

# Global Bioeconomy Summit

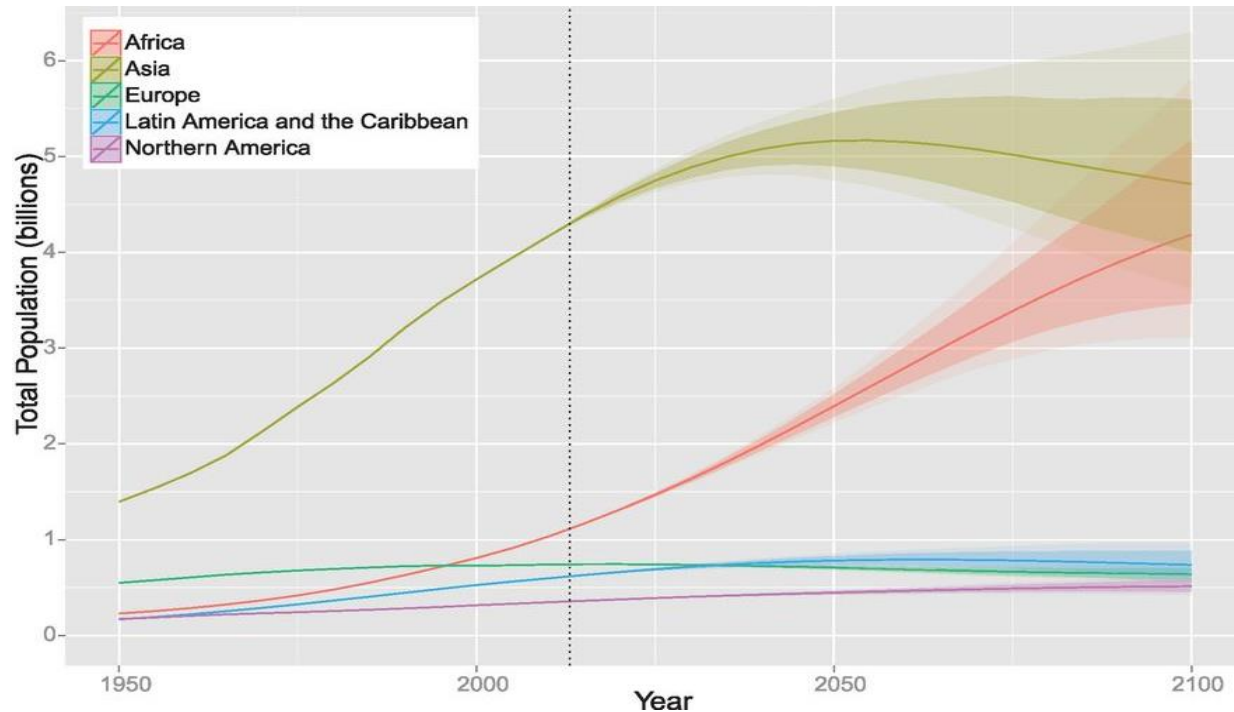
What is needed to foster the transformation in agriculture- From future scenarios to innovations

**Agricultural Systems of the future:**

**How should the agricultural landscape look like?**

Prof. Dr. Sonoko Bellingrath-Kimura

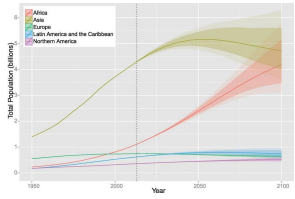
- **Food, feed and fibre for the growing world population**  
(differentiation between regional, rural and urban development)



(Gerland et al. 2014)

