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Sustainable Paper Cycles – These Are The Facts

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PTS FIBRE based solutions

vdp

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bifa Umweltinstitut GmbH
Facts at a glance

- Founded: 1991
- Employees: approx. 40
- Turnover: approx. € 4 million per year
  (of which currently up to € 1.1 million per year institutional funding by the Free State of Bavaria)
- Legal form: GmbH (nonprofit)
- Shareholders:

Free State of Bavaria

City of Augsburg

Chamber of Industry and Commerce for Swabia

Application-orientated research, development and consulting in the environmental sector

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Our content expertise

- Climate protection and climate impacts
- Sustainable power and heat supply
- Circular economy and waste management
- Pollutants, hygiene, risk management
- Sustainable production and service

Our expertise

- Process engineering and material flows
- Biological process engineering and analytics
- Energy systems and energy technology
- Social sciences and environmental psychology
- Life cycle assessment and system analysis

Objectives

Reliable, current and comprehensive fact base on the sustainability of paper

Focus

- Paper production & use in Germany
- Environmental effects
- Main thematic areas: life cycle assessment, energy consumption, wood sources and recycling

- The term „paper“ represents paper and board in this study
- Data and graphics sources cf. report

Project

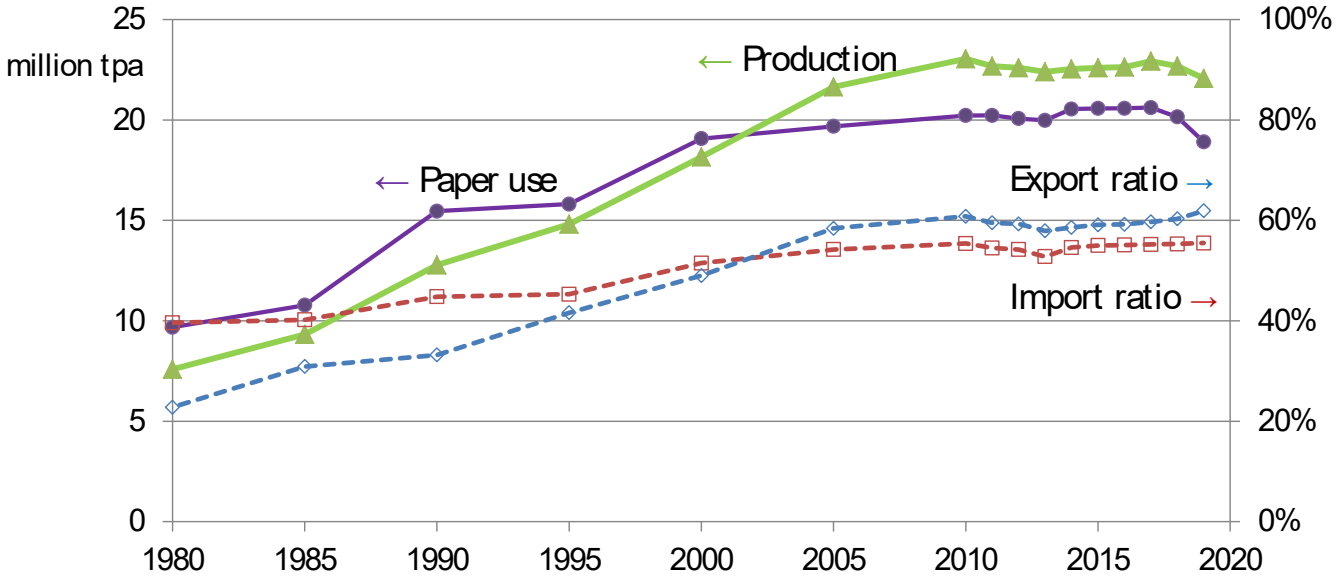
Period	11/2019 – 10/2020
Funding	Kuratorium für Forschung und Technik der Zellstoff- und Papierindustrie im Verband Deutscher Papierfabriken e.V.
Internal title	INFOR 218
Editors	Wolfram Dietz (bifa), Gert Meinl (PTS), René Peche (bifa), Siegfried Kreibe (bifa) et al.
Steering group	9 representatives of 5 companies and 3 associations
Publication	No. 70 in publication series „bifa-Texte“

