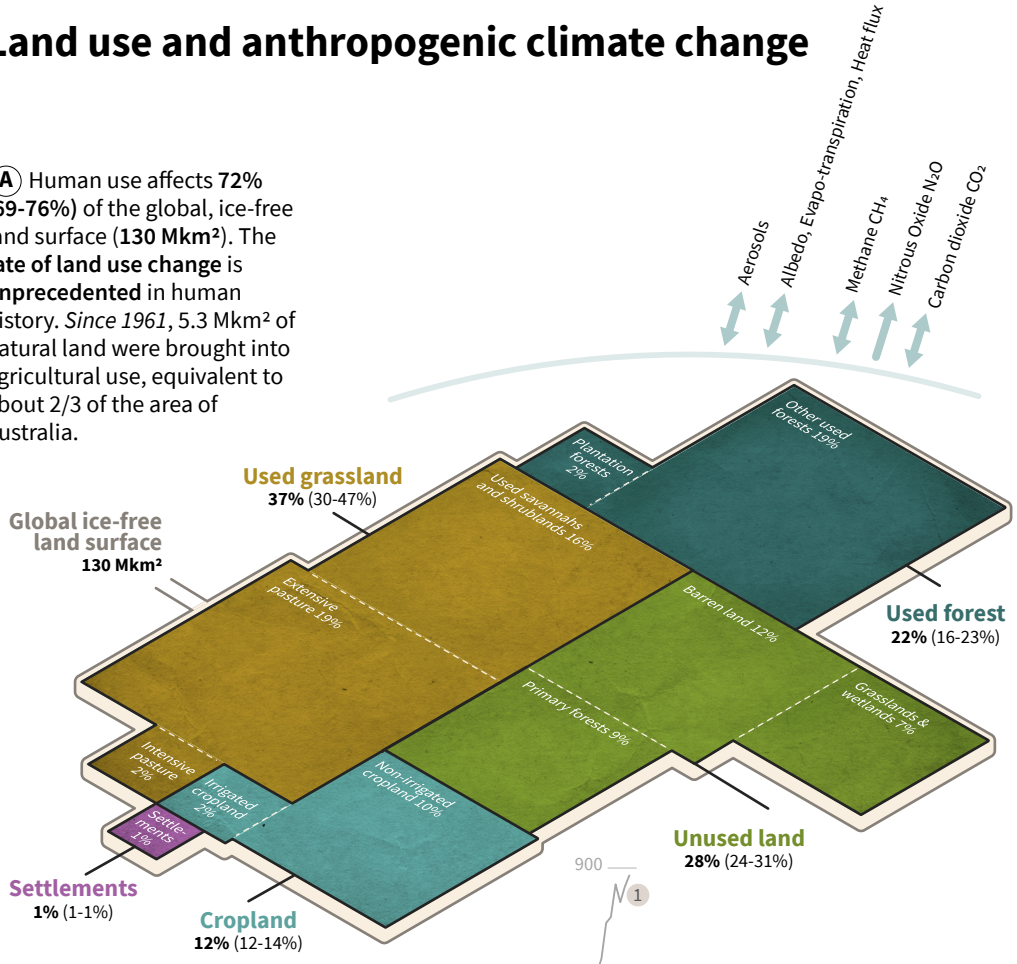
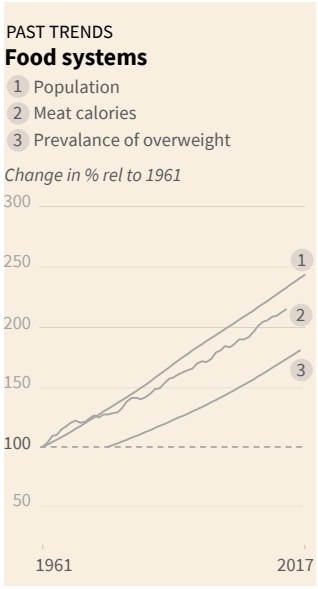
Land use and anthropogenic climate change