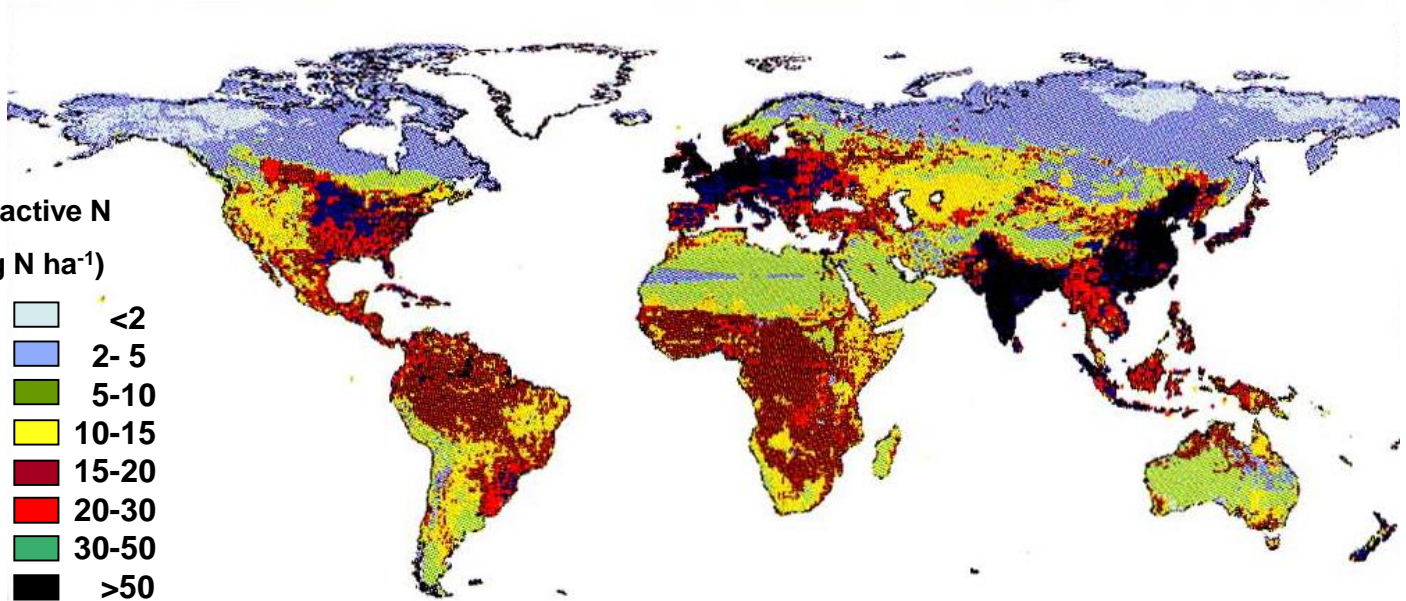
# Global Change: Factors that has to be taken into account

- Food, feed and fibre for the growing world population
- **Reduce losses and environmental load**  
(resource -energy, water, material- efficiency, close nutrient cycle)



(Gerland et al. 2014)

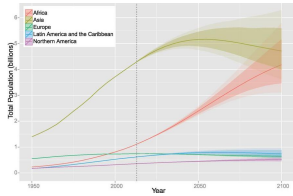
Reactive N  
(kg N ha<sup>-1</sup>)



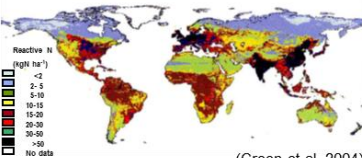
(Green et al. 2004)

# Global Change: Factors that has to be taken into account

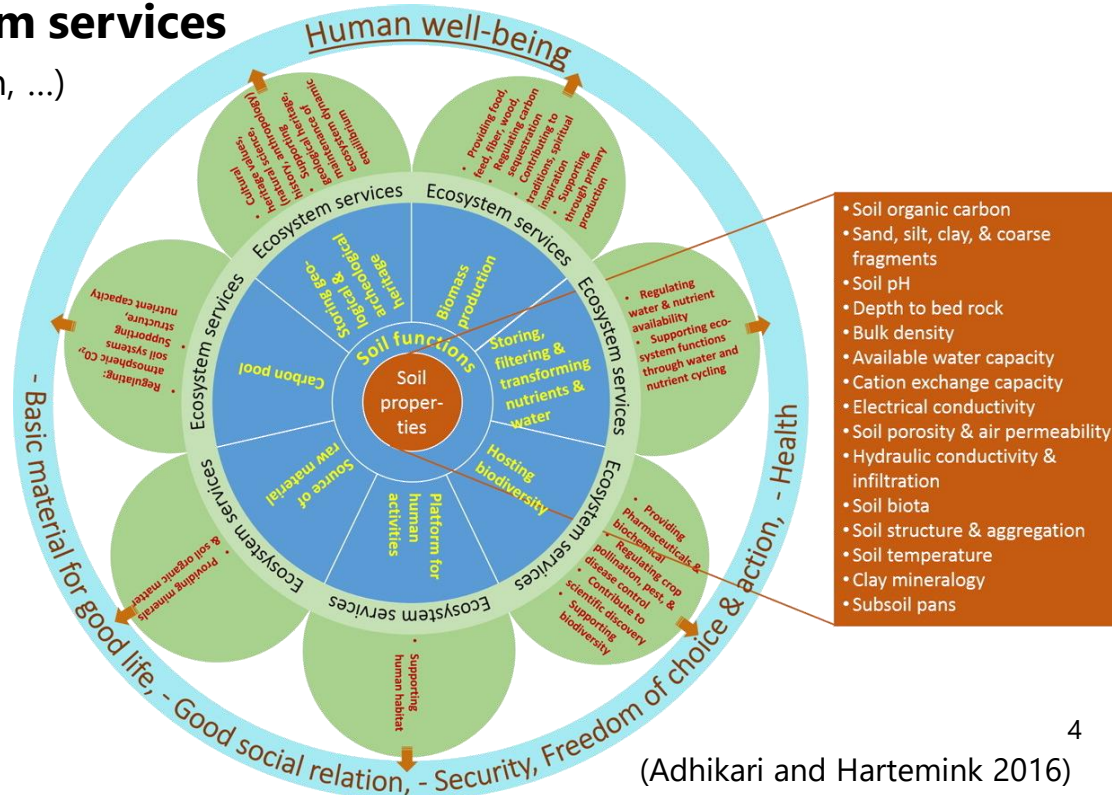
- Food, feed and fibre for the growing world population
- Reduce losses and environmental load
- **Enhance and utilize ecosystem services**  
(cleaner soil, water and air production, ...)



