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Pathway Narratives

	A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	JUSTIFICATION
General description	**We do not act differently than in the past decade/today**	**National actions/policies are aligned with national commitments**	**National actions/policies are aligned with global sustainability targets**	
Country Narrative We considered three different pathways for the three scenarios. – For Current Trends, we considered business-as-usual; and expected that current trends will continue, with no major changes in policy or investment. - For national commitments, we considered the sustainability pathway because we assume that effective implementation of the government policies will lead to sustainable development. - For the global suitability pathways, we assume a green growth pathway, as we expect economic growth to be decoupled from environmental degradation through the	We considered the Business-as-usual pathway for the current trends, which assumes relatively high population growth and moderate economic growth, with continued increasing rates of inflation. Under this pathway, the agricultural land expansion will continue (specifically in the lowlands), and the net balance of deforestation-afforestation rates will remain net forest loss. Cereal will still be the dominant diet, and agricultural productivity will continue increasing moderately. The country is projected to achieve the average daily energy intake per capita requirement by 2030.	We considered a sustainability pathway for the national commitments. It assumes slighter population growth than current trends and high economic growth. Massive irrigation agriculture expansion coupled with rapid agricultural productivity growth will lead the country towards food self-sufficiency and a net exporter of major food crops by 2030. In the dietary composition, we expect a moderate increase in the intake of vegetables, fruits, and animal-source products. Massive afforestation efforts will lead to a net increase in forest areas, an expansion of	We considered a green growth scenario for the global suitability pathways, expecting that the government will work to achieve the SDG goals. This would involve stable population growth, rapid economic growth, reduced inequities, and inflation rates. Food sufficiency and dietary composition would change based on national commitments. Afforestation rates and expansion of protected areas would be significantly greater than the national commitments, due to the involvement of international agencies as part of the SDG goals.	We established a baseline scenario for each parameter using empirical evidence. We then projected expected changes under three different scenarios, primarily based on information from scientific studies, government policy and strategic documents, and narration of global

effective adaptation of global sustainability goals with national development pathways.		protected areas, and increased biodiversity conservation.		sustainability goals.

Pathway Assumptions

		A) CURRENT TRENDS	B) NATIONAL COMMITMENTS	C) GLOBAL SUSTAINABILITY	JUSTIFICATION
1. Macroeconomics	**1.1)** GDP per capita	2.5-5% annual growth rate of GDP per capita in the past decade, and the current GDP per capita is about 1,080 USD which will reach 1,477 USD by 2030 and 2,626 USD by 2050.	The GDP per capita is projected to grow parallel with the GDP, at an annual growth rate of 10%, according to government plans. This means that the GDP per capita will reach $1,836 by 2030 and $3,900 by 2050.	Same as the National Commitments pathway	(MoPD, 2021; WB, 2023)
	1.2) Population	We assume it will increase by 2.7% annually. The future population growth of the country is projected to be one	The population will reach 173 million by 2050	Same as the National Commitments pathway	(CSA, 2013; DESA, 2022; UNDP, 2019)

		of the highest in the world based on its current trend, and the total population will increase by more than 70 million in 2050.			
	1.3) Inflation	The inflation rate will continue to increase based on past trends, ranging from 26% to 15%	Inflation will remain lower than 10% between 2020-2030	Same as the National Commitments pathway	(MoPD, 2021; National Bank of Ethiopia, 2021; Telaye, 2021)
	1.4) Inequalities	Inequality is expected to increase moderately based on its current trend, with a Gini coefficient value of 0.3 and 0.35, and an annual increasing rate of 1%.	Same as Current Trends	Inequality will tend to fall as countries commit to achieving equitable distribution of wealth.	(Cornia & Martorano, 2019; MoPD, 2021; WB, 2020)
2. Land	**2.1)** Constraints on agricultural expansion/deforestation	Agricultural land will continue expanding at historical average rates (2.6% expansion rate annually) but will tend to reduce in the highlands because of land scarcity and possible interventions of agricultural intensification and dry season production of major cereals in the highlands. For example, in 2021/22, about 400,000ha was cultivated by irrigation mainly in the highlands than the lowlands.	A higher expansion of agriculture is expected in the lowlands because of government plans indicated in the Development Policy document. More than 3.3 million ha of land could be developed for crop production, mainly in the lowlands for irrigation practices. Moreover, the dry season/ irrigated wheat is expected to increase substantially.	The government will focus on agro-ecological practices to increase production and productivity instead of farmland expansion and there will not be free expansion of farmland in the coming decades. The land allocated to the private sector will also increase.	(Katy & Franks, 2022; Tadesse et al. 2022; Schmidt & Thomas, 2020; Seyoum Taffesse et al., 2013)

