Challenges of Multi-Purpose Forest Management in Germany

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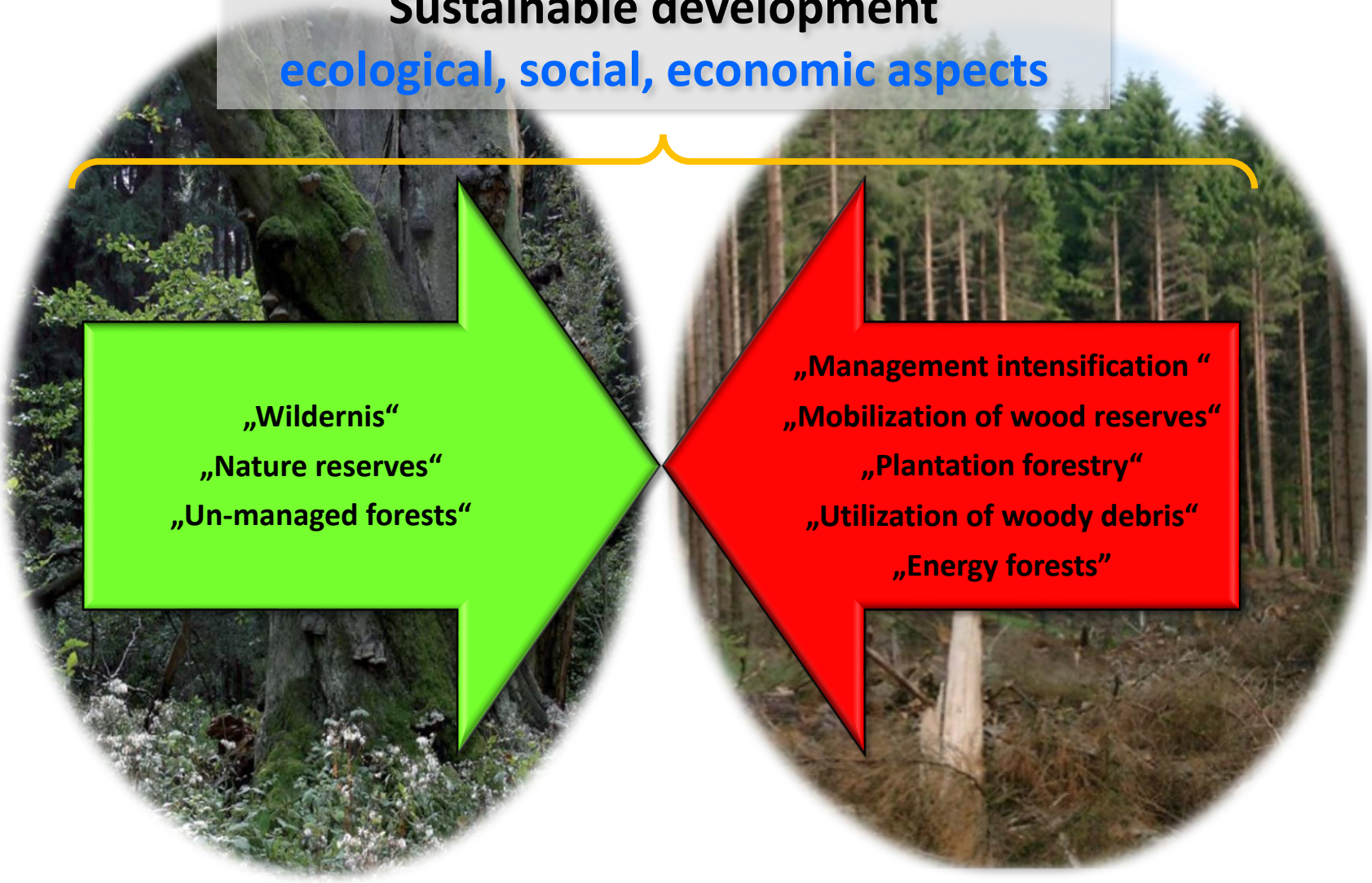
Challenges of multi-purpose forest management in Germany

- **Current debate**
- **Terms & concepts**
- **Forest management and forest ecosystem services**
- **Ecosystem services trade-offs**
- **Forest management concepts**
- **Integration – segregation balance.**

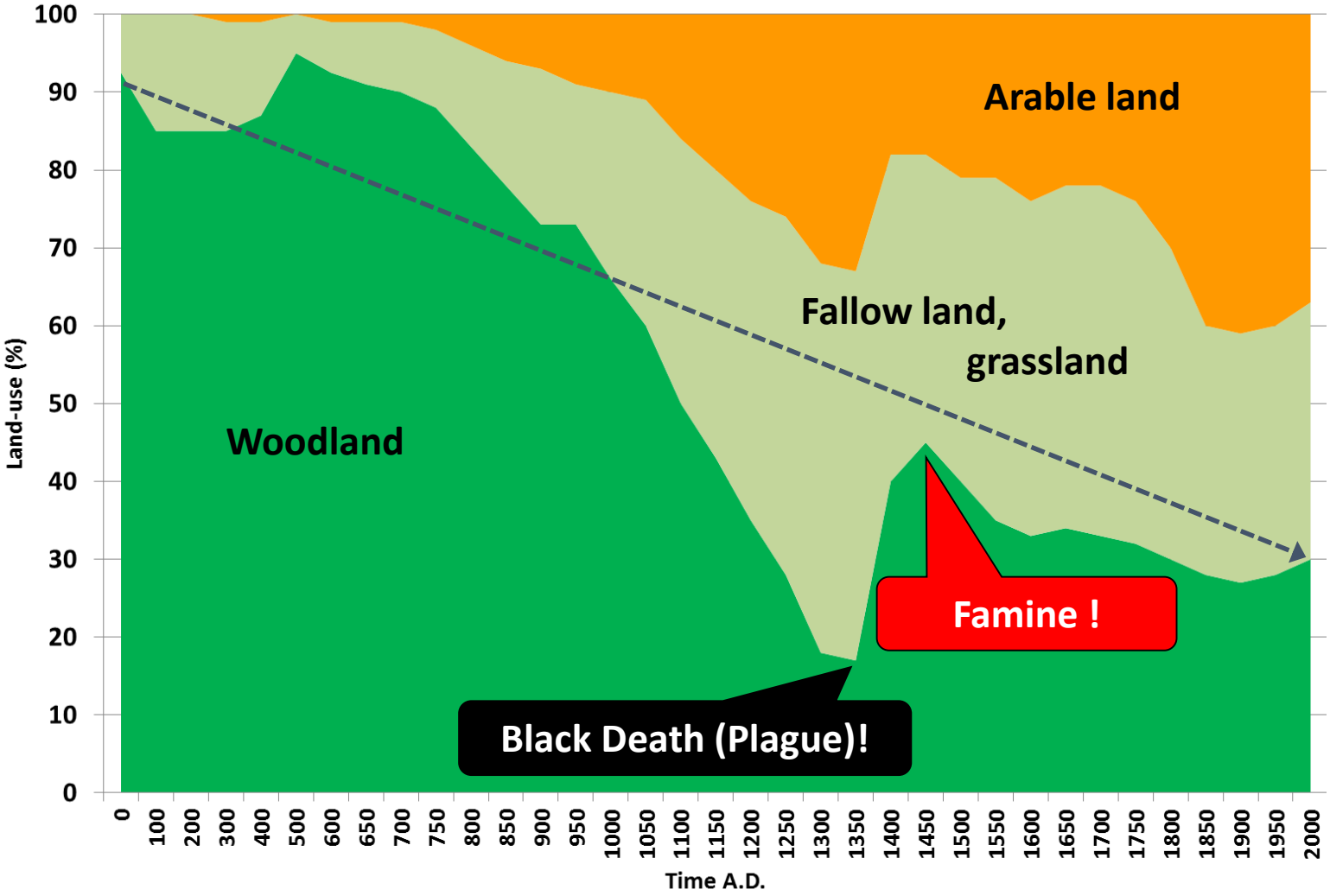
Polarization of actual debate on forest management in Germany