(Gerland et al. 2014)



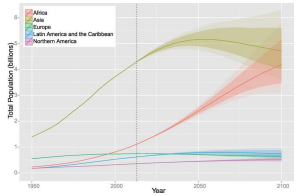
(Green et al. 2004)



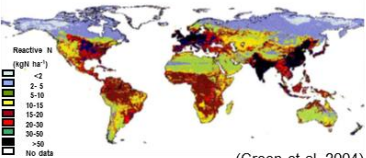


# Global Change: Factors that has to be taken into account

- Food, feed and fibre for the growing world population
- Reduce losses and environmental load
- Enhance and utilize ecosystem services
- **Adopt and mitigate climate change**  
(reduce GHG emission, create resilient system)



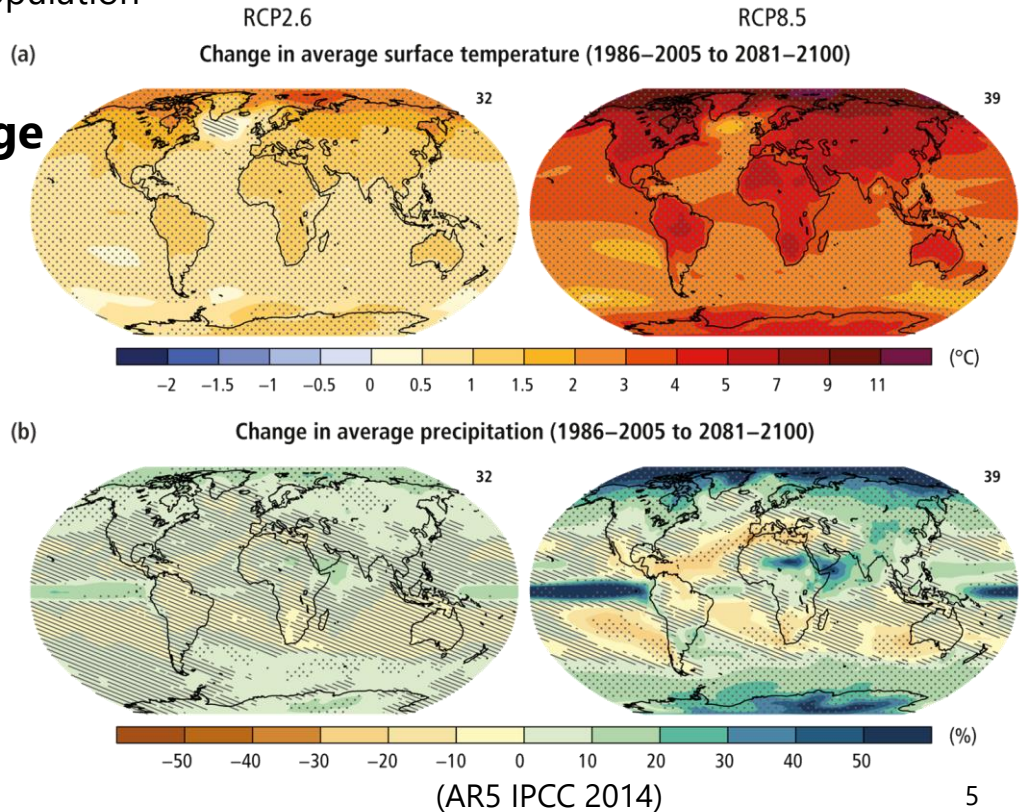
(Gerland et al. 2014)



