

ERF Policy Brief

Spatiality of Climate Change and Agricultural Development in Turkey

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About the authors

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In a nutshell

- *Climate change is a global phenomenon. However, local differences in economic life, socio-demographic environment create a need to understand the local reflections of climate change.*
- *The sectoral composition of production and the rising spatial inequalities in developing countries increases concerns on the impact of climate change on different segments of society.*
- *Turkey with sizable spatial disparities is one of the most interesting examples. Eastern isolated and rural regions are observed to be extremely vulnerable to the impact of climate change. More remarkably, the impact of global warming on agricultural development is going to be more visible across this under-developed territory of the country.*

Climate change has been imposing an existential threat on human beings. In the meantime, people and the places that they live in are unequally affected by climatic developments. Motivated by the rising importance of local differences in climatic developments, this brief aims to investigate the impact of climate change on the spatial distribution of the agriculture sector in Turkey. The research findings indicate that climate change is another factor that contributes to the west-east regional development disparities in Turkey.

Adverse effects of climate change have already brought sizeable economic costs to countries. Inevitably countries with higher agricultural dependency are more vulnerable to climate change. The main threats are a drop in crop yields, loss of capital and land due to sea-level rise, capital damages due to extreme weather events, and increased food prices and vulnerable employment in the agriculture sector. These items translate into drier, hotter weather conditions and increases in the occurrence of extreme weather events.

While climate change is a global phenomenon, the Middle East and North Africa (MENA) region is one of the most severely affected areas of the world. Moreover, the extent of rurality and the agriculture dominance in the region's countries highlight the higher vulnerability of the MENA region to climate change compared to many other regions.

Turkey is no different from the countries in the MENA region in terms of its exposure to global climate change and its agriculture sector's vulnerability. Furthermore, there are an extensive economic, social, and environmental disparities across Turkish regions since the establishment of the Turkish Republic. Even though there are numerous studies examining the regional disparities in Turkey, there is limited discussion about how agricultural production is influenced by rising global warming and climate change. Underpinning the negative effects of climate change are Turkey's heavy reliance on agricultural production and the current spatial disparities in Turkey. Examining the spatial effect of climate change on the agricultural sector across Turkish regions offers valuable lessons for countries in the MENA region.

There has been a long-lasting debate between centralized and localized policies. We believe for developing countries like Turkey and other less developed countries; this debate is even more central. It has to be kept in mind that identifying the regional effects of climate change would enable us to construct locally-tailored smart policies to mitigate the adverse effects of climate change on the poorer rural and agriculturally dominant regions of developing countries. In other words, "one size fits all"

approach which has been dominantly used in and offered for developing and less developed countries, might be ineffective to mitigate the negative consequences of climate change and in combating global warming.

Based on all these discussions, we examine the effect of climate change on the agricultural value-added, employment, food prices, and agricultural productivity across Turkish regions. As noted before, the previous studies examine the country-level implications of climate change, providing an overall picture without distinguishing the spatial variations among sub-regions. This research; however, considers the spatial spillovers and heterogeneity allowing us to examine the regional spillovers and region-specific effects of climate change on the agricultural sector.

Inevitably there are numerous factors that affect agricultural development. For instance, the agricultural dependence of regions is not independent of the urbanization levels of the regions, and therefore, we expect that controlling for urbanization levels is essential to control for the transition from traditional to modern industrial production and will be inversely related to local agricultural development. While controlling for urbanization also helps in controlling for structural transformation, we also apply a different empirical setting to overcome the identification problems. These kinds of problems can result from the possible omission of important factors and/or the possibility of reserve causation.

Controlling for identification and also possible spatial spillovers, our results demonstrate that regions experiencing an increase in temperature generate lower value-added and employment in the agriculture sector. Furthermore, the impact of decreasing precipitation becomes visible once the interaction between temperature and precipitation is included. In our view, these results support arguments that various forms of climate change influence agricultural development.

As highlighted before, spatial heterogeneity might result in spatially varying impacts for climate change. That is to say that some certain regions can be more vulnerable to rising global warming. Interestingly, we find out that the negative impact of the average temperature on agricultural value-added is strongest among Turkey's underdeveloped rural eastern regions. Additionally, even though agricultural productivity seems to be positively affected by rising temperature, we found that climate change hurts agricultural productivity in the rural, underdeveloped south-eastern regions, but the effect of climate change is positive on the agricultural productivity in western Turkey. What explains this?



Our results show that the impact of climate change and global warming is not equally distributed across the Turkish regions. On the contrary, climate change's impact on the agriculture value-added and agricultural productivity is more visible among the less developed isolated territory of the country. Inevitably, this would amplify the development gap between the eastern-western divide in Turkey.

Our results for the existence of spatial channels are crucial. First of all, the existence of spatial spillovers highlights that implementing policies to mitigate the adverse effects of climate change would have a positive influence on agricultural development policy in near surrounding regions. Therefore, any policy action in one region will have an increasing impact on the geographical surrounding. This positive externality argument will be a key element for countries like Turkey, where sources are limited, and policy is centralized and inflexible. Second, identification of a spatially varying channel highlights that policy should be space specific. The mitigation efforts in rural and agriculturally dominant regions need to be spatially dissimilar compared to policy implementations in urbanized and industrial regions. While there are universally accepted principles in mitigating adverse effects of climate change, the needs and prerequisites of localities are not necessarily identical.

We find it valuable to underline that geographically tailored climate change adaptation policies should prioritize eastern regions to mitigate the negative consequences of climate change in Turkey. This will also contribute to reducing spatial economic inequality.

Further Reading

Karahasan Burhan Can, Pinar Mehmet (Forthcoming),
Climate Change and Spatial Agricultural Development in Turkey, ERF Working Paper.





ERF at a Glance: *The Economic Research Forum (ERF) is a regional network dedicated to promoting high-quality economic research for sustainable development in the Arab countries, Iran and Turkey. Established in 1993, ERF's core objectives are to build a strong research capacity in the region; to encourage the production of independent, high-quality research; and to disseminate research output to a wide and diverse audience. To achieve these objectives, ERF's portfolio of activities includes managing carefully selected regional research initiatives; providing training and mentoring to junior researchers; and disseminating the research findings through seminars, conferences and a variety of publications. The network is headquartered in Egypt but its affiliates come primarily from different countries in the region.*

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