International Labour Organization

▶ ILO brief

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Impacts of heat stress on jobs and productivity in Ethiopia

Climate trends in Ethiopia over the past three decades

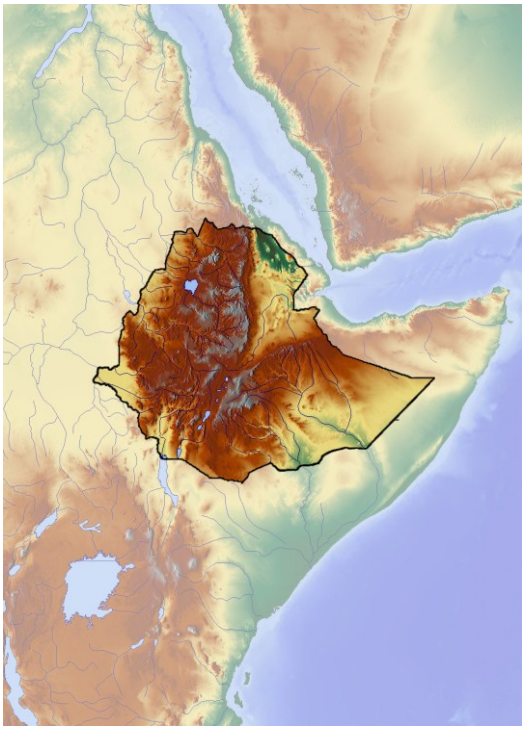
Country background

With 134 million inhabitants, Ethiopia is the 10th-most populous country in the world and the 2nd-most populous in Africa. The capital and largest city is Addis Ababa, while other cities include Dire Dawa, Mekelle, Adama, and Hawassa (Fig. 1). Ethiopia experienced strong economic performance in the last 20 years but also faced macroeconomic imbalances and shocks. Real GDP growth averaged nearly 10% per year from 2004 up to 2018 – one of the highest rates in the world – driven largely by public infrastructure investments.[i] Despite these gains, Ethiopia remains one of the poorest countries globally.[i] Agriculture is the backbone of Ethiopia's economy, employing roughly two-thirds of the population and contributing about 34-40% of GDP.[ii] Services contribute around 40% of GDP while the industrial sector (mining, manufacturing, and construction) contributes about 23-24%.[ii]

Climate

Ethiopia's climate is highly diverse due to its varied topography, encompassing everything from humid tropical regions to arid deserts. In general, much of the country is dry sub-tropical, but rainfall and temperature vary widely by elevation and location.[i,iii] High-altitude highland areas experience cool temperatures (sometimes near freezing at night), whereas lowland areas are much hotter, with extreme highs reaching 45-50°C.[i,iii] Nationwide, the mean annual temperature is 22.6°C (range: ~21.5°C in December to ~25°C in April). From April through September, both average maximum temperature and Wet-Bulb Globe Temperature (WBGT)[iv] values are notably higher, particularly in the northern regions (Fig. 2). This is influenced by the primary Kiremt monsoon (mid-June to mid-September) which delivers 50-80% of the annual rainfall in most regions.[i] Between October and December, temperatures and WBGT are relatively lower across much of the country. From January to March there is a renewed intensification of heat stress in the lowland areas.

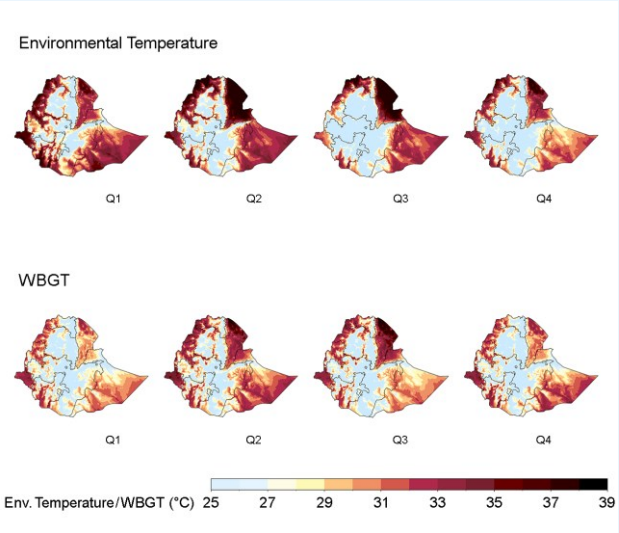
Figure 1. Ethiopia physical map.[v]



▶ **Temperature vs. WBGT:** Both indicators identify Q2 as the hottest season, but WBGT expands the risk in Q1 and Q3, and highlights hot corridors along rift/valley floors and lee slopes that are not identified on the air temperature maps, pointing to combined humidity, solar, and low-wind effects.