(Green et al. 2004)



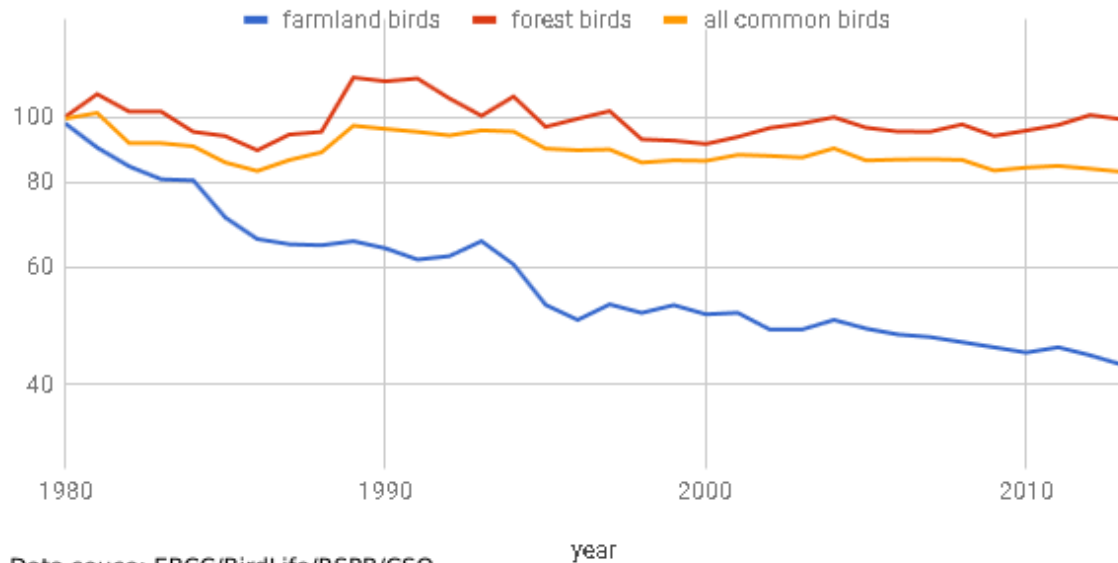
(Adhikari and Hartemink 2016)



# Global Change: Factors that has to be taken into account

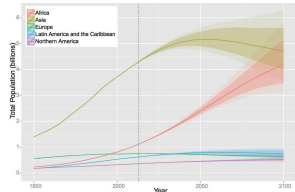
- Enough food, feed and fibre for the growing world population
- Reduce losses and environmental load
- Enhance and utilize ecosystem service
- Adopt and mitigate climate change
- **Preserve and enhance biodiversity**

## European farmland birds, forest birds and all common birds, EBCC indicators

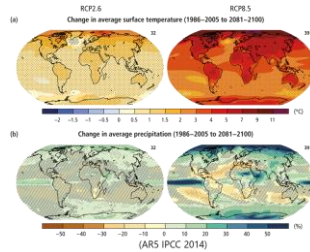


Data source: EBCC/BirdLife/RSPB/CSO

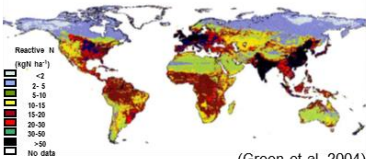
year



(Gerland et al. 2014)



(ARS IPCC 2014)



(Green et al. 2004)



(Adhikari and Hartemink 2016)



Global  
Change

Chance

Challenge

## New market values

- Integrating ecosystem services, biodiversity and resource efficiency

## New sensors and models

- Documentation, forecasting and controlling of site-specific effects of agricultural activities