Sustainable development

ecological, social, economic aspects



Land-use change in the area of Germany over the last 2.000 years



(Poschlod 2015)

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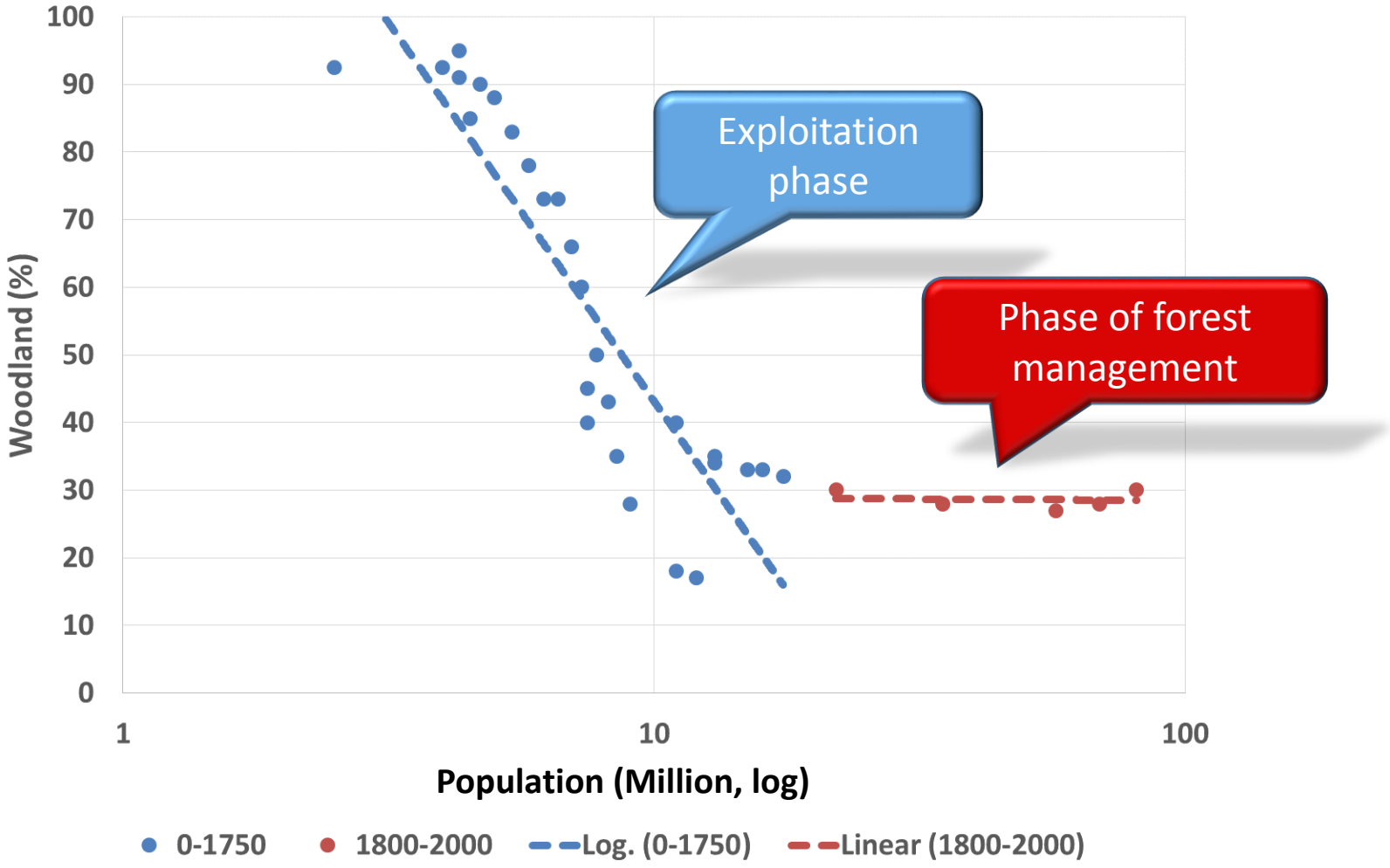

(Data source: Poschlod 2015)

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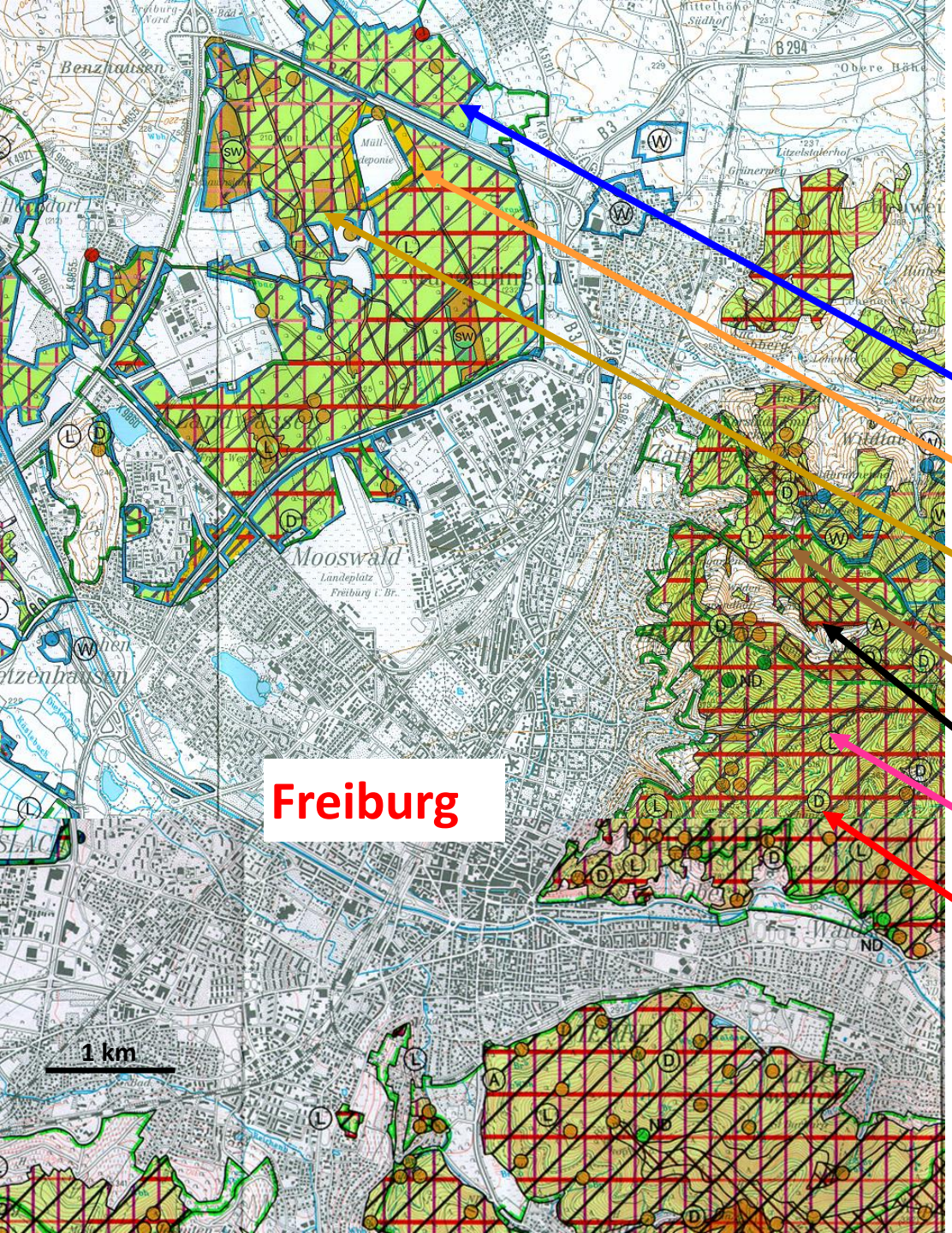