The German paper industry in 2019

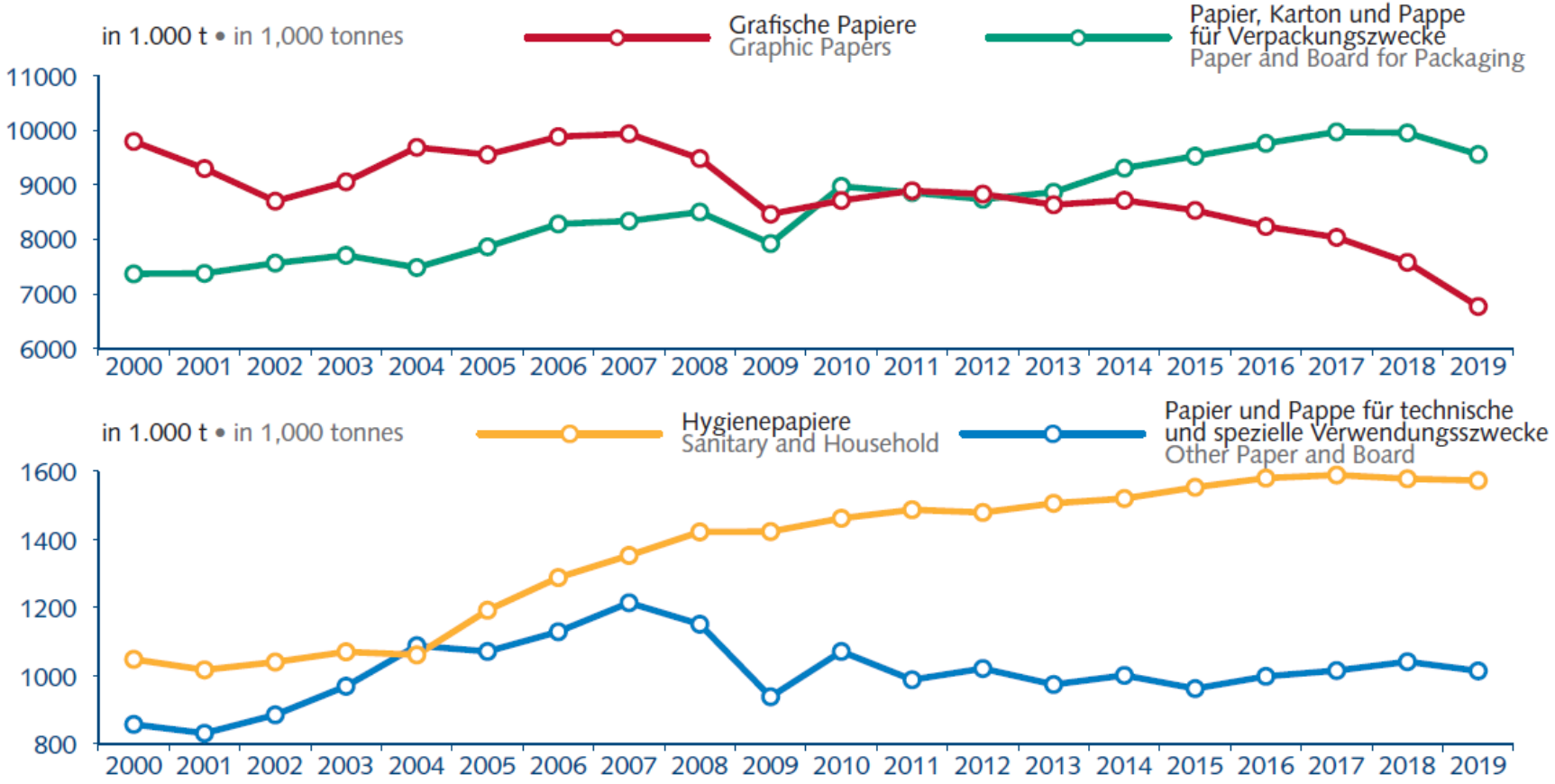
- 91 companies
- 153 production sites
- Production output 22.1 million tons
  - ranks first in Europe
  - ranks fourth worldwide after China, U.S. and Japan

Main grades:

- Graphic papers
- Paper and board for packaging
- Sanitary and household papers
- Technical and specialty papers



