NUMERICAL DATA

Responses of greenhouse-gas emissions to land-use change from rice to jasmine production in subtropical China (2019)

Global-warming potential (GWP) of paddy and jasmine fields (average ± SE, N = 3) analyzed by mixed models, with plot as a random factor.

Land use	**Cumulative greenhouse-gas emission (g m^{-2})**			**GWP (kg CO_2-eq ha^{-1})**			**Total GWP (kg CO_2-eq ha^{-1})**
	CO_2	**CH_4**	**N_2O**	**CO_2**	**CH_4**	**N_2O**	
Paddy field	7245 ± 335a	25.5 ± 1.3a	0.56 ± 0.08a	72453 ± 3352.48a	8865 ± 428.13a	1667 ± 2284a	82784 ± 3421a
Jasmine field	4744 ± 125b	0.31 ± 0.44b	3.36 ± 1.15a	47437 ± 1245.69b	105 ± 150b	10013 ± 3423b	57556 ± 3056b

Different letters within a column indicate significant differences ($P < 0.05$).

CO_2 flux in the paddy field was generally higher from April to December (rice growth period, and the beginning of straw return for December, > 264 mg m^{-2} h^{-1}) and lower from January to March (fallow period, < 100 mg m^{-2} h^{-1}). CO_2 flux in the jasmine field was generally higher from April to August (jasmine rapid-growth period, > 770 mg m^{-2} h^{-1}) and lower from September to March of the next year (jasmine slow-growth period, < 300 mg m^{-2} h^{-1}). Cumulative CO_2 emission was lower in the jasmine than the paddy field ($P < 0.05$).

Source: https://www.sciencedirect.com/science/article/abs/pii/S1352231018308896

Challenges of Employing Renewable Energy for Reducing Green House Gases (GHGs) and Carbon Footprint (2019)

Different renewable technologies and their emissions

Renewable technology	**Basic information**	**Renewable source**	**CO_2 emission (gmCO_2 eq/kWh)**
Fuel cell	Device which converts chemical energy into electrical energy	Methanol (CH_3OH), Natural gas, Reforming of CH_4 to H_2 leads to decreased efficiency	50
Photovoltaic (Solar PV)	Generates no heat and produces electricity from solar radiation	Sun	Utility scale - 48 Rooftop - 41
Wind	Converts wind energy to electrical energy by wind turbines.	Wind	Offshore – 12 Onshore – 11
Hydro	Natural Resource	Water	24
Biomass	Biofuel, Waste management system	Biological waste	Dedicated – 230
Geothermal energy	Thermal energy of Earth	Earth Temperature	38
Other renewables	OTEC (Ocean thermal energy conversions)	Temperature difference between cooled water and warm tropical surface waters	17

[a] Source: IET Renew. Power Gener., 2016, vol. 10, Iss. 7, pp. 873–884.

[b] Source: IPCC, 2014. Global warming potential of selected electricity sources.

Source: https://sci-hub.tw/https://doi.org/10.1016/B978-0-12-803581-8.11170-1

Challenges of Employing Renewable Energy for Reducing Green House Gases (GHGs) and Carbon Footprint (2019)

Precipitation change projections for India due to increasing GHGs

Year	*Precipitation change (%)*			*Sea level rise (cm)*
	Annual l	*Monson*	*Winter*	
2020s	1.36 ± 0.19	1.61 ± 0.16	1.13±0.43	**4–8**
2050s	6.7 ± 8.9	−2.9 ± 26.3	6.7 ± 8.9	**15–38**
2080s	**11.0 ± 12.3**	**5.3 ± 34.4**	**11.0±12.3**	**46–59**

Source: Aggarwal, D., Lal, M., 2001. Vulnerability of Indian Coastline to Sea-level Rise, New Delhi: Centre for Atmospheric Sciences, Indian Institute of Technology

Temperature change projections for India due to increasing GHGs

	Annual l	***Monson***	***Winter***
2020s	1.36 ± 0.19	1.61 ± 0.16	**1.13±0.43**
2050s	2.69 ± 0.41	3.25 ± 0.36	**2.19±0.88**
2080s	**3.84 ± 0.76**	**4.52 ± 0.49**	**3.19±1.42**

Source: Aggarwal, D., Lal, M., 2001. Vulnerability of Indian Coastline to Sea-level Rise, New Delhi: Centre for Atmospheric Sciences, Indian Institute of Technology.

URL: https://sci-hub.tw/https://doi.org/10.1016/B978-0-12-803581-8.11170-1

Effects of water deficit stress on agronomic and physiological responses of rice and greenhouse gas emission from rice soil under elevated atmospheric CO_2 (2018)

Table 1. Representative studies reporting GHG emissions from rice soils under different water management practices.