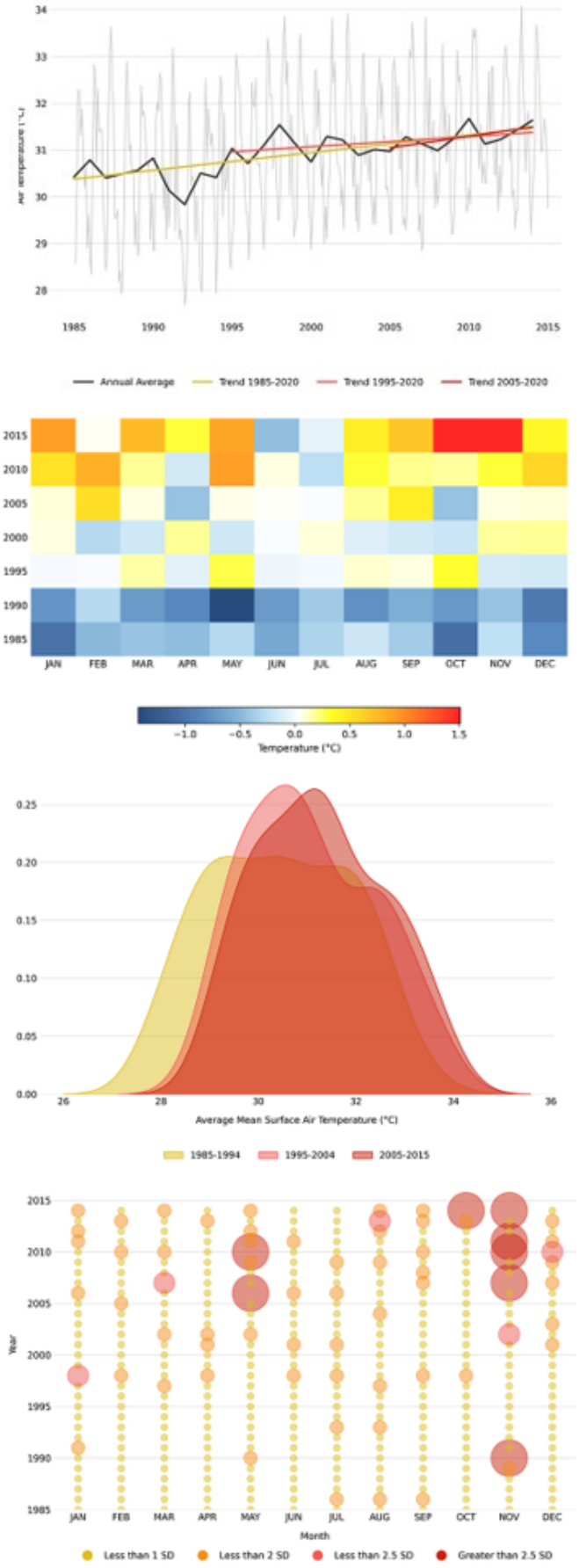
▶ **Policy implications:** Relying solely on ambient temperature data may understate heat risks in rift/valley floors and urban centres during Q1 and Q3. Employing WBGT as a heat assessment measure can provide a more accurate foundation for developing occupational safety guidelines, especially in labour-intensive sectors.

Figure 2. Quarterly average maximum environmental temperature (top) and WBGT (bottom) across Ethiopia during the reference historical period (1985-2014).



Climate data covering the last three decades show a clear and accelerating warming trend in Ethiopia; warming has intensified, particularly in the period 2010-2014, while the frequency and intensity of extreme temperature events are increasing (Fig. 3).

Figure 3. Climatological trends in Ethiopia during 1985-2015: average daily mean environmental temperature trends (first and second graphs); change in distribution of average mean environmental temperature (third graph); change in intensity of extreme daily maximum temperature events (fourth graph).



Ethiopia's climate has become warmer with high rainfall variability. The country remains vulnerable to climate shocks, with droughts occurring more often and intense rainfall events occasionally causing floods. The main impacts on key industries are:

- **Agriculture:** Agriculture employs about two-thirds of the population and contributes 34-40% of GDP. Primarily rain-fed, it is vulnerable to shifting rainfall and heat, which can lower yields and cause periodic floods, destroying crops and displacing communities.
- **Mining and Industry:** Prolonged heat as well as drought-driven water shortages or flooding can disrupt mining operations and refineries, while hydropower limitations affect power production.
- **Services:** Floods often disrupt transport and commerce. Droughts and ecosystem stress diminish wildlife and landscapes, while heritage sites are affected by heavy rains and erosion, straining tourism, a growing sector.

