United Kingdom

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Pathway Narratives

	A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	JUSTIFICATION
General description	**We do not act differently than the past decade / today**	**National actions/policies are aligned with national commitments**	**National actions/policies are aligned with global sustainability targets**	
Country Narrative - in a concise way explain the main elements that have guided the selection of the assumptions under each pathway	Based on current trends over the last 10 years.	Based mainly on the Balanced Net Zero (BNZ) pathway developed by the Climate Change Committee (CCC), the government's advisors, as the basis for setting the 6th Carbon Budget (6CB) as mandated by the Climate Change Act. This pathway is considered by the CCC to be the most widely acceptable pathway for delivering Net Zero. Also aims to deliver on the government's commitment to the 30x30 target, although policies are not yet in place to do this.	Largely based on the High Level options developed by the CCC. This represents more ambitious alternatives for delivering Net Zero faster, in their 6th Carbon Budget report. This pathway also includes stronger actions towards the 30x30 nature recovery target.	See text in columns for each pathway.

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Pathway Assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	JUSTIFICATION
1. Macroeconomics	**1.1)** GDP per capita	SSP2 – middle of the road, medium economic growth	SSP2 – middle of the road, medium economic growth	SSP2 – middle of the road, medium economic growth	No evidence for higher or lower growth, in line with recent trends
	1.2) Population	UN medium projections	UN medium projections	UN medium projections	No evidence for higher or lower growth
	1.3) Inflation	Prices under inflation change based on the average yearly CPI change in the 2000-2020 period	Prices under inflation change based on the average yearly CPI change in the 2000-2020 period	Prices under inflation change based on the average yearly CPI change in the 2000-2020 period	Average. High inflation in the last few months is now falling; future outlook is uncertain.
	1.4) Inequalities				
2. Land	**2.1)** Constraints on agricultural expansion / deforestation	Free expansion	Free expansion	No deforestation	Currently no national policies limit farmland expansion, but this could be necessary under 'Global Sustainability' to achieve global biodiversity targets
	2.2) Afforestation, and forest plantations targets	Remains at **13,000 ha/y** (average observed from 2018-2022, in line with 6th carbon budget baseline) 50:50 broadleaves and conifers in line with current mix (Forestry Commission 2022). Impact of woodland management is not considered as it has a very small impact on	Increase to **31,400 ha/ year** by 2025 then **36,700 hectares by 2035**. 50:50 broadleaves and conifers as for CT. Sum of individual commitments by England (Environmental Improvement Plan (EIP) target for 12% woodland cover and 16.5% including trees outside	Increase to **30,000 ha/ year** by 2025 then **50,000 hectares by 2035** (BNZ). 80:20 broadleaves to conifers reflecting the need to deliver biodiversity targets as well as climate targets.	See comments in columns

		emissions (CCC 2020b, Fig 3.6.d).	woodlands, HM Government 2023a); Scotland (18,000 ha/year by 2025; workshop comment); Wales (5000 ha/y 2025-2034, then 7500 ha/y as in FABLE Wales calculator) and N. Ireland (900 ha/y; Forests for Our Future, DAERA 2020). This exceeds the 30000 ha/y target of the UK Net Zero Strategy (HM Government, 2021) but falls short of the BNZ pathway.		
	2.3) Urban and settlements area	Increase from 8% to 12% (over 2.8 m hectares) by 2050, i.e. **26,000 ha/y**. Based on CCC (2018) BAU which was based on MHCLG housing projections from 2014. Note: This diverges from the 6CB (CCC 2020b) which now projects an increase from 7% to 9% (14,000 ha/y). The housing targets have not changed but the new projections assume more building on green space within settlements (e.g. playing fields). We do not adopt the new projections because this conflicts with the government's Green Infrastructure standards (Natural England, 2023) which	As for current trends	Half of current trends, due to adoption of more compact development patterns i.e. **13,000 ha/y** (CCC 2018 high ambition). Note: This diverges from the 6CB (CCC 2020b) where there are now no differences between scenarios, because we want to model the impact of more compact developments.	See text in columns