Author	**Environment**	**GHG Emission**		
		CH_4 (kg ha^{-1})	**N_2O (kg ha^{-1})**	**GWP (kg CO_2 equivalent ha^{-1})**
Hadi et al., 2010	Continuous flooded	634.2[a]	3.4[c]	15,378
	Intermittent drainage	370.9[a]	4.6[c]	9706
Tyagi et al.,	Continuous flooded	14.45[b]	–	8153.88
2010	Intermittent drainage	8.53[b]	–	4816.25
Xu and Hosen,	Continuous flooded	2.62	–	–
2010	Irrigation at 79% soil water	1.7	–	–
	content			
Khosa et al.,	Continuous flooded	1.3[b]	–	–
2011	AWD	0.47[b]	–	–
Li et al., 2011	Early aeration	1.49	132[d]	2920
	Prolonge aeration	1.52	85[d]	2300
Wang et al.,	Continuous flooded	–	0.28	–
2011	Intermittent drainage	–	0.37	–
Wang et al.,	Continuous flooded	221	0.16	–
2012	Intermittent drainage	74	0.22	–
Jain et al., 2014	TPR	22.59	0.61	888.1
	SRI	8.81	0.91	644.3
Li et al., 2014	Early aeration	1.27[b]	112[d]	2640
	Prolonged aeration	0.85[b]	113[d]	2330
Pandey et al.,	Continuous flooded	108	0.31	2784
2014	AWD	31	0.74	1005
Kumar et al.,	Continuous flooded	34.07	1.04	2328.53
2016	Irrigation at −40 kPa	16.7	0.98	1867.64

[a] Value in kg carbon ha^{-1} season^{-1}.

[b] Value in mg m^{-2} h^{-1}.
[c] Value in kg Nitrogen ha^{-1} season^{-1}.
[d] Value in µg N_2O m^{-2} h^{-1}.

Source : https://www.sciencedirect.com/science/article/pii/S0048969718338026

Effects of biochar application in forest ecosystems on soil properties and greenhouse gas emissions: a review (2018)

Table 1: Effects of biochar application on the greenhouse gas emissions in forest soils.

Soil type	Study type (scale)	Biochar type	Biochar rate	Time	CO_2 emission (over control)	CH_4 uptake (over control)	N_2O emission (over control)	Reference
Cambisols	Laboratory	Corn silage (500°C)	1%, w/w	105	No significant difference	No significant difference	Decreased N_2O emission	Malghani et al. (2013)
Ferralsols	Laboratory	Chicken manure (540°C)	10%, w/w	84	-	Increased CH_4 uptake	-	Yu et al. (2013)
Brunisol	Laboratory	Sugar maple wood (500°C)	5, 10, and 20%, w/w	24	Increased CO_2 emission	-	-	Mitchell et al. (2015)
Humo-ferric podzols	Laboratory	Douglas-fir (420°C)	1 and 10%, w/w	25	Increased CO_2 emission	Decreased CH_4 uptake	No significant difference in the 1% biochar treatment; Increased N_2O emission by 191% in the 10% biochar treatment	Hawthorne et al. (2017)
Lixisol	Field	Wheat straw (450°C)	30 t ha^{-1}	1	Decreased CO_2 emission by 31.5%	-	Decreased N_2O emission by 25.5%	Sun et al. (2014)
Ferralsols	Field	Bamboo leaf (500°C)	5 t ha^{-1}	1	No significant difference	-	-	Wang et al. (2014)
Humo-ferric podzols	Field	Mixed maple and spruce sawdust (350–450 °C)	1 and 10%, w/w	1	No significant difference	No significant difference	No significant difference	Sackett et al. (2015)
Ferralsols	Field	Bamboo leaf (500°C)	5 t ha^{-1}	1	-	-	Decreased N_2O emission by 20.5%	Xiao et al. (2016b)
Humo-ferric podzols	Laboratory	Douglas-fir slash (420°C)	20 t ha^{-1}	3	Increased CO_2 emission by 6.6%	Decreased CH_4 uptake by 8.4%	-	Johnson et al. (2017)
Ultisol	Field	Chicken manure (400°C)/Sawdust (400°C)	24 t ha^{-1}	1	-	No significant difference	No significant difference	Lin et al. (2017)
Ferralsols	Field	Bamboo (800°C)	10 and 30 t ha^{-1}	16	No significance difference	-	-	Zhou et al. (2017)

Source: https://link.springer.com/article/10.1007/s11368-017-1906-y

Nitrogen fertilization and conservation tillage: a review on growth, yield, and greenhouse gas emissions in cotton. (2017)

Table 1. Reported GHG emission and their fluxes in different countries in cotton.

Place of study	GHG under study	GHG emission	GHG flux	Reference
Pakistan	N_2O	3.2 kg ha^{-1}	2.33 g N ha^{-1} day^{-1}	Mahmood et al. (2008)
China	N_2O	2.6 kg ha^{-1}	30 μg N m^{-2} h^{-1}	Liu et al. (2010)
China	NO	0.8 kg ha^{-1}	8.8 μg N m^{-2} h^{-1}	Liu et al. (2010)
Uzbekistan	N_2O	0.9 to 6 kg ha^{-1}	3000 μg N m^{-2} h^{-1}	Scheer et al. (2008a, b)
Australia	CO_2e	127, 127, and 1634 kg ha^{-1} (for solid-plant, double-skip, and irrigated cotton farming systems, respectively)	–	Maraseni et al. (2010)

Source: https://link.springer.com/article/10.1007/s11356-016-7894-4