Paper consumption by main grades



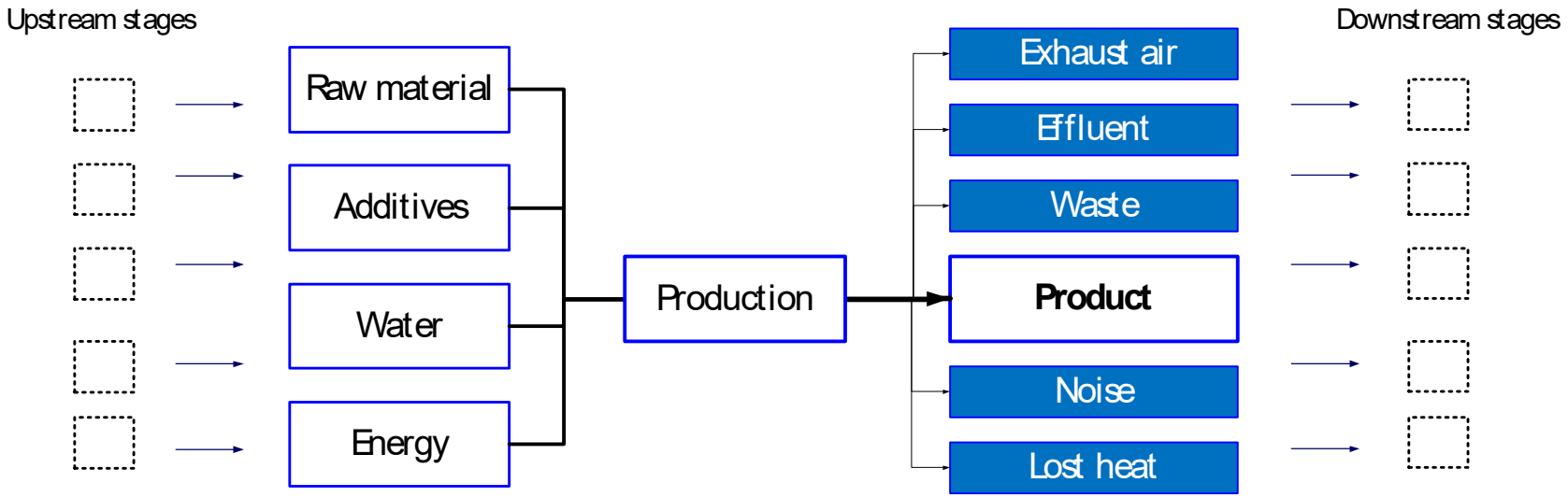
Benchmarking of paper consumption

- Per capita consumption: 227 kg/a
- higher than international benchmarks

- Calculation does not take into account foreign trade flows of paper products
- Consumption in relation to gross domestic product: Germany is close to the world average
- This indicates a close relationship between paper consumption and economic performance

Life cycle assessment

- Method of choice to disclose environmental impacts
- Upstream and downstream stages are considered as well



LCA studies of paper products

- A couple of studies are available that consider the environmental impact of climate change (greenhouse effect)
- Only a few LCAs are available that analyse other environmental impacts besides climate change

Exemplary study results in kg CO_2 equivalents/ ton of product		
890-1,060	Newsprint	VTT 2010
905	Magazines	VTT 2010
1,120-1,280	Copy paper from primary fibres	Ifeu 2006
930	Copy paper from secondary fibres	Ifeu 2006
531	Corrugated board	FEFCO 2018
850	Kitchen roll from primary fibres	bifa 2010
616	Graphical papers	EURO-GRAPH 2017
Older values must be corrected downward for today		