Future heat exposure and impacts on productivity

To understand how future heat conditions might affect working people in Ethiopia, this analysis uses four "storylines" known as Shared Socioeconomic Pathways (SSPs). These scenarios were used by the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report[vi] to describe how different levels of greenhouse gas emissions might impact our world. In simple terms, they help us imagine a range of possible futures: from a sustainable world with clean energy (SSP1-2.6) to one that continues heavy use of fossil fuels (SSP5-8.5).

By considering these global SSPs, Ethiopian policymakers can better understand the potential risks and opportunities that different climate futures may bring. For instance, adopting policies aligned with a more sustainable scenario (e.g., SSP1-2.6) could help mitigate the severity of heat stress, protect worker health, and reduce economic losses from reduced productivity. Conversely, inaction or insufficient adaptation measures (e.g., SSP5-8.5) might expose Ethiopia to extreme heat conditions, with significant repercussions for labour productivity and overall economic resilience. In essence, the global SSPs enable Ethiopia to tailor its climate adaptation and economic policies to protect its citizens and secure a more stable, sustainable future.

Table 1. Characteristics of the global SSPs used in the present study.

SSP	Scenario	Estimated warming (2041-2060)	Estimated warming (2081-2100)	Very likely range in °C (2081-2100)
SSP1-2.6 (Sustainability Pathway)	**Low GHG emissions** CO_2 emissions cut to net zero around 2075	1.7	1.8	1.3 – 2.4
SSP2-4.5 (Middle of the Road Pathway)	**Intermediate GHG emissions** CO_2 emissions around current levels until 2050, then falling but not reaching net zero by 2100	2.0	2.7	2.1 – 3.5
SSP3-7.0 (Regional Rivalry Pathway)	**High GHG emissions** CO_2 emissions double by 2100	2.1	3.6	2.8 – 4.6
SSP5-8.5 (Fossil-fueled Development Pathway)	**Very high GHG emissions** CO_2 emissions triple by 2075	2.4	4.4	3.3 – 5.7

Key: GHG = greenhouse gas.

Future heat exposure

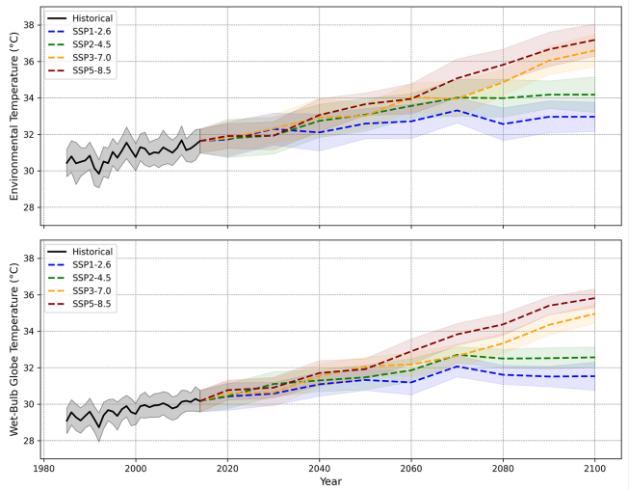
The analyses conducted in the main part of the report indicate that Ethiopia is projected to experience a significant rise in both ambient temperature and WBGT compared to historical conditions (1985-2014). Even the lower-emission scenarios (SSP1-2.6 and SSP2-4.5) suggest warming of 2-3°C for maximum temperature, while the highest emission pathways (SSP3-7.0 and SSP5-8.5) indicate increases of up to 6°C by late century. The WBGT trends follow a similar pattern, with low-emission trajectories adding around 2°C by 2100 and high-emission pathways reaching as high as 5°C, denoting severe heat stress.

These projections emphasize that the level of warming that Ethiopia will face depends largely on global emissions and that more ambitious mitigation leads to less severe impacts. But, even lower-emission scenarios (SSP1-2.6 and SSP2-4.5) pose a substantial risk to health and labour productivity, necessitating the adoption of adaptation measures and strategies to protect workers from rising heat.

