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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 - the main elements that have guided the selection of the assumptions under each pathway	This scenario corresponds to the continuation of trends observed over the last 20 years and assumes little change in the policy environment. It is characterized by high population growth (from 26 million in 2020 to 38 million in 2050), significant constraints on agricultural expansion, a low afforestation target, on-trend productivity increases in the agricultural sector, and no change in diets. These and other important assumptions are justified using historical data, experts' advice, and results from integrated science assessment models. This Current Trends Pathway is embedded in a global GHG concentration trajectory that would lead to a radiative forcing level of 6 W/m2 (RCP 6.0), or a global mean warming increase likely between 2°C and 3°C above pre-industrial temperatures, by 2100. Our model	This scenario investigates sustainability impacts of ongoing trajectory of policies and practices in Australia. The scenario reflects a significant national focus on emission reduction targets and modest or limited policy implementation or commitments in other areas. This scenario builds on current trends for areas where there are not explicit policies or targets and assumes full implementation of long-term policies or commitments e.g., Nationally Determined Contributions.	Sustainable Pathway represents a future in which significant efforts are made to adopt sustainable policies and practices that are consistent with higher-than-trend productivity growth and corresponds to a high boundary of feasible action. Similar to the Current Trends Pathway, we assume that this future would result in high population growth and no agricultural expansion. However, the Sustainable Pathway assumes higher agricultural productivity growth, higher carbon sequestration via afforestation and regrowth, adoption of more sustainable diets, and lower blue water footprint than under the Current Trends Pathway. This corresponds to a future based on the adoption and implementation of new ambitious policies that support farmers in achieving greater yields at lower environmental costs and which enable	

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	includes the corresponding climate change impacts on crop yields by 2050 for corn, millet, nuts, rapeseed/canola, rice, soybean, sugarcane, sunflower, and wheat.		the development of negative-carbon technologies to bridge the gap between what industry can achieve in terms of emission reductions and the net-zero emissions target. This Sustainable Pathway is embedded in a global GHG concentration trajectory that would lead to a lower radiative forcing level of 2.6 W/m2 by 2100 (RCP 2.6), in line with limiting warming to 2°C.	

Pathway Assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	JUSTIFICATION
1. Macroeconomics	**1.1)** GDP per capita	4.3% increase per year	4.3% increase per year	4.3% increase per year	IGR- Australian Intergeneration Report 2023.
	1.2) Population	2.04% increase per year	2.04% increase per year	2.04% increase per year	IGR- Australian Intergeneration Report 2023.
	1.3) Inflation	Current prices in 2010 USD	Current prices in 2010 USD	Current prices in 2010 USD	Inflation is not modelled
	1.4) Inequalities				
2. Land	**2.1)** Constraints on agricultural expansion / deforestation	No productive land expansion beyond the 2010 value	No productive land expansion beyond the 2010 value	No productive land expansion beyond the 2010 value	Previous CSIRO publications and National Farmers Federation roadmap to 2030 and National Commitment to 30% land and sea protection

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	2.2) Afforestation, and forest plantations targets	3.128 million hectares afforested by 2050	3.128 million hectares afforested by 2050	10.53 million hectares afforested by 2050	**Current trends and National Commitments:** Forest regrowth estimates based on data from the Australian State of the Forest report. Forest regrowth estimates based on data from the Australian State of the Forest report, including a federal target to incentivize planting one billion trees in forestry projects (0.4 - 1 million hectares) by 2030. Sustainability: Australian National Outlook 2019. Carbon and environmental plantings under "Green and Gold" scenario (RCP 2.6) range from 9.41 million hectares (mha) to 18.45 mha. Carbon plantings range from 8.14 mha to 14.93 mha, under the GFDL-ESM2M and NorESM1-M GCM projections respectively.
	2.3) Urban and settlements area	Increase of 86% from 2020 to 2050	Increase of 86% from 2020 to 2050	Increase of 86% from 2020 to 2050	IGR- Australian Intergeneration Report 2023.Reported percents are taken from the