- Energy consumption in paper mills is a major contributor to CO_2 emissions

Aspects to be considered in the evaluation of LCAs

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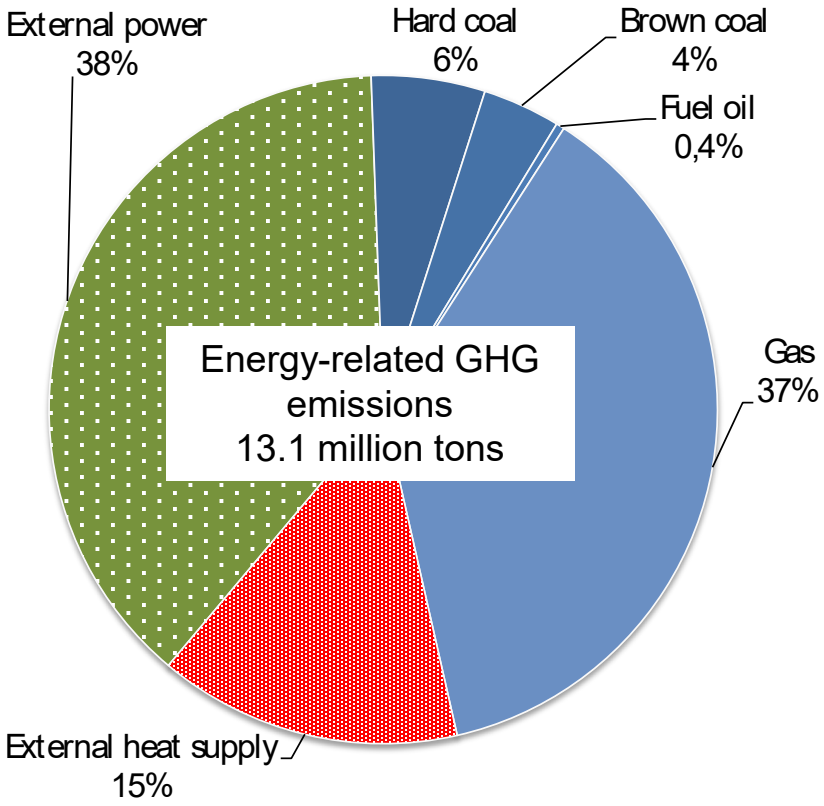
- Various methods can be used to **allocate** environmental impacts to products or cycle stages – particularly in the case of co-products and closed-loop recycling
- LCAs are designed for specific objectives – they use **selected data and simplifications** accordingly. The interpretation for other objectives must be approached with caution
- **Biodiversity** is not or only insufficiently considered in LCAs
- Increase or decrease of **forests** is not yet been taken into account in LCAs
- **Social** aspects are not considered

Energy use and greenhouse gas emissions

- Final energy use 58.4 TWh/a
- The German paper industry is one of the most energy-intensive industries

- Final energy consumption per tonne of paper has been reduced by 43 % since 1980
- A substantial hurdle to achieving further reduction is paper drying
- Energy-related greenhouse gas emissions are primarily caused by
  - fossil fuels in company-owned power plants
  - electricity purchased



Primary fibre pulp

- 5.2 million tons of primary pulp are used in Germany, mainly chemical pulp
- 2.3 million tons of primary pulp are produced in Germany

Wood sourced in Germany

- The pulp and paper industry accounts for 7.7 % of the use of domestic wood raw materials
- For the production of primary fibre materials, mainly thinned wood and small-dimensioned wood is used – trees mature for harvesting are needed for the sawmill industry
- By-products of the sawmill industry are another raw material for pulp production, with a share of 38 % in Germany

Changes in forest cover 2015 vs. 1990 in countries supplying Germany with pulp, and for Germany

