



## Comparative carbon footprints of buffalo milk produced at smallholder and organised farms in Hisar district of Haryana, India

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Received: 25 March 2022; Accepted: 28 March 2023

Supplementary Table 1. Carbon emission factors (in kg CO<sub>2</sub>-eq./kg) used in carbon footprint estimation

Material used	Emission factor
Synthetic fertilizer production <sup>a</sup> (in kg CO <sub>2</sub> -eq./kg N)	5.66
Fuel (Diesel Combustion) <sup>b</sup>	3.13
Seed production <sup>c</sup>	0.3
Wheat straw <sup>d</sup>	0.67738
Cotton seed cake <sup>d</sup>	0.35201
Cotton seed <sup>d</sup>	0.35201
Gram hull*	***
Wheat bran <sup>d</sup>	0.59201
Wheat flour <sup>d</sup>	0.59201
Pearl millet grain*	***
Gram chunni*	***
Oat grain <sup>c</sup>	0.570
Wheat grain <sup>d</sup>	0.59201
Barley grain <sup>d</sup>	0.42087
Maize grain <sup>d</sup>	1.9079
Mustard cake <sup>d</sup>	1.042
Soya bean meal <sup>d</sup>	1.5501
Ground nut cake*	***
Deoiled rice polish <sup>d</sup>	0.53156
Rice polish <sup>d</sup>	0.53156

Source: <sup>a</sup>Kool *et al.* 2012, <sup>b</sup>APAT 2003, <sup>c</sup> Pirlo and Carè 2013, <sup>d</sup>Ecoevent database 2.01 2010, <sup>e</sup> Rajaniemi *et al.* 2011, \*\*\* Not Found.

Supplementary Table 2. Total feed and fodder consumed by reared buffaloes (in kgs)

Feed ingredient	Smallholder farm (kg)	Organised farm (kg)
<i>Green fodder</i>		
Sorghum	385930.2	428376.2
Oat	148604.1	0
Berseem	285462.1	474137
Maize	42352.03	440780.6
Local grass	338658.2	0
China cabbage	0	5335
Pearl millet	0	11607.02
<i>Dry fodder</i>		
Wheat straw	390269.6	206042.5
<i>Concentrate</i>		
Cotton seed cake	108222.6	0
Cotton seed	34884.79	0
Gram hull	16691.3	0
Wheat bran	87914.71	12446.5
Wheat flour	46214.88	0
Pearl millet grain	2369.99	0
Wheat grain	0	38452.39
Barley grain	810.3	22390.62
Maize bran	0	14306.94
Mustard cake	0	40808.95
Soya bean meal	0	9013.905
Ground nut cake	0	10572.99
Deoiled rice polish	0	40601.11
Rice polish	0	12446.5
Oat grain	0	2790.66

Supplementary Table 3. Estimated cultivation area required for yearly fodder production

Green fodder production	Smallholder farm (hectares)	Organised farm (hectares)
Sorghum	5.51	5.02
Oat	3.12	---
Berseem	2.59	2.46
Maize	0.9	4.17
Pearl millet	---	0.09
China cabbage	---	0.06

Supplementary Table 4. Estimated yearly greenhouse gases emissions

Sources of GHGs	Smallholder farm (in kg)	Organised farm (in kg)
CH <sub>4</sub> from enteric fermentation	19524.92	15401.35
CH <sub>4</sub> from manure management	919.08	636.17
N <sub>2</sub> O from manure management	124.41	99.09
N <sub>2</sub> O from managed soils	152.36	143.38