## New small-scale and site-specific management systems

- Optimization by small robots

## New operating models

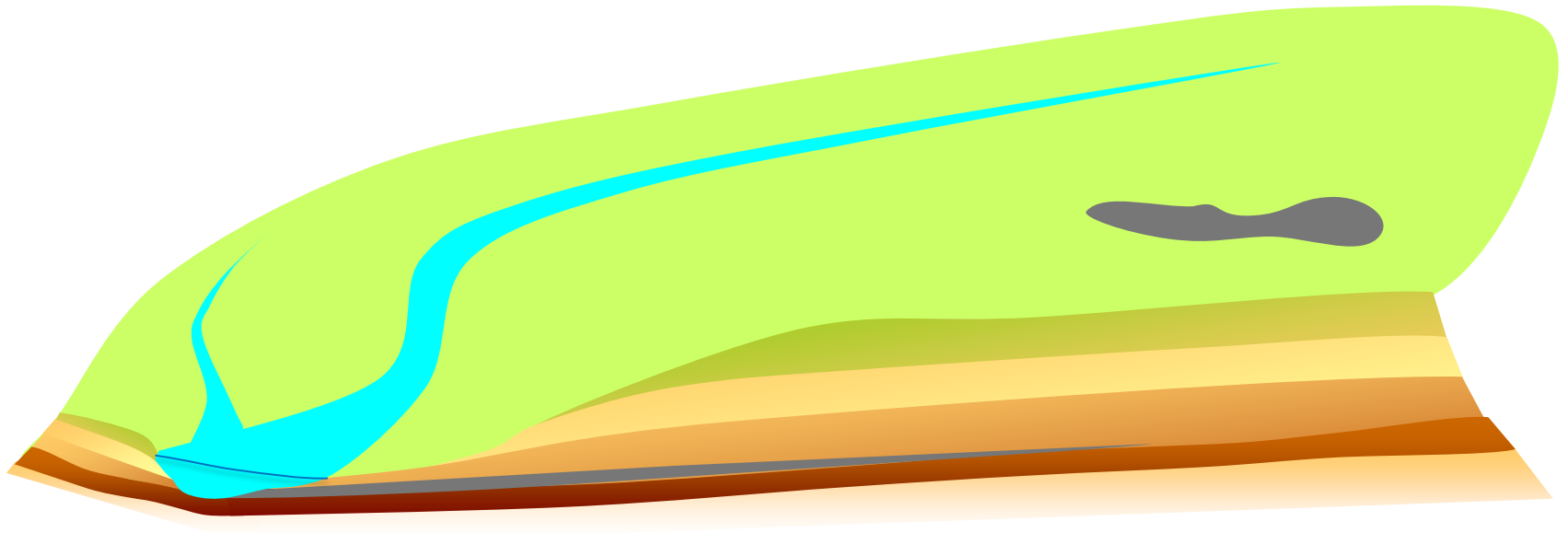
- Develop new orientation goals in operational planning and support complex decisions