“Forest function” map: Map of the ecosystem services provided by/demanded from forests

Forest in watershed protection area

Forests to screen from view

Forest for biodiversity conservation

Forest for soil-/erosion protection

Forest for emission protection

Forest for local climate protection

Forest for recreation

In addition to wood production and carbon sequestration!

(Ministry for Rural Space, Baden-Württemberg, 1990: Erläuterungsband zu Blatt L 7912 Freiburg-Nord und Blatt L 8112 Freiburg-Süd)

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Challenges of multi-purpose forest management in Germany

- **Multi-purpose forest management** has traditionally been interpreted as the attempt **to balance and optimize the ecosystem services provided by forests and the services demanded by society** simultaneously in time and space

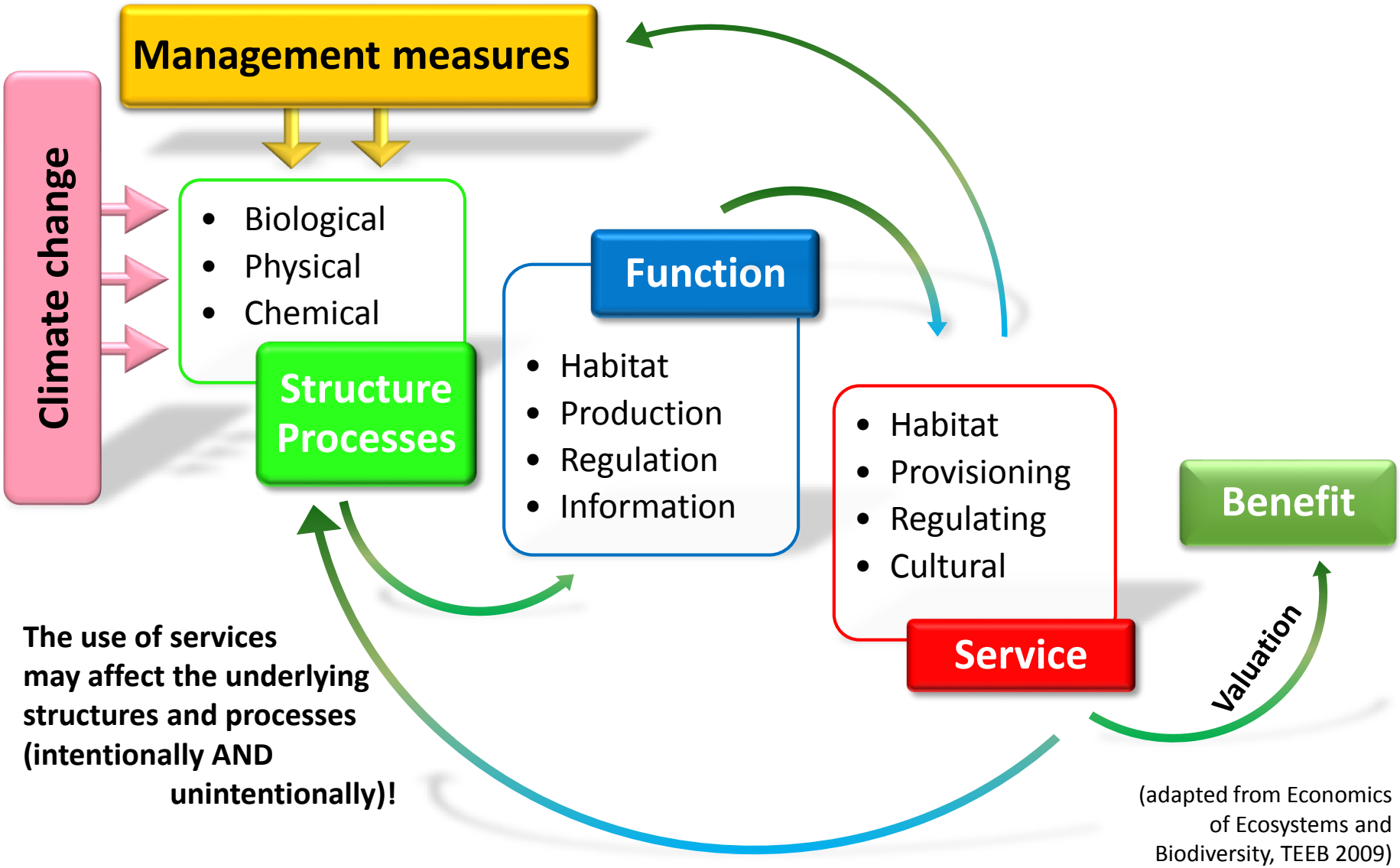
- The concept of multi-purpose forest management has **come under stress**, due to the **growing diversification of stakeholder views and interests**

- A **prioritization of some ecosystem services** over others is required

- **International obligations** add to this challenge, especially in regard to biodiversity conservation and climate change.