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					Calculator Table S.23 column LM
	2.4) Protected areas	No change	Protecting 30% of Australian land and sea area by 2030	Linear extrapolation of the commitment to protect 30% of Australian land and sea area by 2030	National Commitment to 30% land and sea protection
3. Productivity and management	**3.1)** Crop productivity for the key crops	Yield gap: 54%	Yield gap: 40%	Yield gap: 20%	There are no national commitments in terms of yield gap, and even measurements of yield gap are limited to some of the major broadacre crops. 80% closure of yield gap amounts to what was considered feasible in the Yield Gap Australia project.
	3.2) Cropland under agroecological practices	Large-scale adoption of advanced farming practices, generating a 15% increase in yields.	Large-scale adoption of advanced farming practices, generating a 15% increase in yields.	Large-scale adoption of advanced farming practices, generating a 15% increase in yields.	Progression towards closing the year-on-year yield gap consistent with the adoption of advanced farming practices such as controlled traffic, yield mapping, soil testing-guided fertilizer programs, improved cultivars, and early sowing (all these seen widespread adoption between 2000-2020), as well as future increased use of long-coleoptile varieties and better strategizing around crop rotations and

					opportunistic cropping. This is consistent with the Australian Farmers Federation's objectives to increase the productivity of the sector.
	3.3) Livestock productivity for the key livestock products	1% increase per year	1% increase per year	1.5% increase per year	Based on historical trends in the agricultural productivity sector as modeled in the Australian National Outlook 2019.
	3.4) Pasture stocking rate	0.92% increase per year	0.92% increase per year	1.38% increase per year	Rates of change based on business-as-usual stocking rate growth between 1980 and 2010, calculated with data from Meat and Livestock Australia (2019).
	3.5) Forest management				
4. Trade	**4.1)** Share of consumption which is imported for key imported products (%)	No changes to historical shares of imported food	No changes to historical shares of imported food	No changes to historical shares of imported food	The share of total consumption that is imported increases in response to domestic population growth. Historical trends in Australian trade data from 1986 to 2016 (FAOSTAT, 2019), and endogenous changes driven by trade assumptions in the Calculator indicate that the quantity of fruit and vegetable imports doubled

					from 2015 to 2050. Import value for other commodities remains at 2015 levels.
	4.2) Evolution of exports for key exported products (1000 tons)	No changes in export tonnage by 2050	Doubling export tonnage by 2050	Doubling export tonnage by 2050	Based on statistical projections with FAOSTAT (2019) 1986-2016 data that suggest that under historical trends the value of Australian exports by 2050 could be around 1.6 times the 2015 value. Changes in total factor productivity due to technological development allows Australian exports to remain globally competitive. Increases in food demand from the Asian region also contributes to the increase in Australian exports beyond current trends.
5. Food	**5.1)** Average dietary composition	Major changes. Increased consumption: by 94% fruits and vegs, 82% eggs, 53% fish, 47% cereals. Decreased consumption: by 63% pulses, 56% nuts, 31% red meat	No significant changes in diets.	No significant changes in diets.	Target values for the National healthy diet are similar to the values in the FAO calibration year, i.e., there is no change in the diet in this scenario. The Fat diet changes are well aligned with current trends but not so much of

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					an increase in fat consumption.
	5.2) Share of food consumption which is wasted at household level	No change	No change	20% decrease	Same share as in 2010 (Based on Baljelj etal. 2014 - compounded waste from current consumption is 29.7%)
6. Biofuels	**6.1)** Targets on biofuel and/or other bioenergy use	Undefined	Undefined	Undefined	Need to update table S20 to define the National scenario. According to ARENA to reach global trends in biofuel production to 2060, Australia needs a 40-fold expansion of the domestic biofuels industry. This would allow the production of 20 gigalitres per year. However, that information may be useful for the sustainability scenario. There are no current policies focused on boosting biofuel production.
	6.2) Targets on other non-food use	No change	No change	No change	
7. Water	**7.1)** Irrigated crop area	same irrigated harvested area as in 2010	same irrigated harvested area as in 2010	same irrigated harvested area as in 2010	