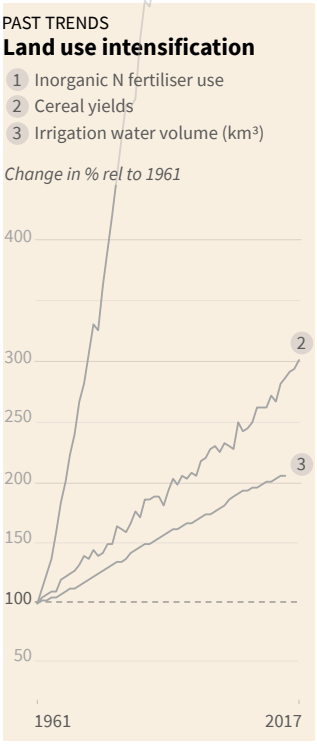
Ⓐ Human use affects **72% (69-76%)** of the global, ice-free land surface (**130 Mkm²**). The **rate of land use change** is **unprecedented** in human history. *Since 1961*, 5.3 Mkm² of natural land were brought into agricultural use, equivalent to about 2/3 of the area of Australia.



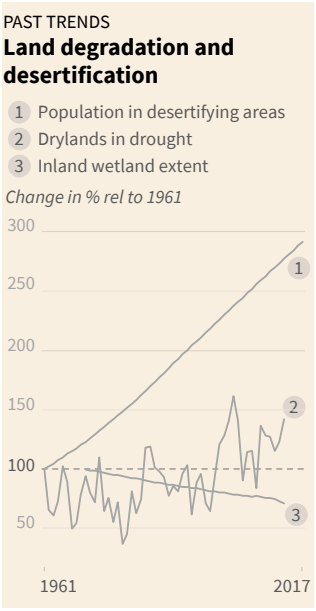
Ⓑ **Land use change** has been driven by increases in food, fibre and timber production arising from the demands of an increasing **population** and **dietary changes**. *Since 1961*, the **consumption of meat** more than doubled and *since 1975*, the prevalence of the population who are **overweight** nearly doubled.



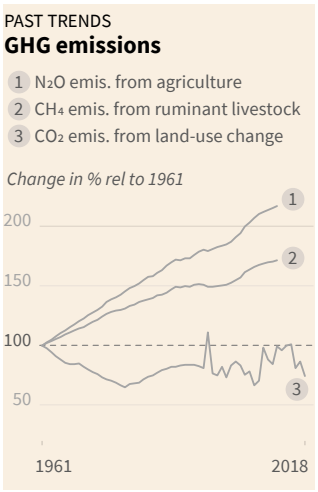
Ⓒ The increasing **demand for food** was also supplied through the rapid **intensification** of agricultural land use. *Since 1961*, the use of **inorganic fertiliser** increased nine fold and the use of **irrigation water** doubled.



Ⓓ Land use change has contributed to **land degradation** and **desertification**. The extent of **inland wetlands** has declined to 70% of the extent *in 1970* and the number of **people living in desertified areas** has increased by nearly 300% *since 1961*.



Ⓔ An estimated 24% of total **anthropogenic greenhouse gas emissions** (2008-2017) derive from land use. *Since 1961*, CH_4 emissions from ruminant livestock have increased by 1.7 times and **N2O emissions** from fertiliser have more than doubled. **CO2 emissions** from land-use change (mostly deforestation) dropped slightly in the early 1960's but remain at consistently high levels (1.5 ± 0.7 Gt CO_2 yr-1, 2008-2017).



Ⓕ Since the pre-industrial period, **global warming over land** has been **1.41 °C** (1.31-1.48 °C), substantially larger than the global mean warming of **0.87 °C** (averages for 1881-1900 vs. 1999-2018). Future climate change will exacerbate the considerable challenges already experienced by land systems and ecosystems.