

AFRICA: Research concentrated in three countries

Wagdy Sawahel

23 May 2010

Issue: 0054



Africa has extremely uneven distribution of research and innovative capacity, according to a recent report. Research is concentrated in Egypt in the north, Nigeria in the middle and South Africa in the south. Africa produces only some 27,000 papers a year - about the same volume of published output as The Netherlands - but the continent has relatively high representation, as a share of world publications, in fields related to natural resources.

The distribution of research is described in a report, titled **Global Research Report: Africa**, published last month by the UK-based Thomson Reuters research performance analysis and interpretation group Evidence.

It is the second study evaluating the state of science and technology across the continent using scientometrics (See "**Researchers lag in science and technology**", *University World News*, November 2008).

The study broke Africa down into three regions with six countries in North Africa, 34 in Central Africa, and the 14 countries that belong to the Southern African Development Community, SADC.

In the decade to 2008, the study revealed, the central region of Africa produced the smallest number of papers - some 7,100 a year, despite having the most countries.

North Africa accounted for the highest number of papers in recent years, with more than 10,500 produced in 2008, even though it has only six countries. The 14 countries of the south region also produced more than 10,000 papers that year.

"This immediately points to an uneven distribution of research and innovative capacity at both country and regional levels," according to the study.

More detailed analysis revealed that research in Africa is concentrated in just three countries - Egypt in the north, Nigeria in the middle, and South Africa in the south.

In the decade to 2008, South Africa produced the biggest volume of research, with nearly 47,000 papers compared to the region's next most prolific nation Tanzania, which fielded just over 3,000.

Egypt produced nearly 30,000 papers between 1999 and 2008, "which was about three times the total for Tunisia, its next-place and regional neighbour", the report revealed. Nigeria's total for the same period was over 10,000 papers, compared to around 6,500 produced by Kenya, which is the leading research economy in East Africa.

In west-central Africa, Nigeria's total for the same period was over 10,000, compared to roughly 6,500 for Kenya which is the leading research economy in the east of the continent.

The study also analysed the most prolific African countries in each of 21 main fields used for the Thomson Reuters *Essential Science Indicators*. It looked at the five years from 2004 to 2008. This showed that Africa had relatively high representation, as a share of world publications, in fields that are relevant to natural resources.

"The highest percentage of any field, for example, is South Africa's 1.55% share of Plant & Animal Science. Not far behind is the same country's 1.29% portion of Environment-Ecology," the study found. South Africa led in 15 out of the 21 fields, Egypt in five and Nigeria in one (agricultural sciences).

The report has also compared publication output with gross domestic product (GDP) for each country, "reasoning that proportionate investment in the knowledge economy is a good index of a government's commitment to maximise the longer term benefit of resource development and exploitation for the general wealth of its people". The leading countries by output were South Africa, Egypt, Nigeria, Tunisia, Algeria and Kenya.

Indexing output against GDP provided further interesting information, said the report: "The real leaders are Tunisia and Malawi with very different economic bases but strong relative productivity in both cases. Zimbabwe was the most productive country, but only because it retained its legacy research base despite a collapsing economy and very low current GDP.

"South Africa, Kenya and Egypt all have significant relative productivity, as do a number of other countries in East Africa (Ethiopia, Uganda, Tanzania) and West Africa (Cameroon, Ghana," the report continued.

"It is clear, however, that despite Nigeria's high volume output it is not returning as much research as would be expected given the size of its economy. The value of its resources is not yet being felt in its knowledge base." This research productivity gap between resources and investment, also seen in several other countries, showed where Africa is not yet benefitting from the best use of its natural resources.

Analysing collaborations between countries, represented by co-authorships of publications, the study found a marked interaction between countries in North Africa which share both language and culture and are also relatively prolific across the fields analysed.

"Thus this network is probably the strongest group overall since it links countries which are individually research active across multiple fields. The group does little research with the rest of Africa, however, other

than through the Egypt-South Africa link. The essential regional role of other countries, such as Cameroon and Tunisia, was also marked.

The historical legacy of past ties was reflected in collaborative networks associated with Francophone and Anglophone groups of nations, the report found.

The Francophone group had the benefit of proximity in West Africa, and this could prove an important regional focus and development opportunity. The Anglophone group had good links to the US and UK, and its common language base meant it already accessed and was exposed to the international community that used English for research publication.

"The test will be whether the research activity reflected in these links is maintained when economic constraints start to bite in Europe and North America."

Some countries showed the potential to play a transformational role. "This report has identified a pair of axes, running between Egypt and South Africa and between Nigeria and Kenya, which engage a high proportion of Africa's research and which link the rest of the continent in collaborative networks.

"The essential regional role of other countries, such as Cameroon and Tunisia, is also marked," the report argued. The future of the African research enterprise would depend significantly on the ability of active countries to help facilitate research growth through leadership, strong local investment and the creation and support of key facilities and centres to draw in and assist currently less well resourced partners.

"The volume of activity remains small, much smaller than is desirable if the potential contribution of Africa's researchers is to be realised for the benefit of its populations. The challenges that the continent faces are enormous and indigenous research could help provide both effective and focused responses," said the report.