#### Possibilities for extending use of biomass in a sustainably way

PÅL BÖRJESSON, ENVIRONMENTAL AND ENERGY SYSTEMS STUDIES, LUND UNIVERSITY



## Total global biomass production via photosynthesis





(IEA, 2021; WBA, 2016)

\* per year

#### Sustainable biomass resources





#### Residues, by-products and excess agriculture land





#### Utilisation of forest biomass (Sweden)



# JRC report 2021 - Forest bioenergy



## Logging residues\* – Sustainable recovery levels

Harvest level (%)			Environmental effects			
Felling site	Landscape	Total	Biodiversity	Soil fertility	Acidification	Etc
80	70	56				$\rightarrow$
70	70	49		$\longrightarrow$	$\longrightarrow$	$\rightarrow$
70	60	(42)	$\rightarrow$	$\longrightarrow$	$\rightarrow$	$\rightarrow$

LUNDS UNIVERSITET

\*Slash - coniferous

#### Increased forest biomass potential\* (%)



(Fossilfritt Sverige 2021; Börjesson 2021)

# Damaged roundwood





(Holmen)

#### Sustainable biomass from agriculture





#### Strategic expansion of multifunctional biomass cultivations



## Increased biomass potential from agriculture\* (%)

Manure, catch crops, crop residues etc. (biogas)

Straw **Ecological Focus Areas etc.** 





(Fossilfritt Sverige 2021; Börjesson 2021)

\* Sweden, 2045

#### Sustainable increase of domestic biomass supply



(Swedish Energy Agency, 2020; Börjesson, 2021; Fossilfritt Sverige, 2021)

#### Conclusions

- The potential of an increased biomass supply is significant in Sweden, also meeting critical sustainability criteria based on decades of comprehensive scientific research and field trials
- The JRC Report include 23 forest bioenergy systems of which the majority are not relevant for Swedish conditions, the few of relevance and utilized are also the ones that are assessed as sustainable in the report
- Biomass from agriculture have the potential to provide additional environmental services, e.g. by multifunctional biomass cultivations
- It is not the supply of sustainable biomass that will be a limiting factor during the coming decade, but investments in biomass conversion facilities



