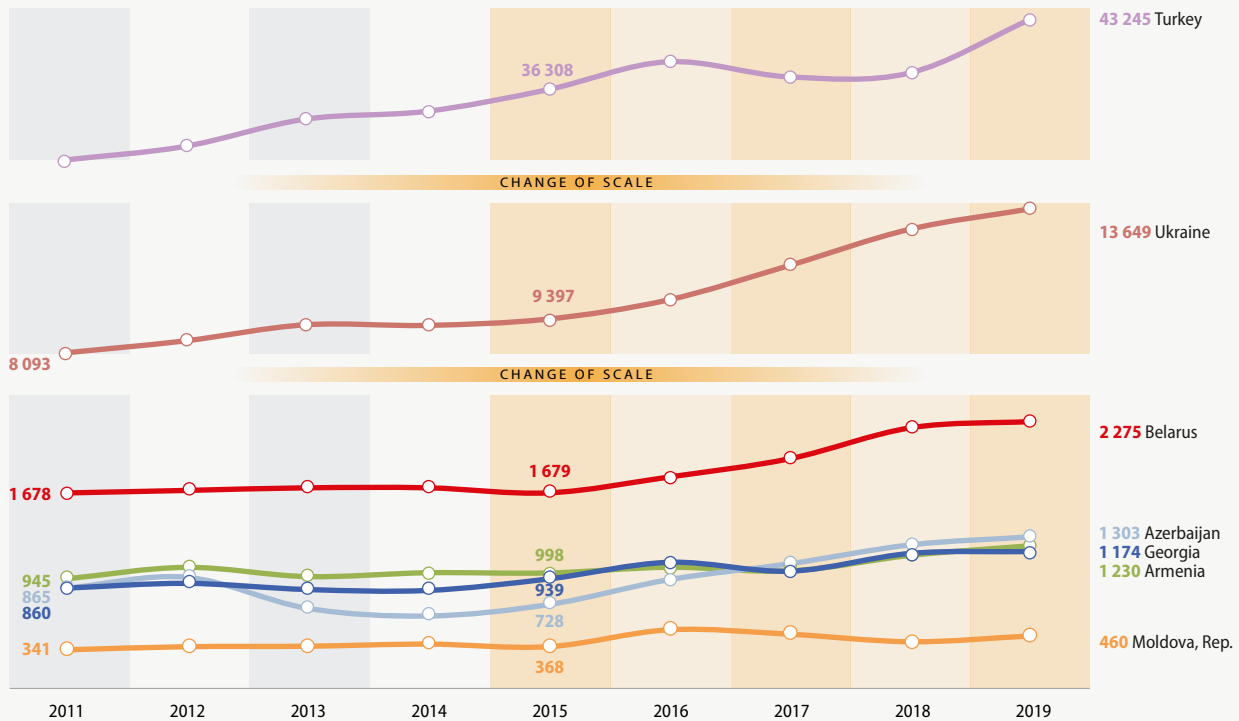


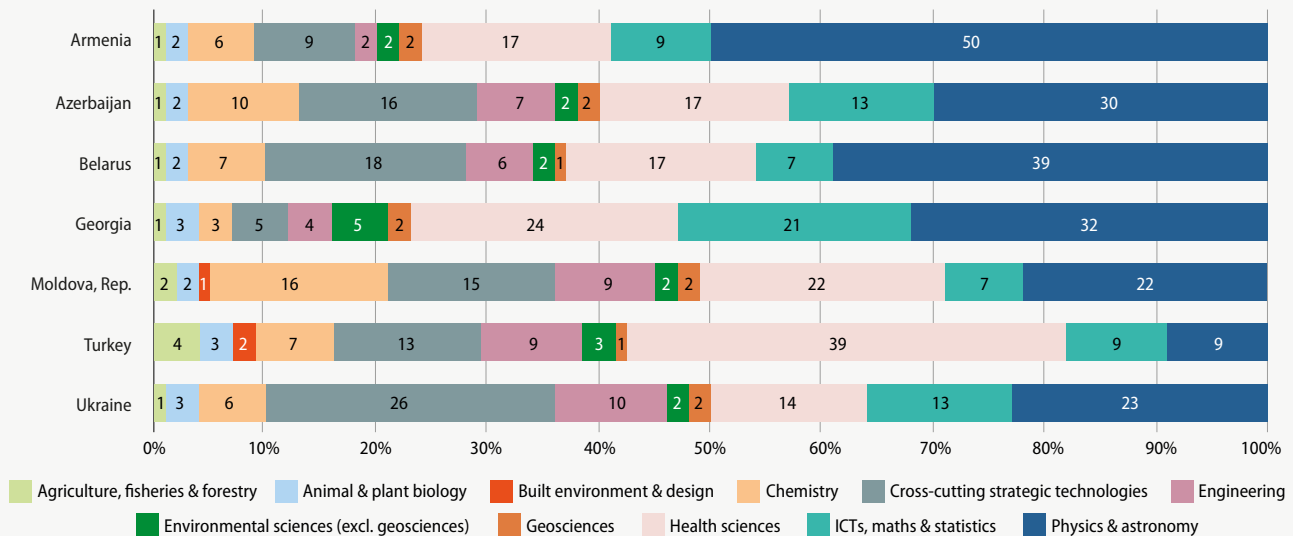


Figure 12.7: Trends in scientific publishing in the Black Sea Basin

Volume of scientific publications from countries in the Black Sea Basin, 2011–2019