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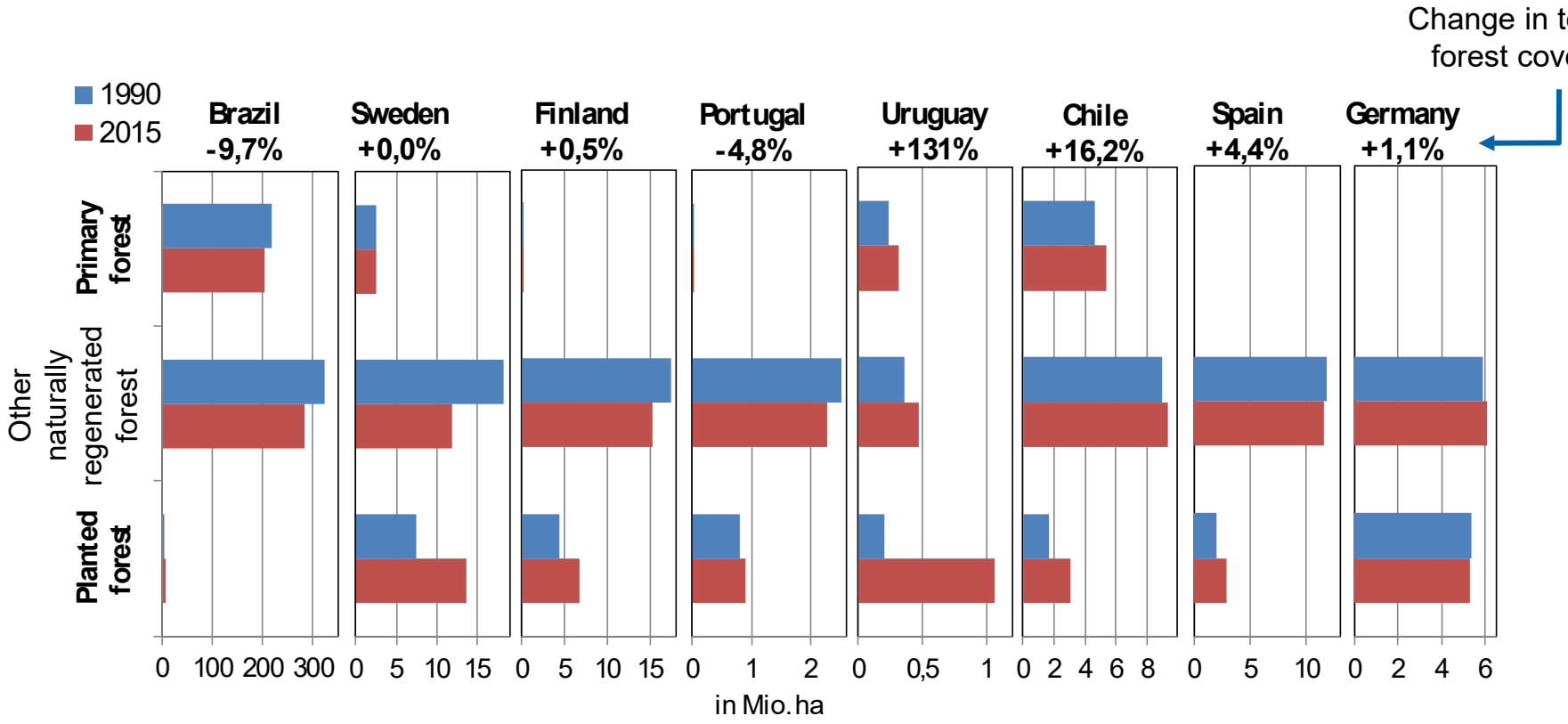


- With the exception of Brazil and Portugal, forest cover increased
- But: Shift from primary and naturally regenerated forest to planted forests

