



Bund Ökologische Lebensmittelwirtschaft

# **Efficiency coping with scarcity of natural resources in Agriculture**

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# Parameters of efficiency



Fertilizer

Water

Capital

Labour



# Parameters of efficiency

Energy  
emission versus sequestration of  
Green House Gases  
purity of drinking water or rivers  
and lakes  
vitality of the seabed  
Biodiversity  
beauty of landscape  
quality of the air we breathe

# Parameters of efficiency

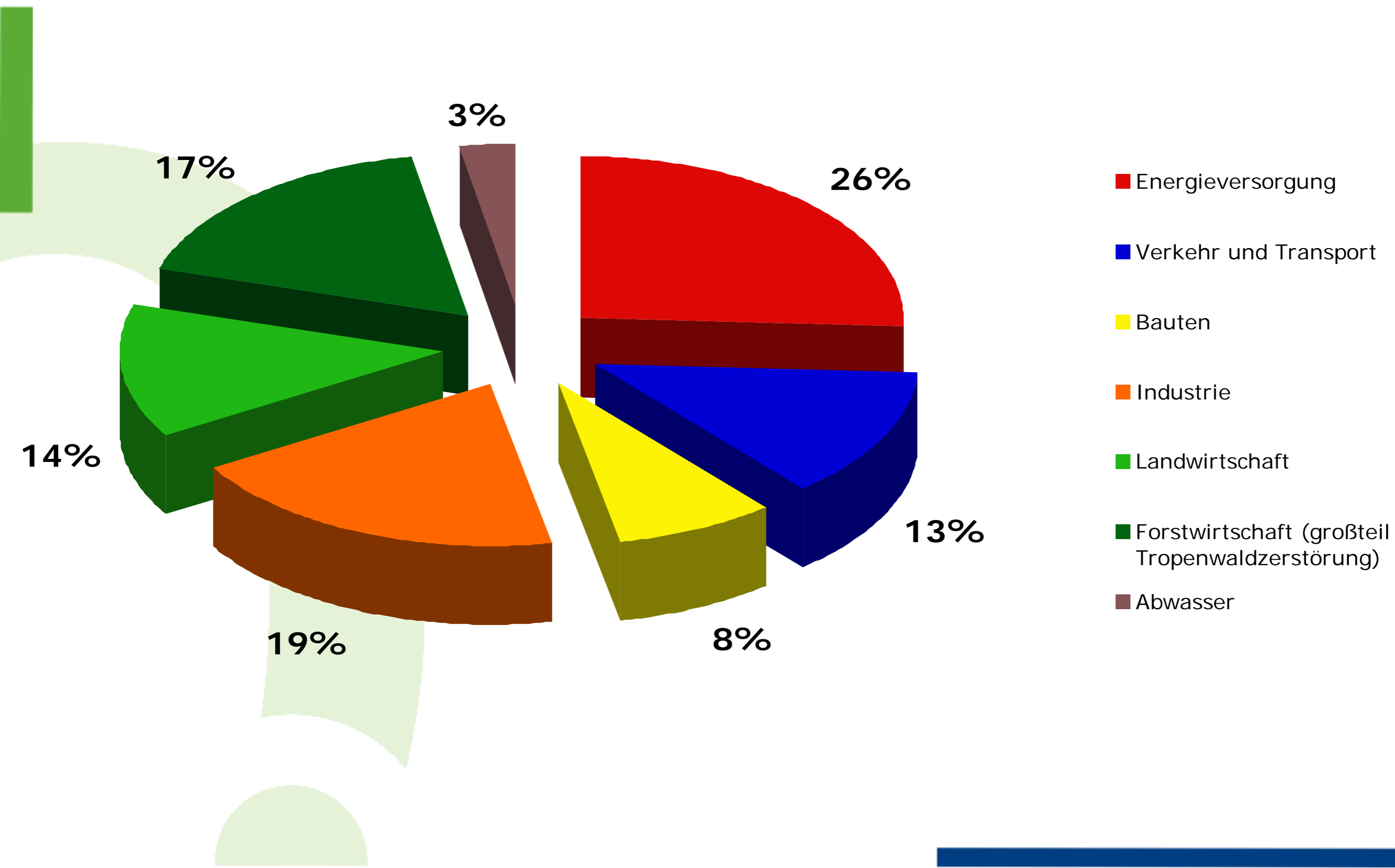
farmers independence

food sovereignty

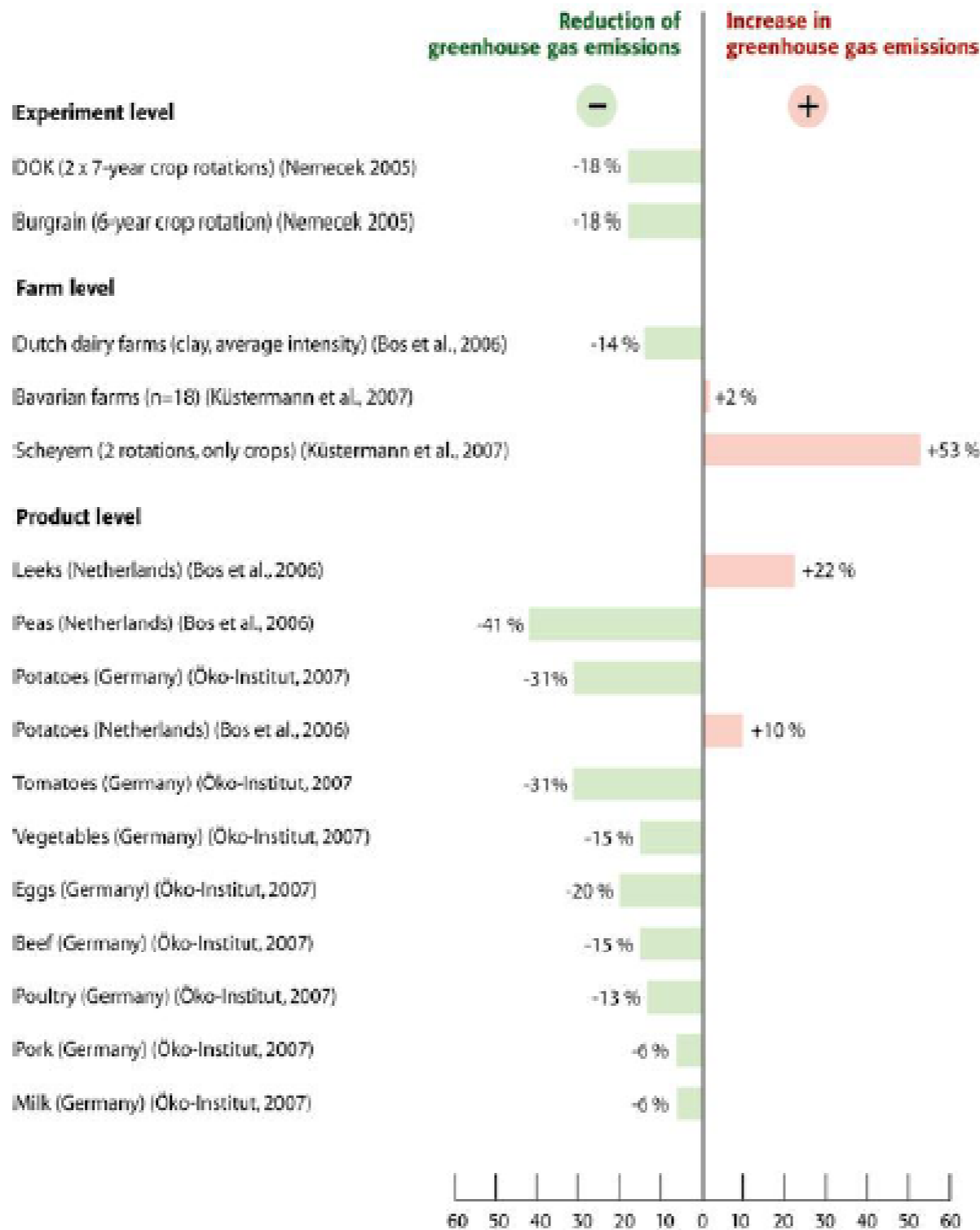


# Anteil der Wirtschaftssektoren an den weltweiten Treibhausgasemissionen

nach IPCC 2007. Grafik: FiBL Österreich



Graph: FiBL, CH-Frick



Parameter	Unit	Organic farming	Integrated farming (IP) with FYM	Organic in % of IP
Nutrient input	kg N <sub>total</sub> ha <sup>-1</sup> yr <sup>-1</sup>	101	157	64 %
	kg N <sub>min</sub> ha <sup>-1</sup> yr <sup>-1</sup>	34	112	30 %
	kg P ha <sup>-1</sup> yr <sup>-1</sup>	25	40	62 %
	kg K ha <sup>-1</sup> yr <sup>-1</sup>	162	254	64 %
Pesticides applied	kg ha <sup>-1</sup> yr <sup>-1</sup>	1.5	42	4 %
Fuel use	L ha <sup>-1</sup> yr <sup>-1</sup>	808	924	87 %
Total yield output for 28 years	%	83	100	83 %
Soil microbial biomass „output“	tons ha <sup>-1</sup>	40	24	167 %

**Table 1 – Economic value of ecosystem services in organic and conventional fields (adapted from Sandhu et al., 2008).**