(acc. to Mann et al. 2012)

The concept of ecosystem services

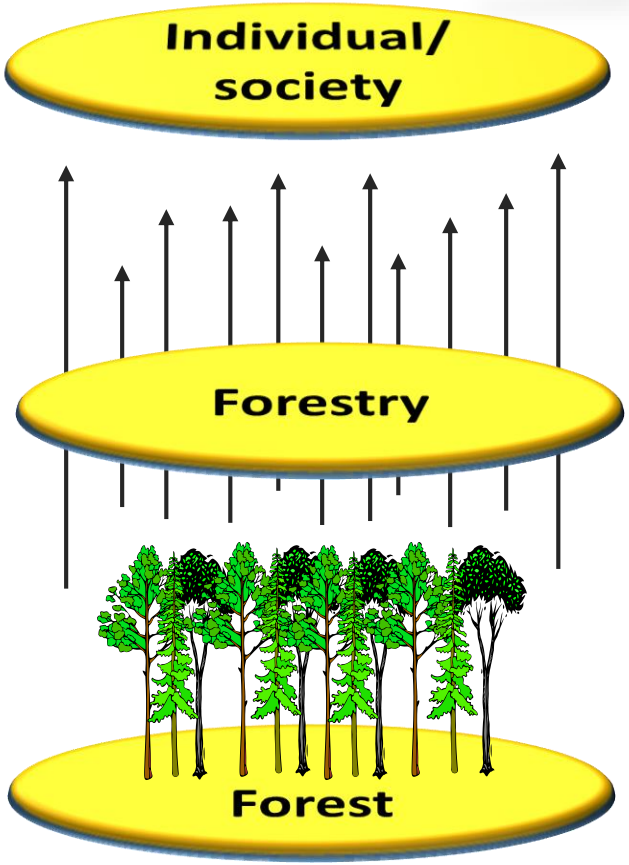


The use of services may affect the underlying structures and processes (intentionally AND unintentionally)!

(adapted from Economics of Ecosystems and Biodiversity, TEEB 2009)

Services provided by forests and the role of forestry

“Traditional view”



Role of forestry

Quality and/or quantity of services transmitted via forestry

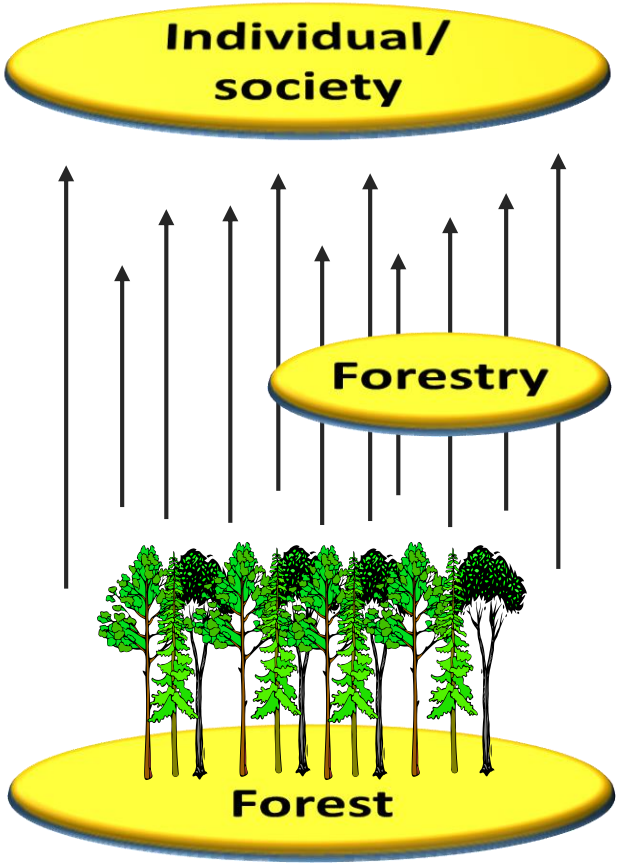
(acc. to Blum 2004)

Services provided by forests and the role of forestry

"Modern view"

Services provided by forests

Functional relation without forestry



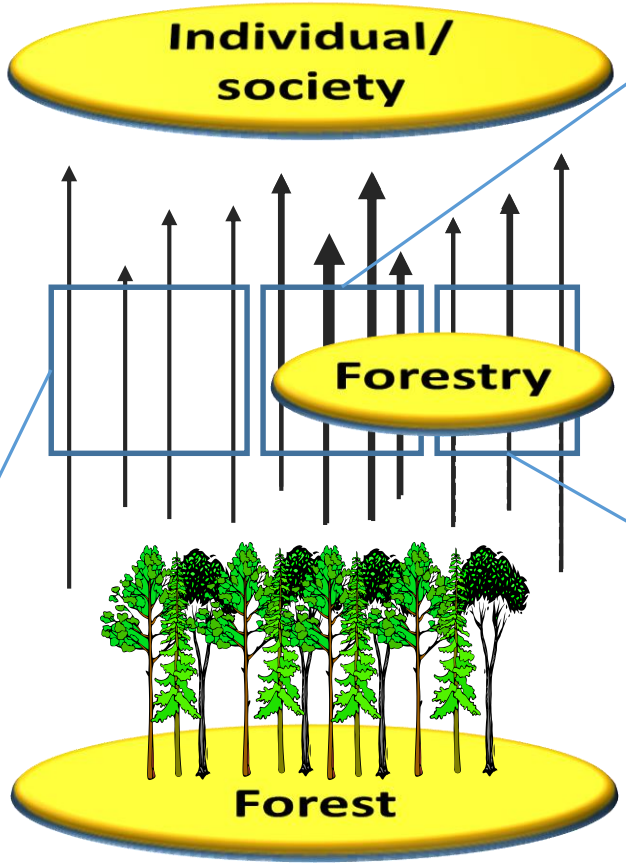
Role of forestry

Quality and/or quantity of services available with forestry

(acc. to Blum 2004)

Services provided by forests and the role of forestry

"Modern view"



Services provided by forests

Functional relation without forestry

Quality and/or quantity of services transmitted via forestry

Role of forestry

Quality and/or quantity of services only available with forestry

(acc. to Blum 2004)