		reflect the importance of green space for health, well-being and climate change adaptation.			
	2.4) Protected areas	Remains at **6.7Mha (27% of land area)**, comprising National Parks, AONBs, local and national nature reserves, SSSIs, Ramsar sites and Natura sites (SACs and SPAs), from WDPA database. (Note: 25 new 'King's' nature reserves are planned but not yet identified, and the total area is unknown, though the 221 existing National Nature Reserves add up to only 0.7% of land area).	Increase to **30%** of land area in line with 30x30 target.	Increase to **30%** of land area in line with 30x30 target.	Note: the new 2020 protected area dataset contains a higher area of protected areas for the UK than expected, compared to 2010 – we are investigating this.
3. Productivity and management	**3.1)** Crop productivity for the key crops	Yields remain at current levels (5 year averages 2016-2020): *with climate change (RCP6.0)* **Wheat: 8.0 t/ha** *7.2 t/ha* **Barley: 6.1 t/ha** *5.5 t/ha* **Potatoes: 38.6 t/ha** *35.0 t/ha* Note that current yields are projected to decrease with climate change as suggested by workshop comments.	Between 2020 and 2050, crop productivity increases by **34%**: *with climate change (RCP6.0)* **Wheat: 11.0 t/ha** *10.5 t/ha* **Barley: 8.2 t/ha** **Potatoes: 52 t/ha** BNZ: 30% increase from 8.2 to 11 for wheat, a 30% increase, equivalent to 34% from the 2020 baseline. Same applied to other crops (though this is unrealistic, e.g. potato yield is declining.)	As for NC	Workshop comments suggested that yields used in previous scenathon were too optimistic. Even the yields we now use for this scenathon are considered optimistic by many, despite being in the Climate Change Committee BNZ pathway.
	3.2) Cropland under agroecological practices	No change. Too early to see if ELMS (new agri-environment scheme in England) is	Increase uptake of **cover crops to 60%** of farmland by 2030 (EIP for England, HM Government 2023a; assume	**50% of farmland under agroecological practices by 2030** (based on CBD post-2020 biodiversity framework target	See columns

		promoting additional uptake of measures.	same for other DAs) and increase uptake of **minimum tillage to 25%** by 2030. No national targets for reduced tillage and organic farming - but 75% of farmers in England 'to engage in low carbon practices by 2030, and 85% by 2035' (HM Government 2023b). So minimum is that 15% of farmers adopt one of these other measures by 2030 and 25% by 2035. Assumed to be min-till as that currently received support under ELMS.	10 which includes a "substantial" increase in agroecological practices, CBD 2022). Assume this includes a mix of practices: cover crops (50%), embedded natural (50%), organic farming (50%). This is lower than the England target for 85% of farmers adopting low carbon practices, (see NC) but assumes that multiple measures are adopted for GS, in line with the need to deliver both carbon and biodiversity targets.	
	3.3) Livestock productivity for the key livestock products	Assume **milk yield increases by 18%** by 2050 (half the current rate), other yields remain at 2015 levels: • 85 kg/head* for cattle meat, • 13.7 kg/head* for chicken meat, • 7.9 t/head for milk. *Note: units are total annual kg produced divided by average herd or flock size at any one time. Hence values differ from carcass weight (e.g. multiple generations of poultry are produced per year).	Assume **milk yield increases by 18%** by 2050 (half the current rate) and **chicken yield increases by 10%**; beef remains at 2015 yield: • 85 kg/head for cattle meat, • 15.2 kg/head for chicken meat, • 7.9 t/head for milk (as for CT). BNZ pathway assumes that livestock yield is affected only through increased stocking density (see below). We apply the same 10% increase to chicken, assuming that this can	Assume **milk yield increases by 27%** by 2050 (75% of the current rate) and **chicken yield increases by 10%;** beef remains at 2015 yield: • 85 kg/head for cattle meat, • 15.2 kg/head for chicken meat, • 8.7 t/head for milk	