Future climate in Ethiopia

Across all SSPs, the analyses for Ethiopia suggest a clear warming trend, with varying degrees of severity depending on the scenario (Fig. 4). Even in the most optimistic scenarios (SSP1-2.6 and SSP2-4.5), Ethiopia will face increases of 2-3°C. The high emission scenarios (SSP3-7.0 and SSP5-8.5) suggest more significant warming of up to 5-6°C. Without effective adaptation strategies, these would lead to significant health impacts and severely reduce the capacity to perform manual labour.

Figure 4. Average maximum environmental temperature (top) and WBGT (bottom) with 95% confidence intervals across the different SSPs in Ethiopia.



Productivity loss due to rising heat stress from climate change

The physical effort required for high-intensity work naturally increases the body temperature and produces metabolic heat.[vii,viii] When this internal heat generation combines with external (environmental) heat stress, the body's cooling mechanisms can be overwhelmed.[viii] Workers engaged in physical work are, therefore, at a greater risk of experiencing the negative effects of heat.[ix] As the body becomes stressed by the combined internal and external heat loads, it responds by slowing down work pace as a protective mechanism. This slowdown can lead to significant loss of labour productivity.[x,xi,xii]

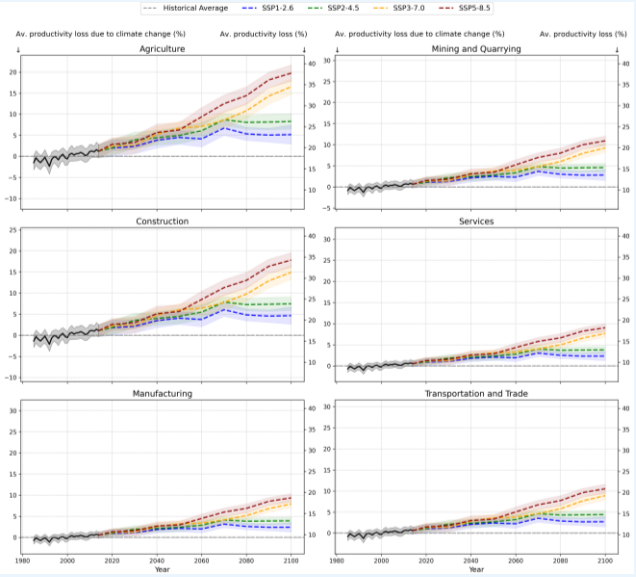
Reduced labour productivity under high heat stress is not only a matter of slower movement; it also includes reduced work output, and increased error rates. This occurs because workers must take more frequent breaks, reduce their pace, or even stop working to avoid heat-related health risks.[x,xi,xii] The cumulative effect of these adjustments is a measurable loss in productivity, as well as increased risks of accidents and long-term health impacts.[x,xi,xii] This also has particular implications for workers in the informal economy, as well as for micro, small and medium enterprises, which often have limited adaptation capacities.[xiii]

The analysis of productivity loss due to rising heat stress from climate change is illustrated in Fig. 5 (for the average, experienced, and acclimatized worker performing their

typical shift). In agriculture and construction, productivity loss due to heat stress fluctuated between 16% and 18%, during the historical period. Under SSP1-2.6 and SSP2-4.5, climate change is expected to further increase productivity loss by 5-9% by 2100, reflecting milder impacts due to climate change mitigation. Under SSP3-7.0 and SSP5-8.5, climate change will lead to increases in productivity loss compared to the average year of the reference historical period, reaching as high as 20% toward the end of the century. Agriculture and construction are thereby particularly vulnerable sectors to productivity loss due to climate change.

In manufacturing, mining and quarrying, services, as well as transportation and trade, productivity loss due to heat stress remained stable at about 9% to 11% during the historical period. Under SSP1-2.6 and SSP2-4.5, climate change is anticipated to further increase productivity loss by 2-5% by the end of the century. This will be higher under SSP3-7.0 and SSP5-8.5, resulting in additional productivity loss of up to 11% in these scenarios by 2100, compared to the average year within the reference period.

Figure 5. Average productivity loss in Ethiopia during the reference historical period (1985-2014) and until 2100 across the different SSPs. Vertical axes in each graph show productivity loss in a given year (right hand side axis) and productivity loss due to climate change, calculated as a change from the baseline historical period 1985-2014 (left hand side axis). Shaded areas represent 95% confidence intervals.