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	2.2) Afforestation, and forest plantations targets	The annual forest gain in Ethiopia is estimated to be between 19,000 and 40,000 hectares per year. However, the annual forest loss is estimated to be 92,000 ha per year. This means that the net forest loss is 73,000 ha per year. Based on this data, it is unlikely that there will be a net gain in forest areas in the future.	The government of Ethiopia has designed multiple forest recovery strategies, including an annual increase in forest area coverage of 8%, rehabilitation of 3% of degraded land per year, and a plan to increase the proportion of forest cover to 20% by 2020 and 30% by 2025. These strategies are expected to result in the total forest area of the country exceeding 35 million hectares by 2050.	Achieve NDC target to increase forest cover to 30% by 2030.	(Chipeta et al., 2015; EBI, 2020; MEFCC, 2017, 2018)
	2.3) Urban and settlements area	An extensive urban expansion is expected in consideration of rapid population growth and continued massive rural-to-urban migration, with an average annual expansion rate of 3%, exceeding 10,000 km^2 by 2030.	The rate of urban expansion will be higher than the current trend because of government policies to establish new urban centers, enhance the development of existing towns and rural development centers, and economic transition towards industrialization.	A moderate rate of urban expansion is expected since the focus will be on the development of sustainable cities rather than a mere horizontal expansion.	(MacManus et al., 2021; MoPD, 2021)
	2.4) Protected areas	There will not be any expansion of protected areas than the current levels (20%), due to increased land scarcity and intensification of anthropogenic impacts on protected ecosystems.	The proportion of protected areas will reach 30% by 2030 owning to ambitious government plans to expand protected areas and increase afforestation	Same as the National Commitments pathway	(EBI, 2020; MoPD, 2021)

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3. Productivity and management	**3.1)** Crop productivity for the key crops	Yield is expected to increase based on historical trends (of 1.9 annual growth rate for major cereals). Accordingly, by 2030, the yield for the major crop will be 23, 30, 35, 50, and 34 quintals per hectare for Teff, Barley, Wheat, Maize, and Sorghum respectively.	A 4% annual increase in productivity (value outputs/ value inputs) per crop and livestock unit is expected in the future.	By 2030, double the agricultural productivity and incomes of small-scale food producers.	(Chipeta et al., 2015; MoPD, 2021)
	3.2) Cropland under agro-ecological practices	The implementation of many agroecological practices other than lowland irrigation will remain insignificant in the coming decades as prevailing government plans lean towards the use of increased artificial farm inputs instead of organic agriculture practices.	The proportion of cropland under agro-ecological practices will increase slightly owing to strategies to reduce the demand for chemical fertilizers, ongoing initiates that promote agro-ecological practices such as Climate Resilience Strategy (CRS) Climate Resilient Green Economy (CRGE), and the comprehensive soil improvement strategy.	The proportion of cropland under agroecological practices will be higher than the current trends because of government commitment to achieve SDG goals.	(Araya et al., 2023; CIAT; BFS/USAID, 2017; Mekuria et al., 2022; MoPD, 2021)
	3.3) Livestock productivity for the key livestock products	The current average milk (1.54 liters per cow per day) and red meat production rate will remain the same because of complex production and productivity problems in the livestock sector.	The productivity will increase more than the current trend because of government plans to increase total value productivity per livestock unit by 4%.	Same as the National Commitments pathway	(Alemneh, 2019; Chipeta et al., 2015; EWCA, 2012; MoPD, 2021)
	3.4) Pasture stocking rate	No assumption	No assumption	No assumption	