## New cooperation

- Creation of new communication channels between farmers, consumers and society

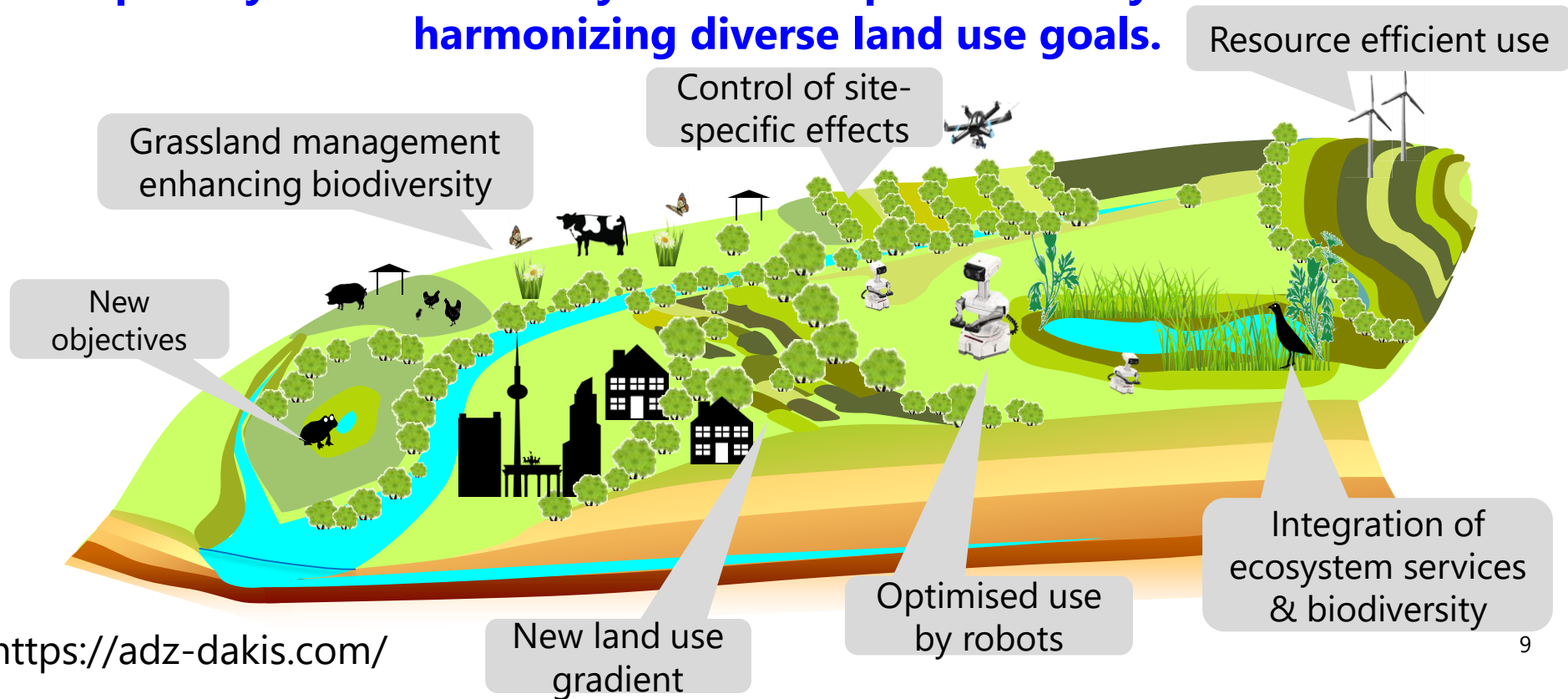


<https://www.agrarsysteme-der-zukunft.de/en/home>



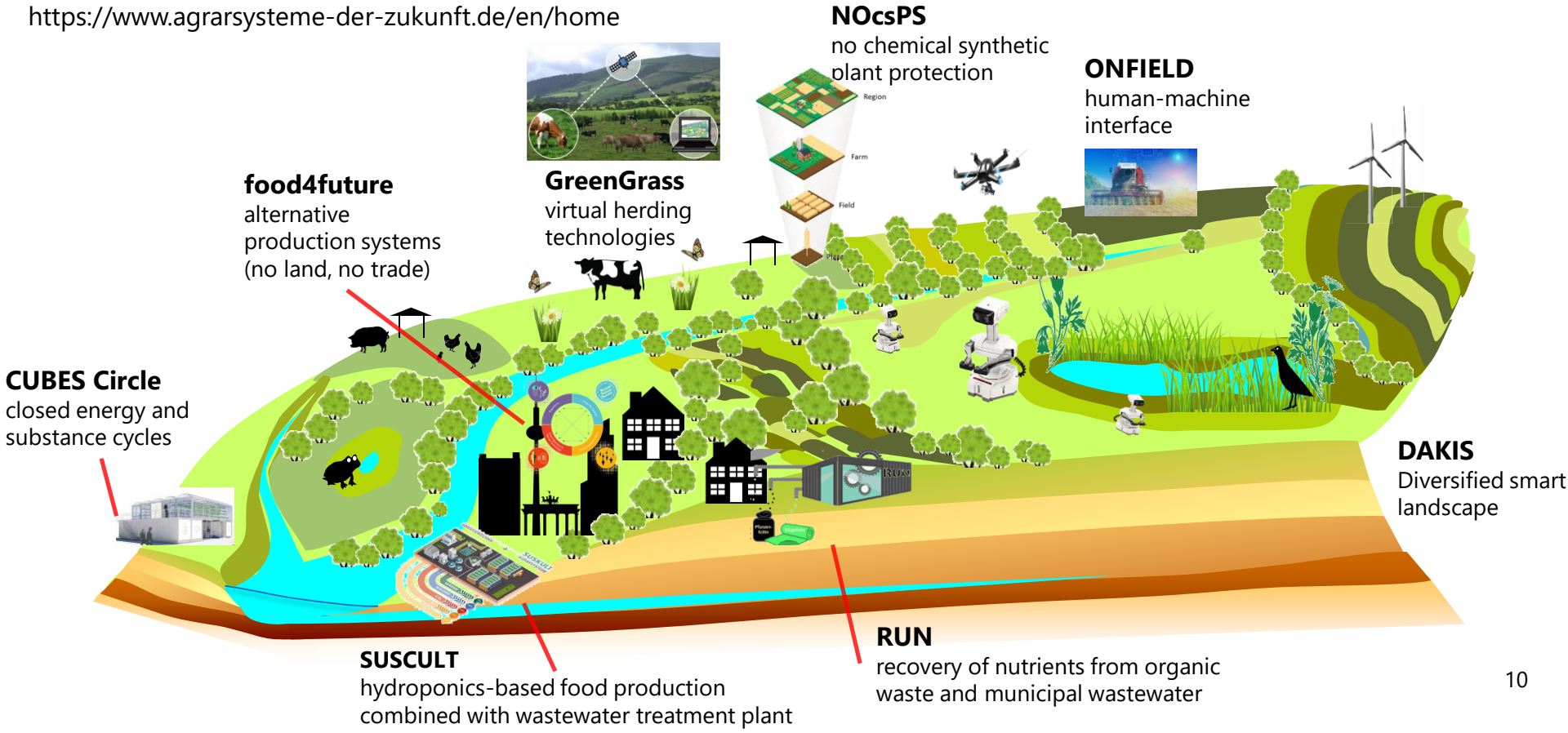


## Spatially and functionally diversified production systems will allow harmonizing diverse land use goals.



# Projects: Agricultural Systems of the future

<https://www.agrarsysteme-der-zukunft.de/en/home>

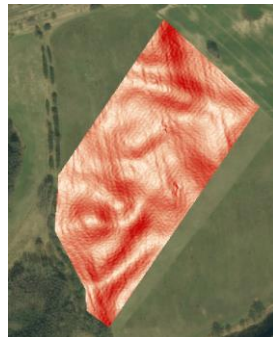


## Landscape analysis

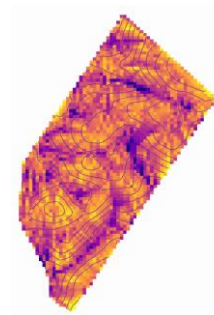
(by Marco Donat)