The key findings of this analysis are as follows:

- **Vulnerability is unequal:** agriculture and construction show the highest productivity losses due to rising heat stress from climate change, reaching as high as 20% by the end of the century in the worst-case scenario. Manufacturing, mining and quarrying, services, transportation, and trade are also heavily impacted, but at a lesser degree.
- **Scenario divergence:** under more optimistic scenarios (SSP1-2.6, SSP2-4.5), productivity losses remain relatively low across all intensity levels. However, in scenarios where climate action is delayed or absent (SSP3-7.0, SSP5-8.5), productivity losses increase significantly, particularly for high-intensity work.
- **Long-term trends:** regardless of the SSP, productivity losses generally increase towards the latter half of the century, reflecting the long-term effects of climate change on productivity in Ethiopia.

Economic and labour market impacts of climate change

Current economic impacts

Economic production relies on the total available work hours, and when those hours diminish due to rising heat stress from climate change, the overall contribution of the workforce to production is reduced.[x,xi,xii] Thus, climate change affects not only individual workers but also has far-reaching implications for national economies. When workers are exposed to higher levels of heat due to climate change, they tend to slow down, take more frequent breaks, or may even be unable to work at all – all of which reduce productivity.[x,xi,xii] This reduction in labour input directly translates into lower economic output, which is reflected in a decrease in GDP.[x,xi,xii]

The economic impacts of rising heat stress due to climate change in Ethiopia are significant. The country lost 8 billion USD more from heat stress in 2023 compared to the average year during the reference historical period (1985-2014) (Table 2). The added GDP losses in the agriculture and services sectors far outweigh those from all other sectors, representing 39.1% and 27.8% of the climate change-induced GDP losses, respectively.

Table 2. Change in the contribution of each sector to GDP due to rising workplace heat stress caused by climate change, between 2023 and the reference historical period 1985-2014.

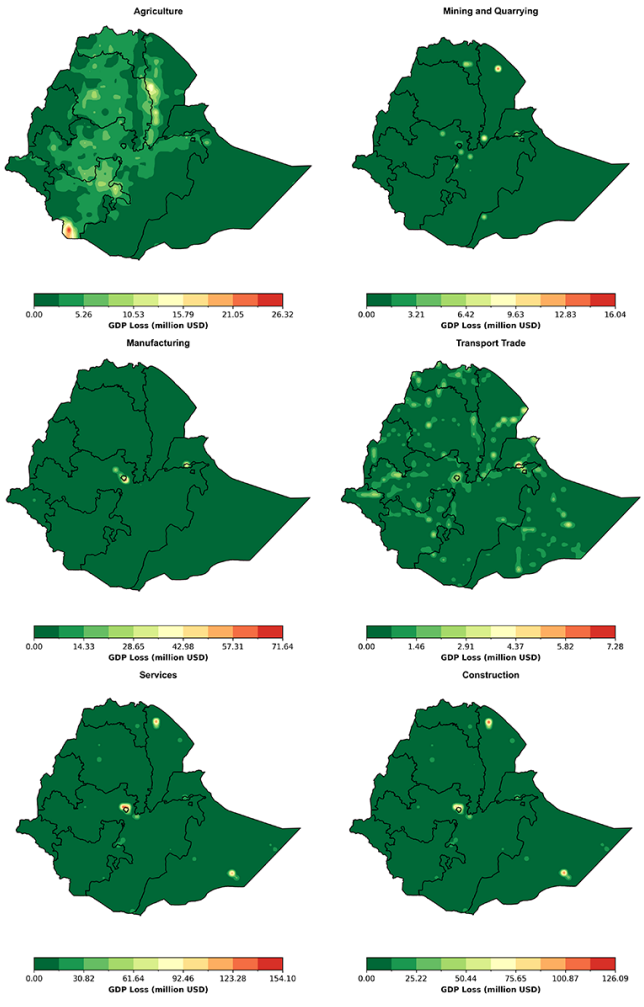
Sector	Change in GDP	
	(million USD) *	*(distribution; %)*
Agriculture	-3,139.7	39.1
Construction	-1,828.6	22.8
Manufacturing	-305.0	3.8
Mining and quarrying	-86.4	1.1
Services	-2,231.1	27.8
Transport and trade	-428.9	5.4
Total GDP change	-8,019.8	

* million USD (fixed 2015 prices), with negative values indicating a GDP reduction compared to the baseline historical period 1985-2014.