The production possibilities concept

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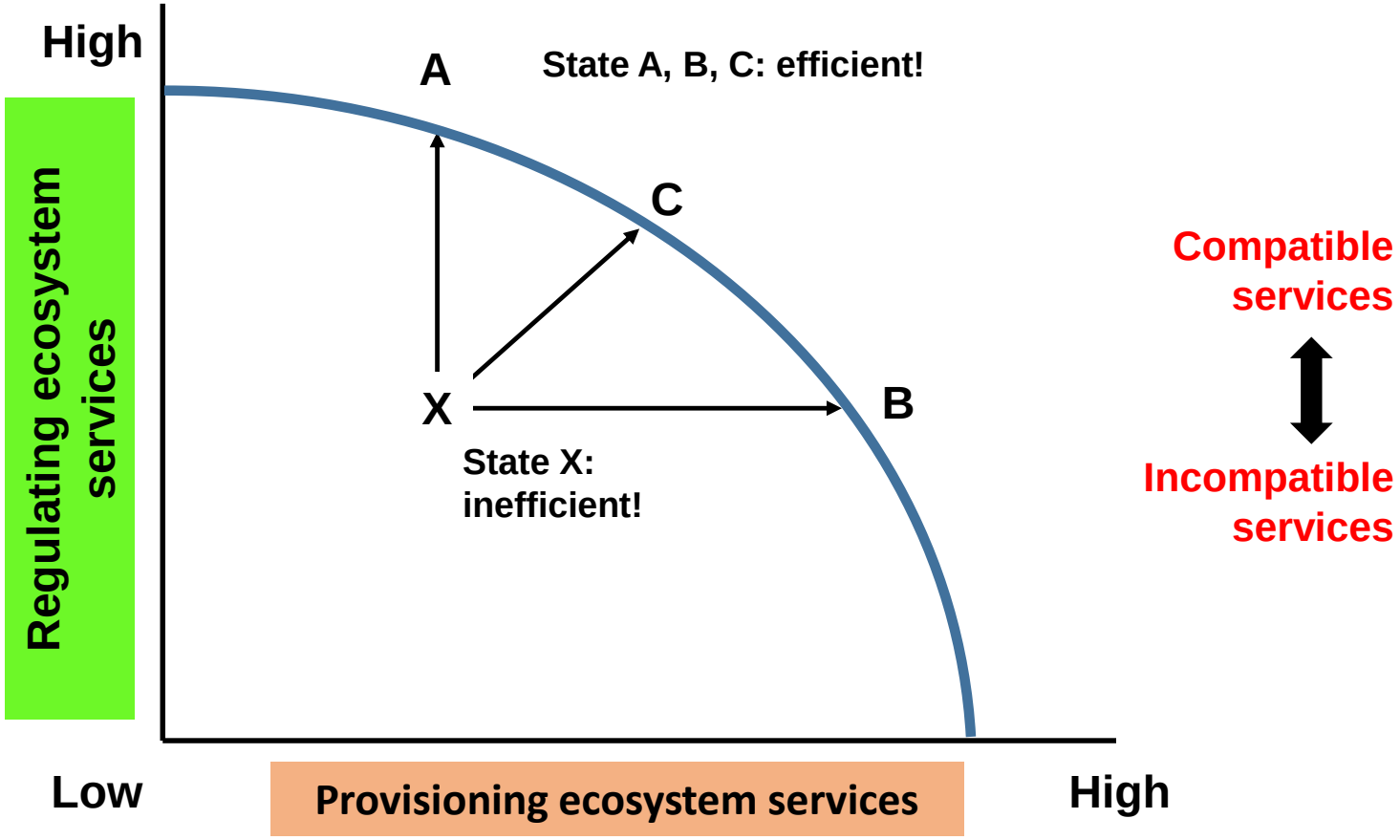
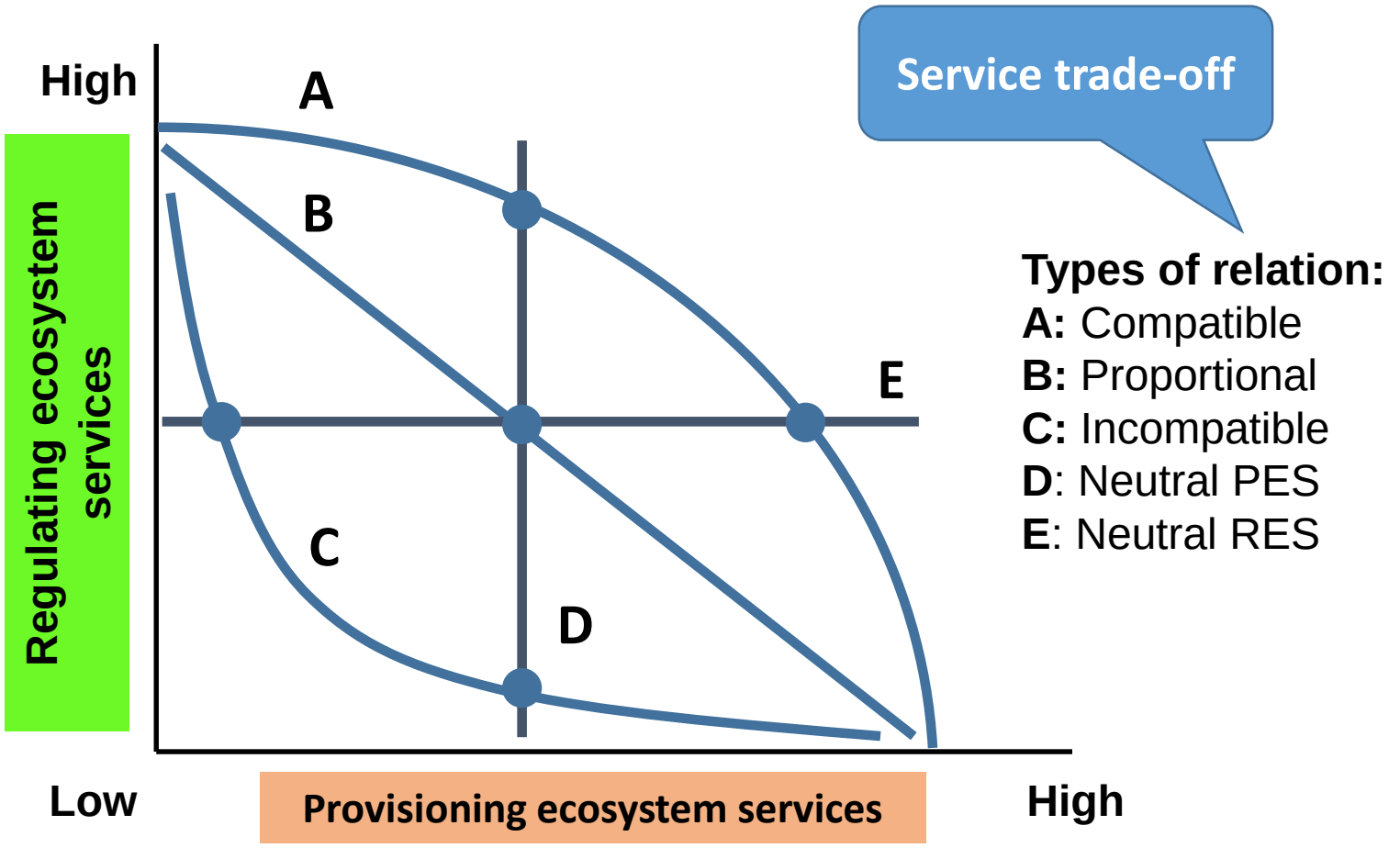