	3.5) Forest management	There is a policy gap and a weak institutional arrangement on forest protection. Existing forest management initiatives will remain limited to some parts of the country.	Ongoing forest initiatives, such as participatory forest management (PFM), area enclosures, sustainable land management programs, and the Green Legacy Initiative will contribute to increasing forest management practices.	Same as National Commitments Pathways	(AMENU, 2017; Kassa et al., 2022; MEFCC, 2018; Negassa, 2014)
4. Trade	**4.1)** Share of consumption which is imported for key imported products (%)	Wheat is the most imported food commodity in Ethiopia, with net imports accounting for up to 30% of domestic consumption. From the total annual average consumption of 7.17 million metric tons, Wheat imports have increased by an average of 6.6% annually over the past decade. This trend is projected to continue, and wheat imports are expected to reach about 50% of total consumption by 2050. The share of other imported food products is projected to remain zero.	The total share of imported wheat consumption will reach zero level before 2030. This is owning government initiatives to reduce dependence on commercial imports of staple food (Chipeta et al., 2015) and the intervention of import substitution by irrigated (dry season) wheat production.	Same as National Commitments Pathways	(Chipeta et al., 2015; Gebreselassie et al., 2017; Rachel B., 2022)

	4.2) Evolution of exports for key exported products (1000 tons)	Export earnings from agricultural products were increasing by 0.26% annually (with a total import value of 2413 million USD in 2022) and are expected to reach 2513.179 USD by 2050.	The merchandise export revenues from agriculture will reach 6.7 billion by 2030. It is envisaged a 10% annual increase in agricultural product export items.	SDG promotes a diversified global market for food amount and it is expected that countries will use the import of food items as a strategy to fill the food production or supply-demand gap.	(Chipeta et al., 2015; Eshetu & Mehare, 2020; MoPD, 2021)
5. Food	**5.1)** Average dietary composition	The prevailing national level Mean energy intake is 2105 Kcal/day and it is expected to increase to 2141 in 2050. The current dietary composition of the general population is characterized by excessive cereal consumption and inadequate consumption of animal-source foods, as well as pulses, fruits, vegetables, nuts, and seeds. Accordingly, we assume that Cereal/grains (Wheat, maize, teff, and sorghum) continue to constitute 70% of the main food, and the contribution of the other food items remained to be less than 10%	The country will achieve the food and dietary recommendation plans by 2030, which recommends calorie intake for children (between 2-5 years) will reach 1,250 kcal/day, calorie intake for youngsters (6-18) and the elderly (>65) will be 2,300 kcal/day and calorie intake for adults will reach 2,700 kcal/day. The food and dietary strategy of the country recommends diversified food intake which promotes increased intake of vegetables, fruits, and animal source products for the general population.	It is projected that by 2030, the average daily energy intake per capita will be higher than the minimum requirement of 1830 kcal per day in all countries. In Ethiopia, the average daily energy intake is projected to reach 2360 kcal per day, which is the minimum requirement for avoiding undernourishment and optimal health.	(EPHI, 2013, 2022; FDRE, 2021; Sheehy et al., 2019)

	5.2) Share of food consumption which is wasted at household level	The share of food wastage in Ethiopia is at a low level and will continue to remain low in the future.	Same as current trends	Same as current trends	We do not expect a significant proportion of food loss because food unavailability and food insecurity are critical problems for the majority of households in Ethiopia.
6. Biofuels	**6.1)** Targets on biofuel and/or other bioenergy use	Currently, about 8 million liters of bioethanol are produced annually using molasses as feedstock. The production amounts remain to be the same by 2030.	Ethiopia is the second most suitable country for sustainable biofuel production with estimated energy amounts of 533 PJ, and it is expected a slighter increase in the use of biofuel by 2030.	Biofuels are thought to be environmentally beneficial and highly encouraged in SDG and a moderate increase in the use of biofuel energy is expected.	(Yimam, 2022)
	6.2) Targets on other non-food use	No assumption	No assumption	No assumption	
7. Water	**7.1)** Irrigated crop area	It is not expected a change in the area of irrigated land during the next years based on previous five-year trends (estimates of the current irrigated cropland area vary from 200 to 490 and it is expected that it remains the same by 2030 as it was declining during the previous years)	The total area of small and medium size irrigation schemes will reach 1,000,000 hectares by 2022. It was proposed an 8% annual increase in irrigated arable land. Accordingly, the total irrigated area of cropland will increase by 70% from its current level if the goal is achieved. Raise the construction of medium and large-scale irrigation networks from 490,000 hectares to 1.2 million hectares.	Irrigation development is one of the prime strategies to adapt agriculture to climate change, in line with the targets of SDG 13, and the area of irrigated cropland will increase by 2030.	(Chipeta et al., 2015; Dejene et al., 2022; MoPD, 2021; MoWIE, 2022)

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