The regional distribution of the impact of rising workplace heat stress due to climate change on each sector of economic activity is illustrated geographically in Fig. 6. The maps indicate that climate change impacts on GDP cluster around the main urban and industrial hubs. The largest hotspot sits in and around Addis Ababa. Regional centers also stand out. These include Dire Dawa in the east, Hawassa and Adama along the Rift Valley corridor, and cities in Amhara and Tigray. Smaller clusters appear in the southeast Somali region. Most rural districts show lower absolute losses because they produce less output per km^2, not because workers are safe from heat. The pattern reflects where people and firms are concentrated. When heat reduces productivity during the hottest hours, the GDP loss is highest where value added and employment are densest. Urban heat island effects and warm indoor workplaces add to the burden. Lower values elsewhere should not be read as low risk. Agricultural and informal workers across the lowlands face high exposure, but the absolute loss is smaller because the local economy is smaller. The key findings are as follows:

- **Agriculture** losses are spread out across the highlands and Rift Valley. The absolute loss per district is smaller than in services, with local peaks around 25 million USD, but the effect on rural incomes can still be significant because many tasks are manual and outdoors.
- **Mining and quarrying** losses are site specific. They appear at a handful of locations with peaks near 16 million USD. While the national total is relatively small, the local impact can be large where a mine dominates the local economy.
- **Services, manufacturing, transport and trade, as well as construction** show losses centred in and around Addis Ababa, with services carrying the largest absolute loss. Smaller pockets appear near other cities. Manufacturing and construction losses are tightly clustered around urban centers. Transport and trade show many small nodes along the highway network and at logistics hubs. Local losses are modest in absolute terms, yet delays and reduced throughput can ripple through supply chains.

Figure 6. GDP loss across Ethiopia due to rising workplace heat stress caused by climate change, between 2023 and the baseline historical period 1985-2014, in each sector of economic activity.



Current labour market impacts

The impact of rising heat stress from climate change on Ethiopia's labour market is significant (Table 3), with varying degrees of productivity and jobs lost across all key economic sectors:

- **Over 1 million more full-time jobs were lost** due to workplace heat stress during 2023 compared to the average year during the historical period.
- Overall, around **30% of the jobs are lost** during the 1st and 2nd quarters, reflecting the parts of the year with peak heat levels, affecting major industrial nodes, including Addis Ababa and the surrounding region (Fig.2).
- Climate change impacts are industry-specific. The full-time jobs lost were:
  - **75% in agriculture**
  - **19% in services**
  - **2.5% in construction**
  - **1.7% in manufacturing**
  - **1.1% in transport and trade.**
- These results highlight the urgent need for adaptive policies, such as regulated work-rest cycles, access to cooling measures, and the integration of heat mitigation into occupational safety standards, to safeguard worker productivity and health in Ethiopia.

Table 3. Annual impact of rising heat stress due to climate change on full-time equivalent jobs lost (proxied from work hours lost) in each sector of economic activity and across the entire economy in Ethiopia, calculated as the change between 2023 and the reference historical period 1985-2014.

Sector	Available Work Hours	Change in Work Hours		Change in Jobs
	(n)	(n)	(% FTE)	(FTE)
Agriculture	72,681,898,937	-1,511,574,896	-2.08	-753,527
Construction	2,413,670,554	-50,483,446	-2.09	-25,166
Manufacturing	3,703,386,960	-35,285,172	-0.95	-17,590
Mining and quarrying	639,578,160	-8,598,667	-1.34	-4,286
Services	34,374,085,869	-388,918,331	-1.13	-193,878
Transport and trade	1,938,962,109	-22,715,421	-1.17	-11,324
TOTAL	115,751,582,589	-2,017,575,932	-1.74	-1,005,771

n: number; FTE: full-time equivalent.

Future economic and labour market impacts

Ethiopia's macro-economic exposure to rising workplace heat stress is set to intensify between 2040 and 2060, with outcomes highly sensitive to global emissions scenarios (Table 4). Even on a Paris-aligned trajectory (SSP1-2.6), heat-related productivity losses will reduce GDP by about 8.8% and 9.2% more in 2040 and 2060, respectively, relative to the losses during the average year within the 1985-2014 baseline. This is equal to an annual loss of 33.3 billion USD in 2040 and 158.4 billion USD in 2060. Under a "middle-of-the-road" scenario (SSP2-4.5), the contraction deepens from 9.2% (29.9 billion USD) in 2040 to 10.2% (139.2 billion USD) in 2060, while a regional-rivalry world (SSP3-7.0) will drastically increase the burden to 10.7% by 2060. Given the slow economic growth foreseen in SSP3 (see Section 2.4.2), this higher per cent loss is equal to 79.4 billion USD. Should fossil-fuel development continue unabated (SSP5-8.5), rising workplace heat stress could cut 12.4% (310.3 billion USD) off annual national output by 2060, eliminating the cumulative GDP value of several medium-sized manufacturing subsectors.