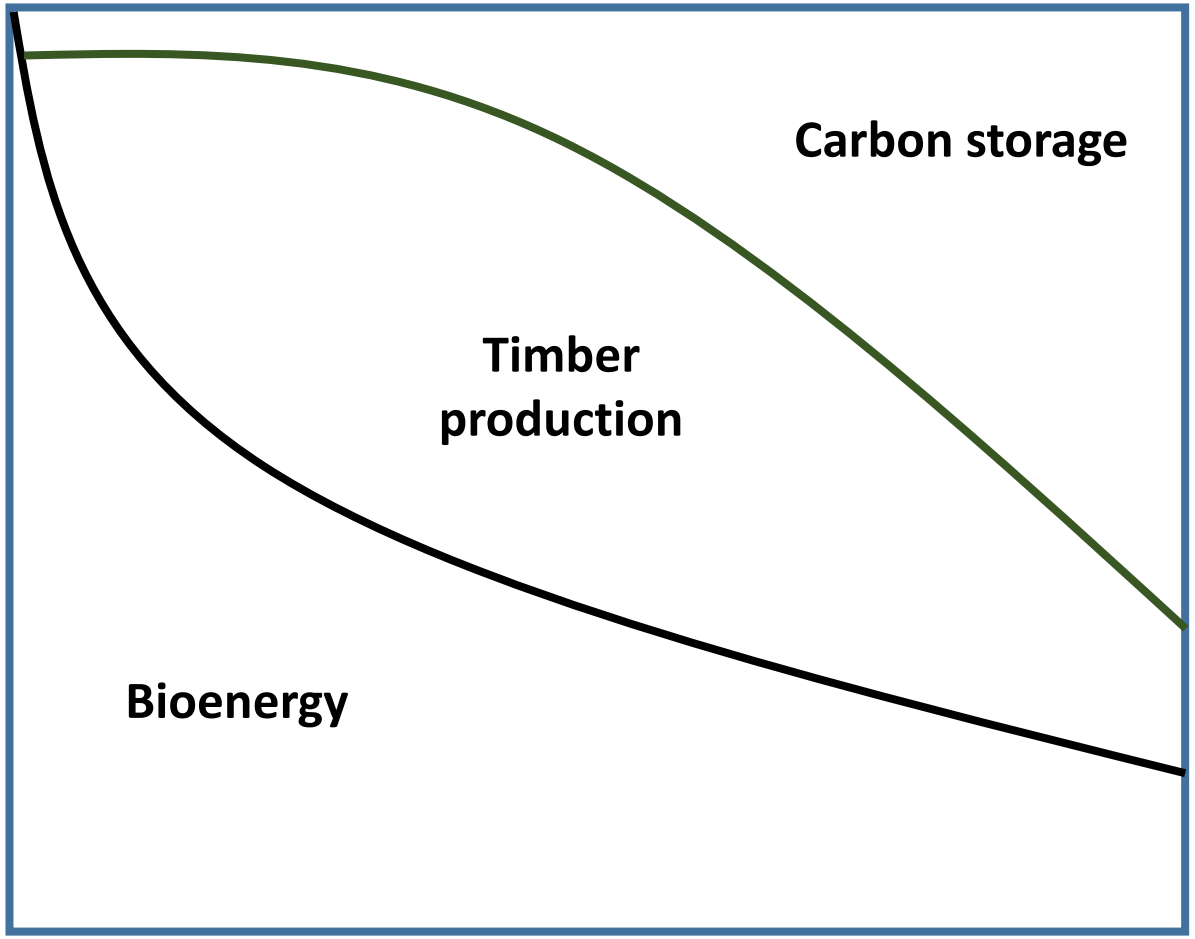
(adapted from Haynes et al. 2002)

The production possibilities concept



(adapted from TEEB 2010)

Service trade-offs and management concepts



Preferred uses

Short rotation forests

Long rotation / uneven-aged forests

(Matthews et al. 2007)

Trade-offs among ecosystem services

Several different types of trade-off can be identified, and are not mutually exclusive:

1. Service trade-offs: manage for one service – lose another

Manipulation of an ecosystem to maximize one particular service risks reducing others.

2. Temporal trade-offs: benefits now – costs later

Temporal trade-offs represent the central tenet of sustainable development "... that meets the needs of the present generation without compromising the needs of future generations….."

3. Spatial trade-offs: benefits here – costs there

Spatial trade-offs are behind much deliberation between communities and countries (especially water) and also occur between ecosystems and production landscapes.

4. Beneficiary trade-offs: some win – others lose

These trade-offs are real but it is possible to move towards "winning more and losing less".

(TEEB 2010)

Challenges of multi-purpose forest management in Germany

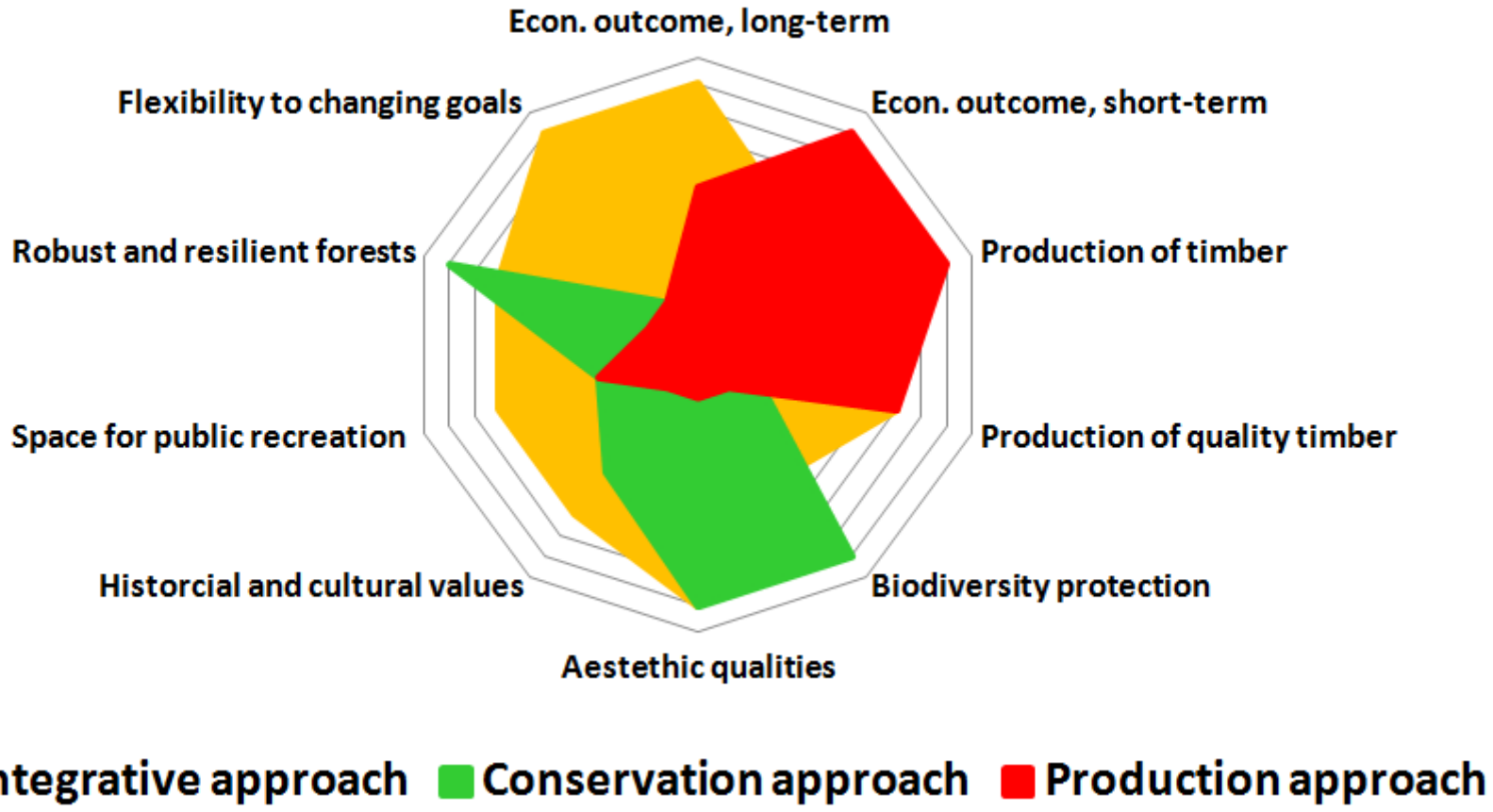
- **Ecosystem management** involves management of the forest as an entire ecosystem rather than simply as a source of trees, recognizing the multitude of interacting factors that make up a forest