			be achieved through improved animal health and breeding.		
	3.4) Pasture stocking rate	Average livestock stocking density remains at 1.1 TLU/ha pasture between 2015 and 2050. TLU = tropical livestock unit (because FABLE is a global model). 1 TLU = 1 cow, 4 pigs, 10 sheep. UK extra feature: % of herd on extensive grassland gradually decreases from 26% to 24% reflecting current trend towards intensification	Average livestock stocking density increases by 10%, from 1.1 to 1.2 TLU/ha pasture between 2015 and 2050 (BNZ). UK extra feature: % of herd on extensive grassland **decreases to 16%** as herd shifts to more intensive grazing (BNZ).	As for NC. Greater increases in stocking density could start to affect other global environmental goals (e.g. water quality, biodiversity). UK extra feature: % of herd on extensive grassland **increases to 30%,** reflecting biodiversity targets.	Workshop comment suggests stocking density could be even higher due to uptake of high-sugar grasses. But BNZ only requires 10% increase.
	3.5) Forest management	Not explicitly modelled as woodland management has a very small impact on emissions (CCC 2020b, Fig 3.6.d).	Not explicitly modelled as woodland management has a very small impact on emissions (CCC 2020b, Fig 3.6.d).	Not explicitly modelled as woodland management has a very small impact on emissions (CCC 2020b, Fig 3.6.d).	
4. Trade	**4.1)** Share of consumption which is imported for key imported products (%)	The share of total consumption which is imported stays constant, as assumed in the Government's 6th carbon budget.	The share of total consumption which is imported stays constant, as assumed in the Government's 6th carbon budget.	The share of total consumption which is imported stays constant, as assumed in the Government's 6th carbon budget.	We considered modelling a decrease in imports in products with a large trade gap cap that can be produced indigenously (e.g. vegetables, milk, apples, chicken). However, it may not be possible to increase production for fruit, vegetables and chicken due to a shortage of seasonal migrant labour (AHDB, 2019), and some sources predict a potential

					increase in imports of beef and chicken (AHDB 2019, EPRA 2018, Hubbard et al 2019).
	4.2) Evolution of exports for key exported products (1000 tons)	The exported quantity stays constant.	The exported quantity stays constant.	The exported quantity stays constant.	Alternatively, key exports could decrease, e.g. for lamb, barley and beef (AHDB 2019; EPRA 2018; Hubbard et al. 2019). Stakeholders consulted in 2020 supported the approach of assuming no change on the grounds that we don't know what will happen.
5. Food	**5.1)** Average dietary composition	No change.	**20% cut in meat and dairy** by 2030, rising to **35% by 2050 for meat only,** to be replaced with plant-based foods (from the BNZ pathway, CCC). Not actually government policy in England, though the National Food Strategy (England) recommends a slightly lower 30% reduction in meat.	**50% cut in meat and dairy by 2050** (6CB High Level). This could entail uptake of lab-grown meat – however this does not need to be explicitly modelled in FABLE (subject to future assumptions about cultured meat crop feedstock – currently too speculative).	**Note:** NC for Wales is Eatwell diet (30% reduction in red meat and 62% reduction in dairy consumption by 2050). Scotland has also adopted Eatwell diet (Scottish Government 2022). This is not yet included in the NC pathway.
	5.2) Share of food consumption which is wasted at household level	No change (share of household consumption which is wasted remains at 14%)	50% cut in food waste by 2030 (share of household consumption which is wasted falls from 14% in 2015 to 7%), **60% by 2050** (CCC BNZ).	50% cut in food waste by 2030 (share of household consumption which is wasted falls from 14% in 2015 to 7%), **70% by 2050** (CCC High Level).	Based on CCC BNZ pathway
6. Biofuels	**6.1)** Targets on biofuel and/or other bioenergy use	No increase – remains very low (0.2% of UK arable area in 2016 according to CCC)	**NOT YET IMPLEMENTED – need to add woody biofuels into FABLE.**	**NOT YET IMPLEMENTED – need to add woody biofuels into FABLE.**	First generation biofuels (i.e. conventioanl crops: primarily wheat and maize in UK + some sugar beat,

			30,000 hectares a year by 2035, 0.7 Mha planted by 2050, evenly split across SRC, miscanthus and SRF. Yield of miscanthus and SRC increases from 12 to **15** oven-dried tonnes/ha by 2050. Yield of poplar SRF remains the same. (BNZ)	**1.4 Mha by 2050**. Yield of miscanthus and SRC increases from 12 to **20** oven-dried tonnes/ha by 2050. Yield of poplar remains the same. (CCC High Level)	oilseed rape, barley) play a limited role in future biomass supply, but 2nd generation short rotation coppice, short rotation forestry and miscanthus expand significantly. These are not directly included in FABLE at present, so we are planning to set up a bespoke implementation in the near future.
	6.2) Targets on other non-food use				
7. Water	**7.1)** Irrigated crop area	No growth – same as in 2010 (about 4%)	No growth – same as in 2010 (about 4%)	No growth – same as in 2010 (about 4%)	Irrigation not widespread and highly crop-specific in UK, and further water abstraction potential is severely limited