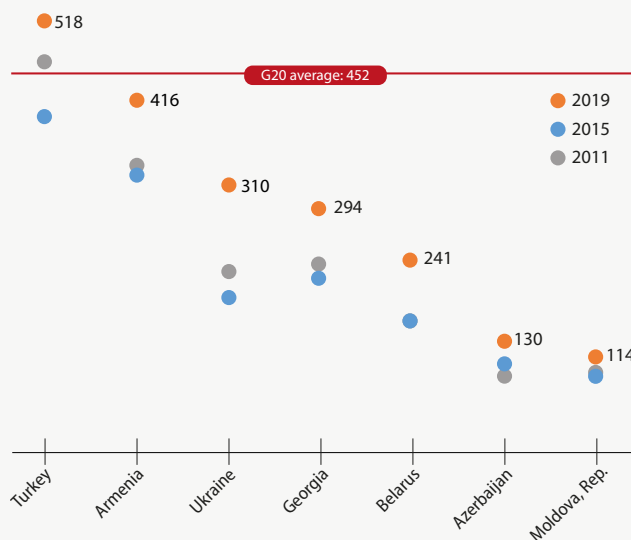
Scientific publications in the Black Sea Basin by field of science, 2017–2019 (%)





### Scientific publications per million inhabitants, 2011, 2015 and 2019

Data labels are for 2019



## 69–70%

Share of foreign co-authors in Belarus, Georgia and the Republic of Moldova in 2019, the highest proportion in the region

*Only Azerbaijan counts another 'Black Sea' country among its closest partners.*

### Top five partners for scientific co-authorship in the Black Sea Basin, 2017–2019 (number of papers)

	1st collaborator	2nd collaborator	3rd collaborator	4th collaborator	5th collaborator
Armenia	Russian Fed. (1 338)	USA (1 188)	Germany (1 076)	France (1 037)	Italy (1 008)
Azerbaijan	Turkey (895)	Russian Fed. (831)	USA (518)	Germany (505)	China (455)
Belarus	Russian Fed. (2 687)	Germany (1 121)	Poland (1 105)	USA (998)	France (961)
Georgia	USA (1 175)	Germany (1 026)	UK (928)	Russian Fed. (913)	Italy (891)
Moldova, Rep.	Germany (266)	Romania (264)	Russian Fed. (223)	USA (146)	France (115)
Turkey	USA (9 132)	UK (4 453)	Germany (4 279)	Italy (3 785)	France (3 121)
Ukraine	Poland (3 961)	Russian Fed. (3 583)	Germany (2 794)	USA (2 532)	France (1 881)

Source: Scopus (excluding Arts, Humanities and Social Sciences); data treatment by Science-Metrix

### How has output on SDG-related topics evolved since 2012?

Output on SDG-related topics is modest in relation to total output but there has been noticeable growth in hydrogen energy (Armenia, Azerbaijan, Ukraine, Turkey), hydropower (Georgia, Turkey), the status of biodiversity and ecosystem services (Belarus, Georgia, Ukraine) and medicines and vaccines for tuberculosis (Armenia, Azerbaijan, Moldova). The Republic of Moldova's output on the latter topic was even four times the global average proportion, with 25 (2012–2015) and 43 (2016–2019) publications.

Georgian output on national integrated water management surged from 1 (2012–2015) to 38 (2016–2019) publications. Belarus doubled its output on photovoltaics to 68. Azerbaijani scientists published their first 11 articles on human resistance to antibiotics between 2016 and 2019. Ukrainian output on radioactive waste management was 2.3 times the global average and grew by 130%: 65 (2012–2015) to 86 (2016–2019) publications.

For topics with over 100 publications, Ukraine registered the fastest growth in sustainable transportation (460%), wastewater treatment, recycling and use (360%), smart-grid technologies (340%) and the sustainable use of ecosystems (280%) but output was still less than half the global average.

Turkey's output on geothermal energy was 2.5 times the global average (130% growth rate): 184 (2012–2015) to 246 (2016–2019) publications. Eco-industrial waste management was the fastest-growing (180%) topic and on a par with the global average: 172 (2012–2015) to 301 (2016–2019) publications.

For details, see chapter 2

## 25%

Share of foreign co-authors in Turkey in 2019, the lowest proportion in the region

## 1.92

Average of relative citations for Azerbaijan, 2014–2016, the highest ratio in the region; the G20 average is 1.02