Ecosystem services	Economic value in US \$ ha <sup>-1</sup> yr <sup>-1</sup>	
	Organic fields	Conventional fields
Provisioning services	4012	3258
Regulating services	107	54
Cultural services	21	21
Supporting services	1388	540

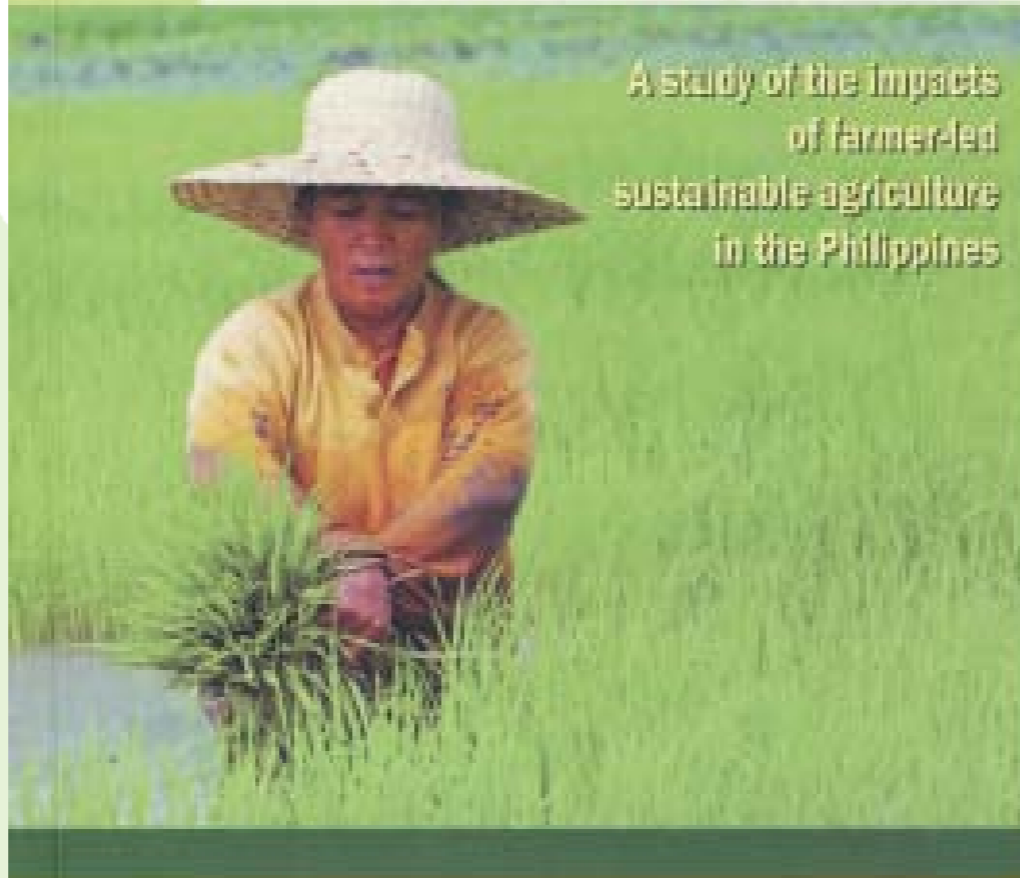


**Table 1: Average yields for seven crops in Tigray, 2001–2006**

Crop type	Average Yield (kg/ha)					
	No input (control)		Compost		Fertilizer	
	Grain	Straw	Grain	Straw	Grain	Straw
broad bean (n=38)	1,544	7,119	3,535	13,998	2,696	11,350
barley (n=112)	1,161	6,927	2,374	13,670	1,832	8,269
wheat (durum) (n=141)	1,313	6,464	2,791	10,740	1,760	8,453
teff (n=223)	1,179	7,384	2,401	12,193	1,774	11,096
maize (n=83)	1,843	13,545	3,895	17,840	3,031	14,363
'hanfets' (n=109)	858	6,706	1,341	10,187	1,199	6,712
finger millet	898	4,177	2,496	12,148	1,297	6,655

# Food Security and Farmer Empowerment

*A study of the impacts  
of farmer-led  
sustainable agriculture  
in the Philippines*



Lorenz Bachmann  
Elizabeth Cruzada  
Sarah Wright

MISEREOR  
GIZ



# Klimawandel

**Chemische  
Verschmutzung**  
(noch nicht quantifiziert)

**Versauerung  
der Ozeane**

**Anreicherung von  
Aerosolen in der  
Atmosphäre**  
(noch nicht quantifiziert)

**Abbau der  
Ozonschicht**

**Verlust der  
Biodiversität**

**Stickstoff-  
kreislauf**

**Phosphor-  
kreislauf**

**Änderung der  
Landnutzung**

**Süßwasser-  
verbrauch**