- At a large spatial scale, there are two main ways in which the various goals of sustainable forest and ecosystem management can be met across the forest:
  - **integrated forest management**
  - **segregative forest management** (e.g. triad management)

- **Triad management** involves the division of the forest into three functional zones:
  - a **conservation zone**,
  - a **multi-use zone**, and
  - an **intensive wood production management zone**.

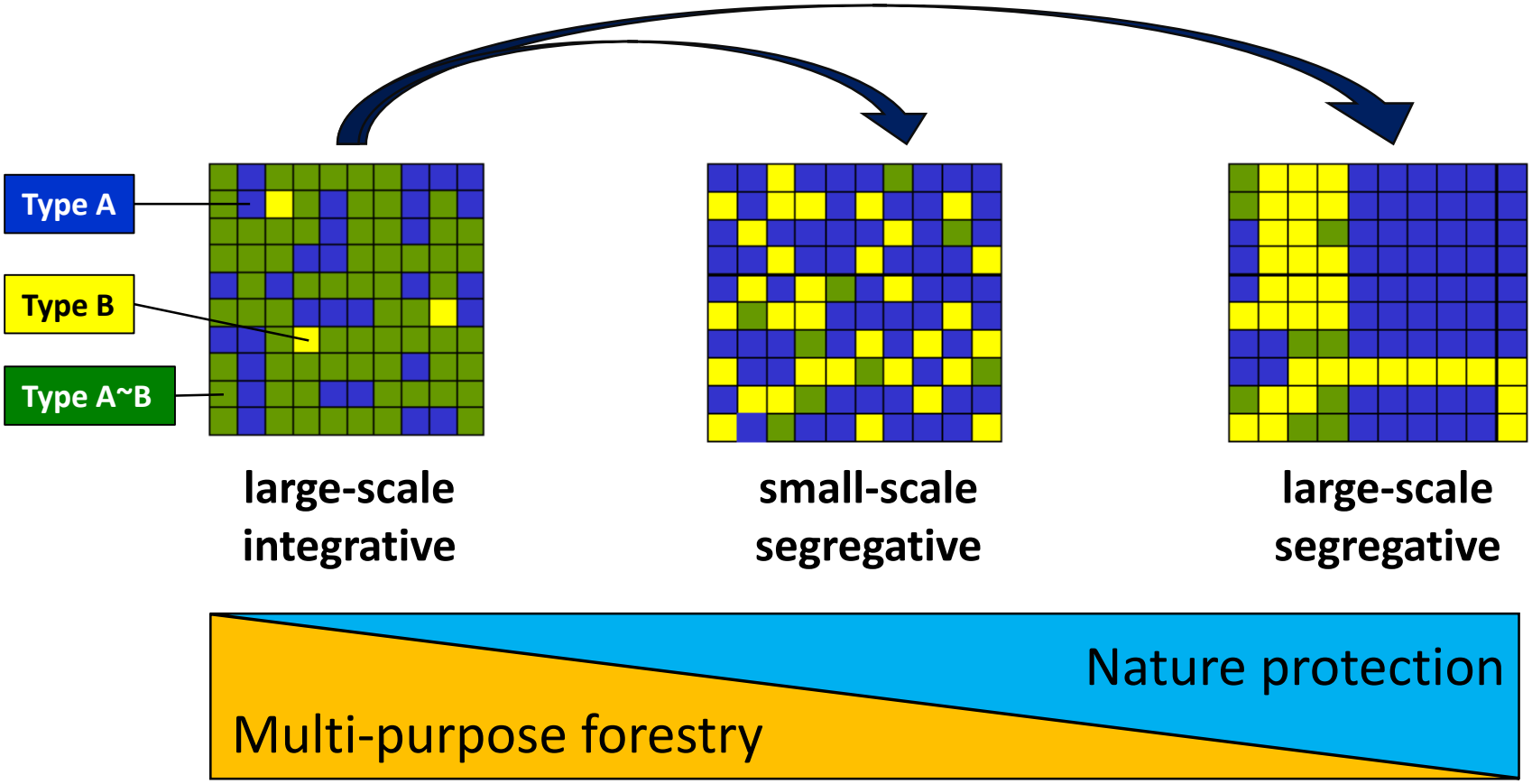
(acc. to Tittler et al. 2016)

Different management approaches and their respective fulfillment of different specific management goals



(adapted from Larsen 2012)