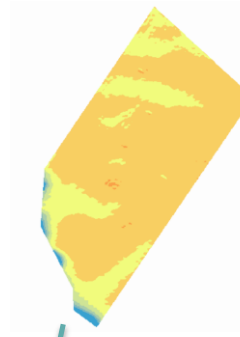
Soil points



Slope angle



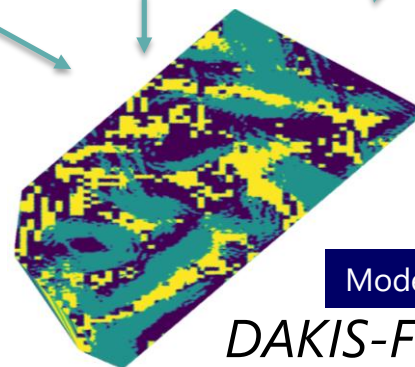
Soil humidity



Solar radiation

Weitere Faktoren:

- Ertragsdaten
- Satellitenbilder (NDVI)
- Elektrische Leitfähigkeit ( $EC_a$ )
- Organische Bodensubstanz (OBS)
- Wetterdaten



High soil quality


Moderate soil quality

Moderate soil quality at slope


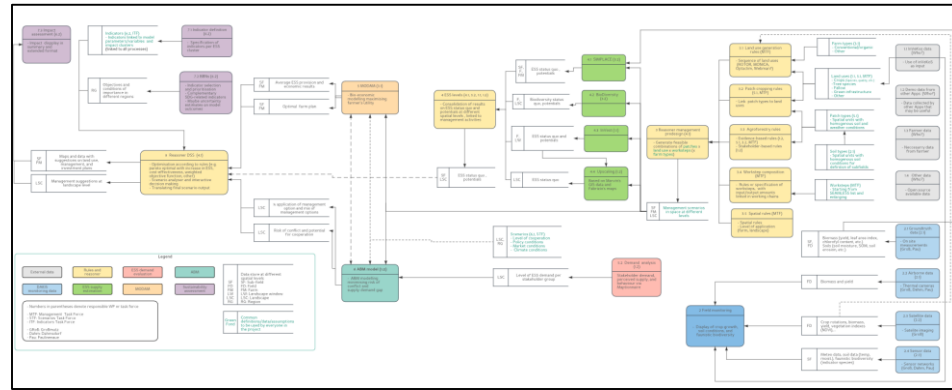
*DAKIS-Field Dahmsdorf*

**ESS potential achievement:** the FARMER sees how the application of the measures on his fields will alter achievement of all ESS and what are the trade offs.