Origin of wood outside Germany

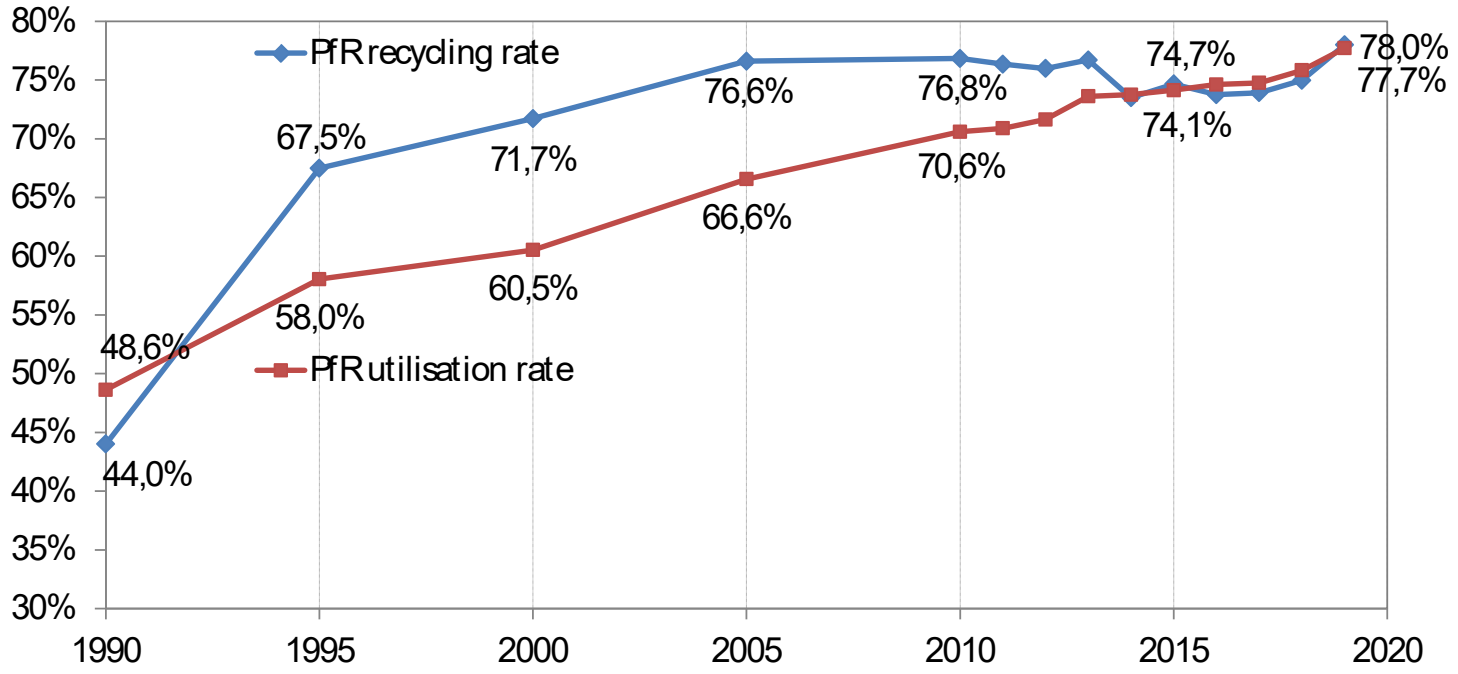
- World roundwood production: 49 % wood fuel and 51% industrial
- Share to pulp and paper industry: 14-19 %
- Pulp imported into Germany:
  primarily from Brazil, Finland, Sweden, Portugal, Uruguay, Spain and Chile

- An analysis of wood sources indicates:
  Clearing or conversion of primary forest and naturally regenerated forest predominantly serve purposes other than paper production

- e.g. for palm oil und soy plantations
- wood use (example Indonesia)
- to mine underground raw materials
- forest fires
- field cultivation and cattle breeding

Successes of recycling

- Use of paper for recycling (PfR) in Germany: 17.2 million tons per year
- 3.3 times as large as the use of primary fibers
- Recycling rate and utilisation rate for Germany have risen steadily over the years
- both currently at approx. 78 %

