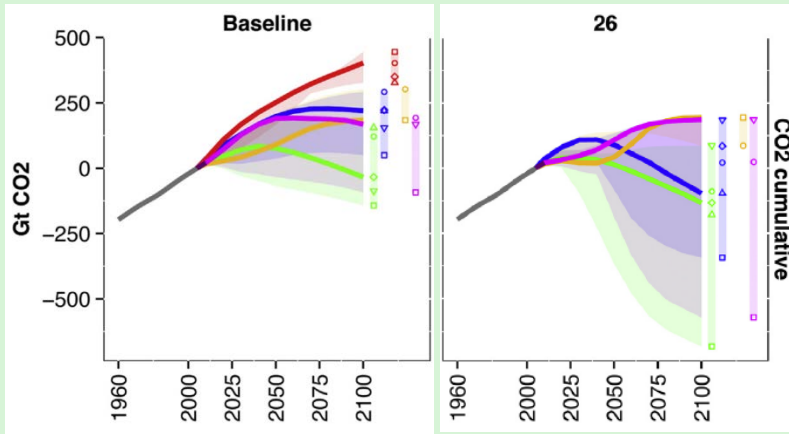


Reactive nitrogen requirements to feed the world in 2050 and potential to mitigate nitrogen pollution

Benjamin Leon Bodirsky^{1,2}, Alexander Popp¹, Hermann Lotze-Campen¹, Jan Philipp Dietrich¹, Susanne Rolinski¹, Isabelle Weindl¹, Christoph Schmitz¹, Christoph Müller¹, Markus Bonsch¹, Florian Humpeöder¹, Anne Biewald¹ & Miodrag Stevanovic¹



Greenhouse gas emissions from Agriculture and Landuse Change

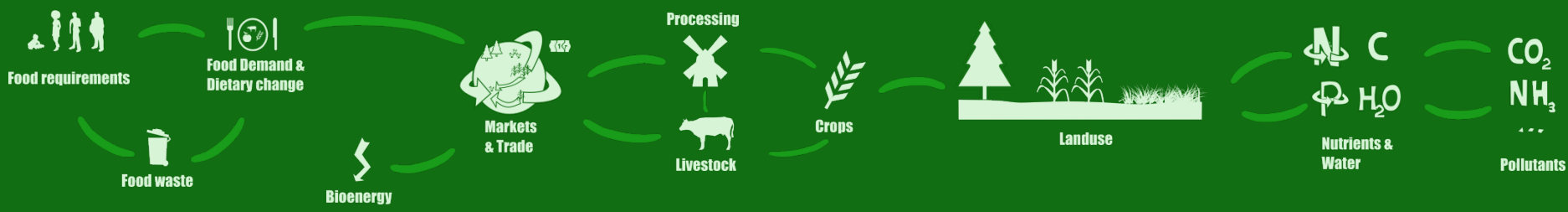


Land-use futures in the shared socio-economic pathways

Alexander Popp^{a,*}, Katherine Calvin^b, Shinichiro Fujimori^c, Petr Havlik^d, Florian Humpeöder^d, Elke Stehfest^e, Benjamin Leon Bodirsky^{d,h}, Jan Philipp Dietrich^a, Jonathan C. Doelmann^e, Mykola Gusti^{d,i}, Tomoko Hasegawa^a, Page Kyle^b, Michael Obersteiner^d, Andrzej Tabeau^e, Kiyoshi Takahashi^e, Hugo Valin^d, Stephanie Waldhoff^a, Isabelle Weindl^{d,i}, Marshall Wise^e, Elmar Kriegler^a, Hermann Lotze-Campen^{a,k}, Oliver Fricko^d, Keywan Riahi^{d,l}, Detlef P. van Vuuren^{d,i}



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Communicate Science
to the public !



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