Maps and spider diagrams/bar charts etc on ESS, Biodiversity and economic performance



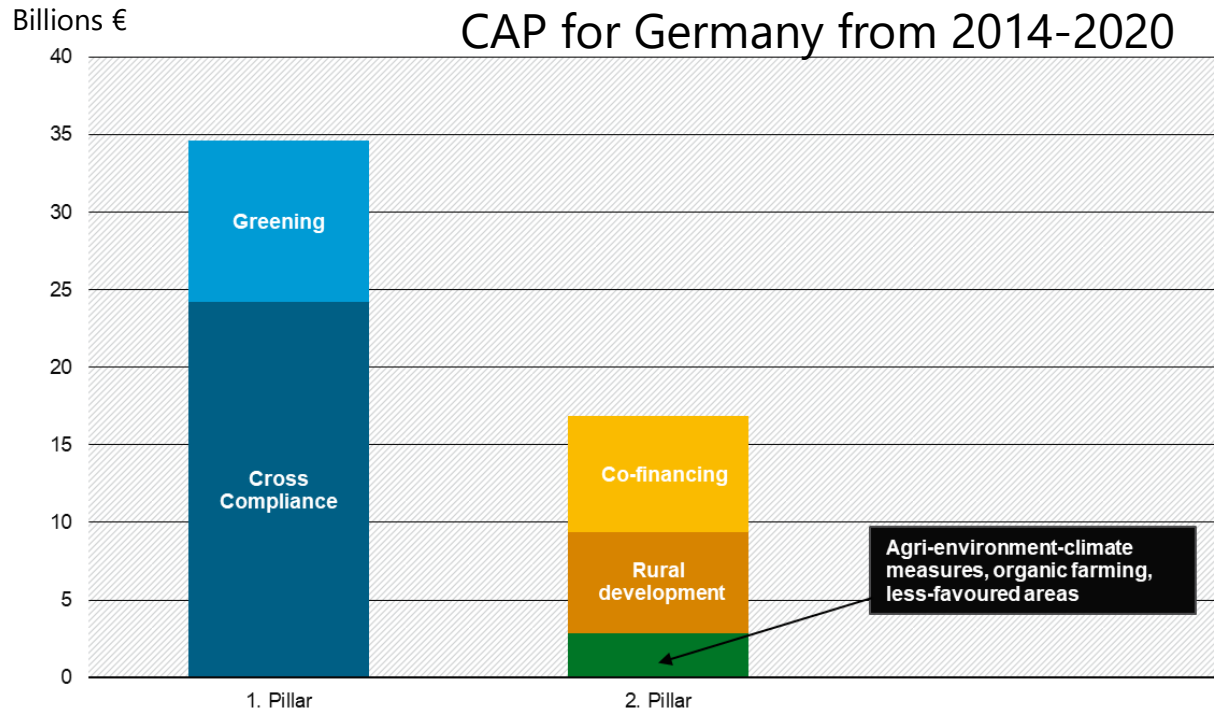
Longer list of impacts on wider selection of indicators

Decision support Tool



## ➤ Agri-environment-climate measures (AECMs)





- Agri-environment-climate measures (AECMs)
- Price of the products

Organic farmers, fulfilling criteria to increase biodiversity



<https://www.landwirtschaft-artenvielfalt.de/>

# Examples of valorisation of ecosystem services and biodiversity

- Agri-environment-climate measures (AECMs)
- Price of the products
- Direct trade of Ecosystem services and biodiversity

agora  
natura



<https://agora-natura.de/>

## Neue Projekte



Blühfläche im Rebhuhnschutzprojekt  
Göttingen  
Niedersachsen

Preis je Zertifikat: 16,50 €  
noch 169 Tage



Feldmäuse für den Rotmilan  
Brandenburg

Preis je Zertifikat: 10,90 €  
noch 152 Tage



Streubstwiese „Doktorgarten Teterow“  
Mecklenburg-Vorpommern

Preis je Zertifikat: 21,60 €  
noch 152 Tage



- Research and development on capturing indicators real time for a better management
- Tools for easy and practical decision support
- Policy incentives such as “Green Deal”
- Valorisation of non-commodity outputs in the value chain
- Awareness of consumer/citizen



Zeichner: Heyko Stöber