Land-use strategies

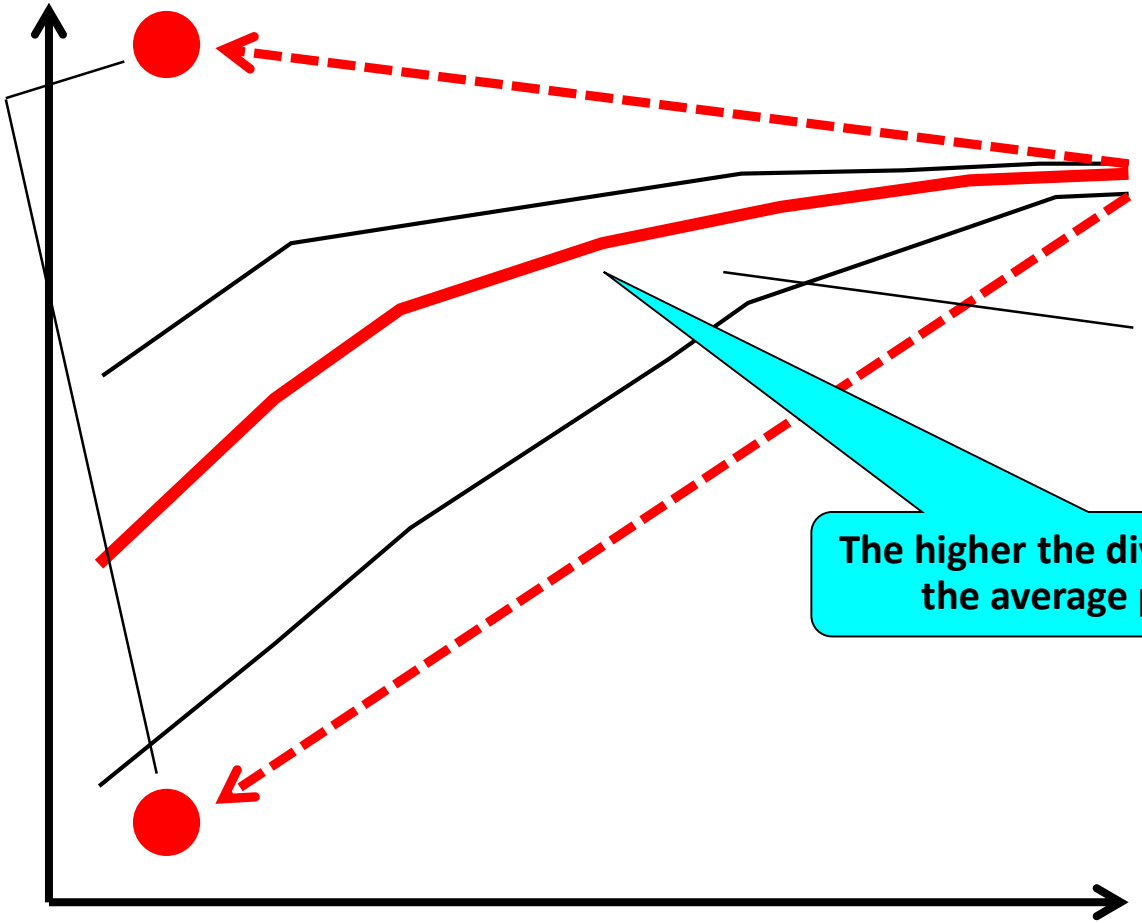


(Meyer 2013)

The scientific basis

Diversity-function relationship

Maximum and minimum values of the most and least productive species grown in monoculture



Ecosystem function (resource capture, biomass production, decomposition, nutrient cycling)

Biological diversity (variation in genes, species, functional traits)

(Cardinale et al. 2012)

Summary

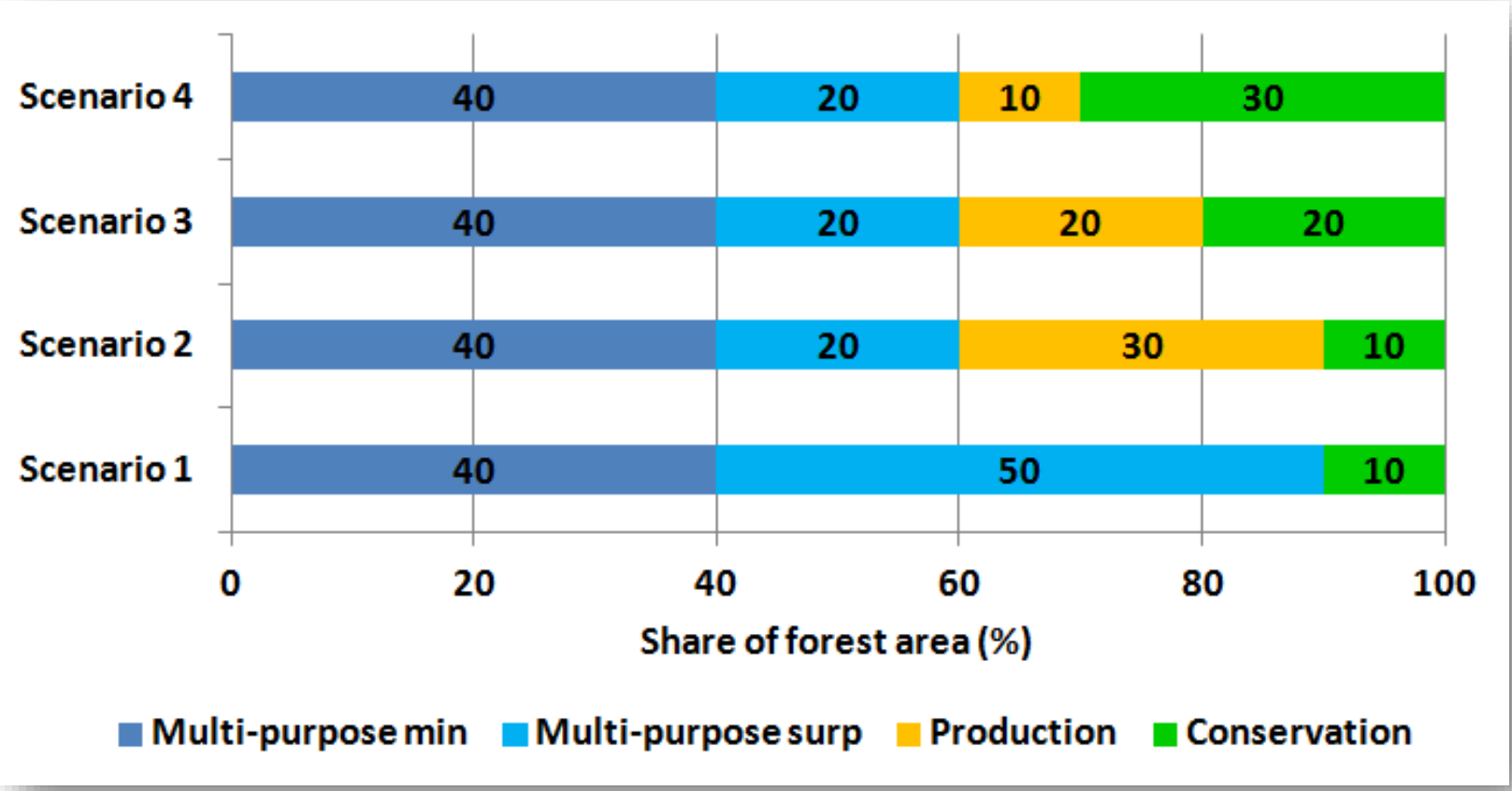
- Implementing a **multi-purpose management strategy** requires for **consensual decision making, coordination and concerted action** on **different levels of forest policy** formulation and forest governance:
  - **horizontal coordination** of policies on the national level,
  - **vertical coordination** between the Federation and the States, and a
  - **negotiated consensus** involving forest owners and civil society.

- Government strategies and programs have been developed through extensive **multi-stakeholder consultations**, and with participation of the scientific community.

- The Federal government, rather than directing policy, acted as **a catalyst and moderator** aiming for the highest possible level of societal consensus and acceptance by the various stakeholders involved.

(acc. to Mann 2012)

The integration-segregation balance



Conclusions

- Today multiple services of managed forests are **predominantly either a chance event** or linked to a **feature of the forest** as such.

- There is a need for a comprehensive hierarchical dual strategy with both integrative and segregative instruments for the conservation of representative forest biota.

- To advance the intensity of multiple-services provisioning beyond the fundamental level of what a particular forest provides, a **specified multiple-service concept** must be developed.

- **Functional understanding** of the relation between
  - **forest structure and processes**
  - **forest management measures**

  and the provision of forest ecosystem services (incl. trade-offs) is needed.

- **Unbiased discussion** of measures to increase forests production, e.g. the role of Douglas fir, share of conifers, genetic improvement, shortening rotation …

(acc. to Wagner et al. 2014)