The projected labour market impacts attributable to heat stress rise from climate change will grow markedly with the global emissions trajectory and become substantial for Ethiopia by 2040 (Table 5). Relative to the 1985-2014 baseline, the economy will lose the equivalent of 1.78 million full-time jobs under a low-emissions pathway (SSP1-2.6). The losses rise to nearly 2.45 million full-time jobs under SSP2-4.5 and peak at 2.8-3.1 million under the high-emissions scenarios (SSP3-7.0 and SSP5-8.5). In proportional terms this represents a 5% contraction in total labour force under the most optimistic scenario and 7.7-8.5% under scenarios in which development is supported by high fossil-fuel usage.

By 2060, the rise in heat stress driven by climate change will remove the equivalent of 2 to 6 million full-time jobs from Ethiopia's economy each year, depending on the global emissions pathway (Table 5). Estimates suggest that under the Paris-consistent trajectory (SSP1-2.6) Ethiopia will lose 2.1 million full-time jobs, or about 5.9% of total labour force. The toll rises sharply to 4 million full-time jobs under SSP2-4.5, as well as 5-6 million under the high-emissions scenarios (SSP3-7.0 and SSP5-8.5), where heat will cut 14.2-16.6% more aggregate work hours compared to the average year within the historical period.

Table 4. Annual impact of rising workplace heat stress caused by climate change on GDP in Ethiopia during 2040 and 2060 across different SSPs, compared to the historical period 1985-2014.

	Change in GDP			
	2040		2060	
	*(M USD)**	*(%)*	*(M USD)**	*(%)*
SSP1-2.6	-33,267.7	-8.78	-158,368.1	-9.15
SSP2-4.5	-29,932.2	-9.15	-139,147.2	-10.23
SSP3-7.0	-24,112.8	-9.32	-79,381.5	-10.69
SSP5-8.5	-48,159.2	-10.11	-310,320.4	-12.38

*million USD (fixed 2015 prices), with negative values indicating a GDP reduction compared to the baseline historical period 1985-2014.
SSP: shared socioeconomic pathway.

Table 5. Annual impact of rising heat stress during 2040 and 2060 due to climate change on full-time equivalent jobs lost across different SSPs, calculated as the change from the historical period 1985-2014.

Scenario	Period	Change in Work Hours		Change in Jobs
		(n)	(% FTE)	(FTE)
SSP1-2.6	2040	-3,576,027,525	-4.97	-1,782,666
	2060	-4,263,740,770	-5.92	-2,125,494
SSP2-4.5	2040	-4,915,988,532	-6.83	-2,450,642
	2060	-7,996,645,330	-11.11	-3,986,364
SSP3-7.0	2040	-6,137,087,044	-8.52	-3,059,365
	2060	-11,971,140,783	-16.62	-5,967,667
SSP5-8.5	2040	-5,558,386,496	-7.72	-2,770,881
	2060	-10,212,265,460	-14.18	-5,090,860

SSP: shared socioeconomic pathway; n: number; FTE: full-time equivalent.

Key recommendations per sector

Rising heat stress is already undermining worker health, productivity, and overall economic resilience in Ethiopia. In light of the evidence presented in this analysis, it is imperative to adopt sector-specific adaptation strategies that not only protect workers but also support continued economic activity. The following recommendations outline targeted measures for each key economic sector, integrating the sector-specific vulnerabilities in this analysis with practical, evidence-based adaptation strategies, ensuring that policy-makers and stakeholders have clear guidance on protecting workers and supporting economic stability in the face of rising workplace heat stress. Importantly, these recommendations should be applied in addition to – not in place of – the general occupational safety and health protection framework for heat stress recommended by the ILO.[xiii] A comprehensive list of recommendations is available in the main text of the country study.

Agriculture: In agriculture, where the majority of work is performed outdoors and workers are directly exposed to the sun and natural environment, adaptation strategies must focus on minimizing heat exposure. Adjusting work schedules to avoid the hottest parts of the day is essential, alongside implementing on-site measures such as the installation of shade structures, provision of adequate hydration, and cooling stations. Additionally, adapting crop management practices by shifting planting cycles and choosing heat-tolerant crop varieties can reduce the vulnerability of agricultural production to extreme heat. Worker training on recognizing the signs of heat stress and on implementing first-aid measures further enhances resilience in this critical sector.