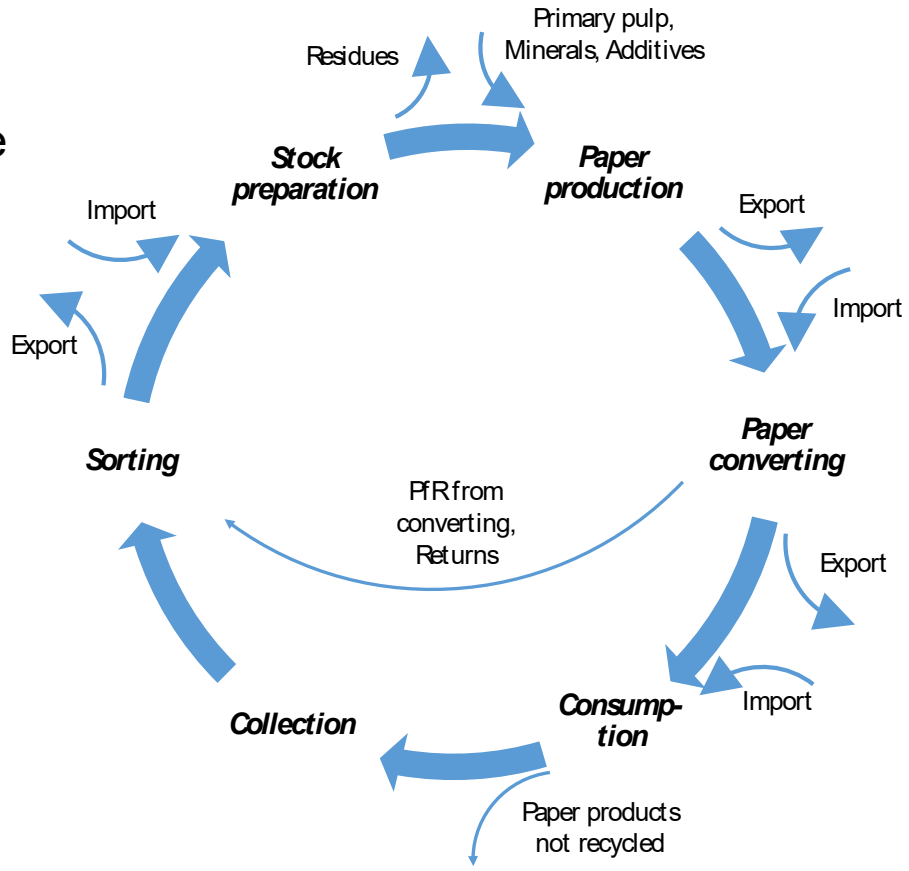


Opportunities and limits of recycling

The limits of recycling do not lie in progressive quality loss of the fibre material

They are rather caused by:

- **Recycling operations** that remove unsuitable components, which also lead to fiber losses
- **Limited recyclability** of certain paper products,
  e.g. sanitary paper, wallpaper or composite packaging
- **Paper losses** in the course of collection



Conclusions and outlook

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Report

- The publication compiles facts – these will allow focused decisions for sustainability in the future.

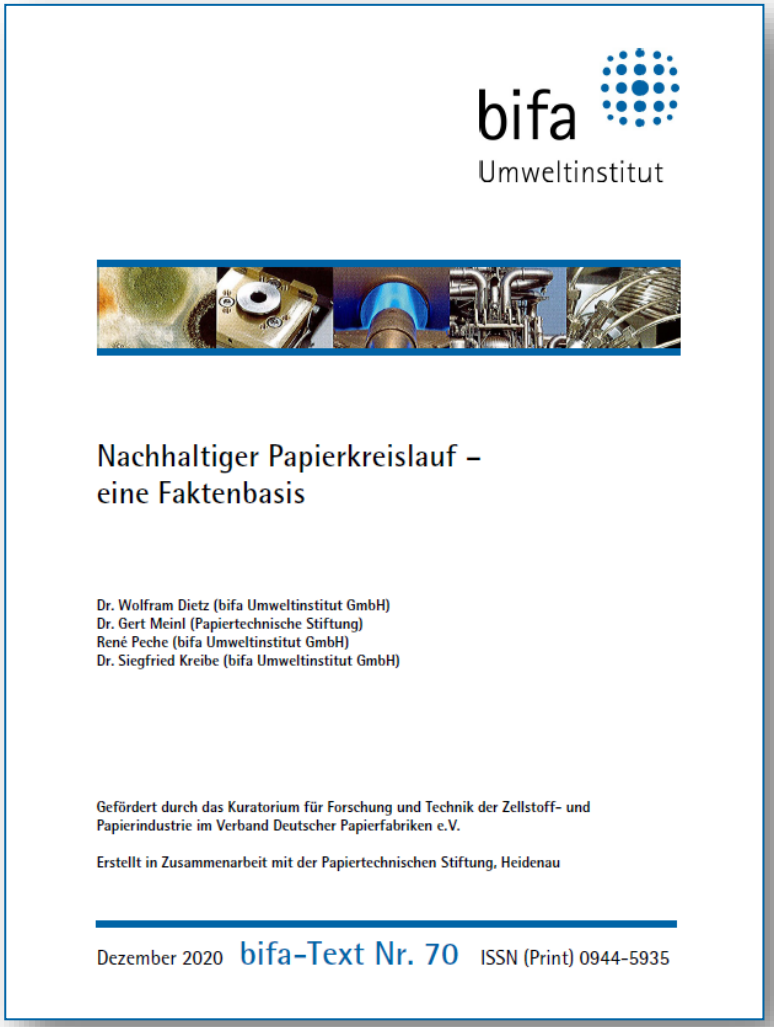
Elaboration process

- A wide range of sustainability aspects was discussed in the steering group. Not all could be addressed in the report.
- The company representatives worked together very constructively – this can provide impetus for further joint projects.

Outlook

- The paper industry faces the challenges of the future
- Major issues to be tackled are forest destruction and climate neutrality

bifa-Text
„Nachhaltiger Papierkreislauf – eine Faktenbasis“



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