Construction: Construction work is characterized by intense physical labour and significant exposure to outdoor heat. To protect construction workers, employers should consider rescheduling work to cooler periods, such as early mornings or late afternoons, and enforcing regular, scheduled breaks during the day. The deployment of portable shading, misting systems, and on-site hydration stations is critical to reducing heat exposure. Engineering controls, such as using reflective materials or temporary insulation, can further mitigate the thermal load on construction sites. In addition, worker acclimatization programs and ongoing risk assessments are vital to ensure that adaptation measures remain effective as environmental conditions evolve.

Manufacturing: Manufacturing facilities, whether operating indoors or in partially exposed environments, must address both process-generated and environmental heat. Enhancing indoor climate control through improved ventilation and energy-efficient air conditioning systems is a key priority. Implementing structured work-rest cycles and staggered shifts can help manage cumulative heat exposure. In addition, installing real-time monitoring systems to track WBGT levels enables a proactive response to emerging heat stress risks. Employee education and training on the importance of hydration and heat stress symptom recognition can further support a healthier and more productive workforce.

Mining and quarrying: For mining and quarrying operations, which often occur in environments with high ambient temperatures or in confined underground spaces, robust environmental controls are crucial. Recommendations include upgrading ventilation and cooling systems to maintain safer working conditions, as well as scheduling operations to reduce exposure during peak heat periods. Establishing mandatory rest breaks with access to cooled rest areas can help mitigate the physiological strain experienced by workers. Regular monitoring of WBGT, paired with comprehensive risk assessments, will ensure that protective measures are effectively tailored to fluctuating conditions. Where feasible, increased mechanization may reduce the need for direct human exposure to hazardous thermal conditions.

Services: Although the formal services sector is predominantly indoor, many subsectors (including retail, hospitality, and tourism) and the large informal street vendors are vulnerable to environmental and work-related heat stress. Especially in facilities with inadequate climate control or in areas where outdoor work is required heat stress reduces productivity. Employers should consider fitting workplaces with efficient cooling and ventilation systems, to ensure that indoor temperatures remain within safe limits during heat waves. Social protection programs for informal service sector jobs, notably street vendors, small outdoor shops, and hawkers, are required to allow workers to shift work hours, protect lost income, and potentially search for less exposed job opportunities. Flexible scheduling and remote work options can also help mitigate risks for employees, particularly those performing heat-vulnerable jobs/tasks. In addition, service providers are encouraged to develop contingency plans and to conduct regular training and awareness campaigns about the risks of workplace heat stress. Such measures not only protect worker health but also support uninterrupted service delivery during periods of extreme heat.

Transportation and trade: The transportation and trade sector, which encompasses both outdoor activities and logistics operations, faces unique challenges from heat stress. It is recommended that work schedules be modified to avoid extreme heat, with the establishment of climate-controlled rest areas and loading docks. Equipping drivers and logistics personnel with cooling equipment and appropriate personal protective gear is essential. Moreover, infrastructural improvements, such as installing shading and misting systems at key transport hubs, can reduce heat exposure and maintain the efficiency of supply chains. These measures are critical to ensuring that the sector's operational continuity is not compromised by rising heat levels.

Collectively, the above recommendations provide a framework for tailoring climate adaptation measures to the unique challenges and opportunities within each economic sector. By implementing these strategies, Ethiopia can protect its workforce, sustain productivity, and enhance the resilience of its economy in the face of a warming climate.

This factsheet is based on a study (Impacts of heat stress on jobs and productivity in Ethiopia: Quantitative and qualitative employment estimates for evidence-based decision-making) commissioned by the ILO with support from the Climate Vulnerable Forum and the Vulnerable 20 Finance Ministers (CVF–V20), and with funding provided through the CVF–V20 Joint Multi-Donor Fund.

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[i] World Bank (2024). Ethiopia - Country Climate and Development Report. Washington, D.C. World Bank Group.
[ii] Wikipedia (2025). Economy of Ethiopia. https://en.wikipedia.org/wiki/Economy_of_Ethiopia. Accessed: 14/1/2025.
[iii] World Bank (2021). Ethiopia Climate Change Overview and Country Summary. Climate Change Knowledge Portal. Washington, D.C.: World Bank Group. https://climateknowledgeportal.worldbank.org/country/ethiopia. Accessed: 4/12/2024.
[iv] WBGT is an important measure of heat stress, considering not only temperature but also humidity, wind speed, and solar radiation, which makes it particularly useful in assessing the risk of heat stress for working people.
[v] The map was made using http://www.maps-for-free.com
[vi] IPCC (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. V. Masson-Delmotte, P. Zhai, A. Pirani et al. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, Intergovernmental Panel on Climate Change.
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