Research in Arabic African countries

Imput

Human Ressources

Financial Ressources

Output

Graduated Students

Scientific production

Causes of the Weakness of scientific research

Steps to improve the scientific research in Arabic African countries

Students

The number of university students in higher education

Countries	Nb of Students in sciences
Morocco	100 000
Algeria	240 000
Tunisia	68 000
Egypt	400 000

The pressure of numbers, and those seeking entry to higher education in particular, was, and continues to be, relentless.

Teachers -Researchers

Countries	Nb of T-R in sciences
Morocco	3 500
Algeria	5 500
Tunisia	5 000
Egypt	14 000

Increasing of the number of students, is inconsistent with the rise of teaching staff. Hence the teaching load becomes heavier and affects the scientific research

The average teachers to student ratio in all fields is estimated at around 1:40 or more in some countries

Financial ressources

Countries	% GDP
Morocco	0.8
Algeria	0.5%
Tunisia	0.3
Egypt	0.3

All the available information indicates that research expenditure in Arabic countries is very low.

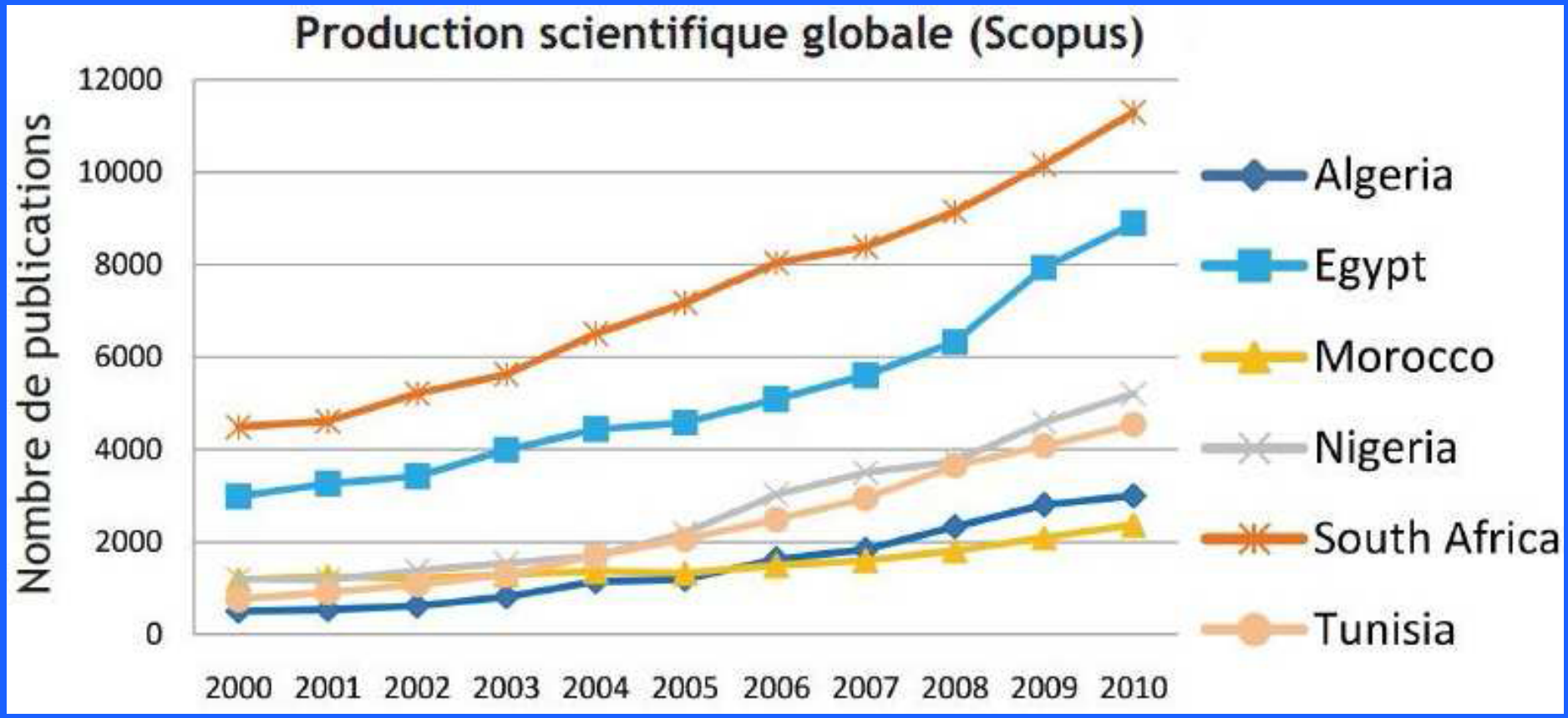
The governments are the major funding source of research activities

Pays	Part du PIB (%)					Évolution 1999/2010 (%)
	1999	2001	2003	2006	2010	
Tunisie	0,43	0,53	0,73	1,06	1,10	155,81
Portugal	0,65	0,8	0,74	0,8	1,66	155,38
Turquie	0,37	0,54	0,48	0,58	0,85	129,72
Maroc	0,37	0,55	0,65	0,64	0,73	100
Espagne	0,87	0,91	1,05	1,15	1,38	58,62
Corée du Sud	2,34	2,59	2,63	3	3,36	43,58
Rép. tchèque	1,15	1,20	1,25	1,55	1,53	33,04
Roumanie	0,35	0,38	0,40	0,45	0,48	20
Égypte	0,20	0,19	0,27	0,26	0,21	5
France	2,14	2,20	2,17	2,15	2,23	4,20
Malaisie		0,40	0,65	0,63	-	
Algérie	0,19	0,23	0,20			
Jordanie			0,3	0,34	0,42	
Sénégal					0,37	

Source : Institut de Statistique de l'UNESCO

Scientific output

Until 2000, in spite of the weakness of ressources, and thank to the effort of the researchers, Morocco had the 3rd scientific production in Africa, just behind South Africa and Egypt.



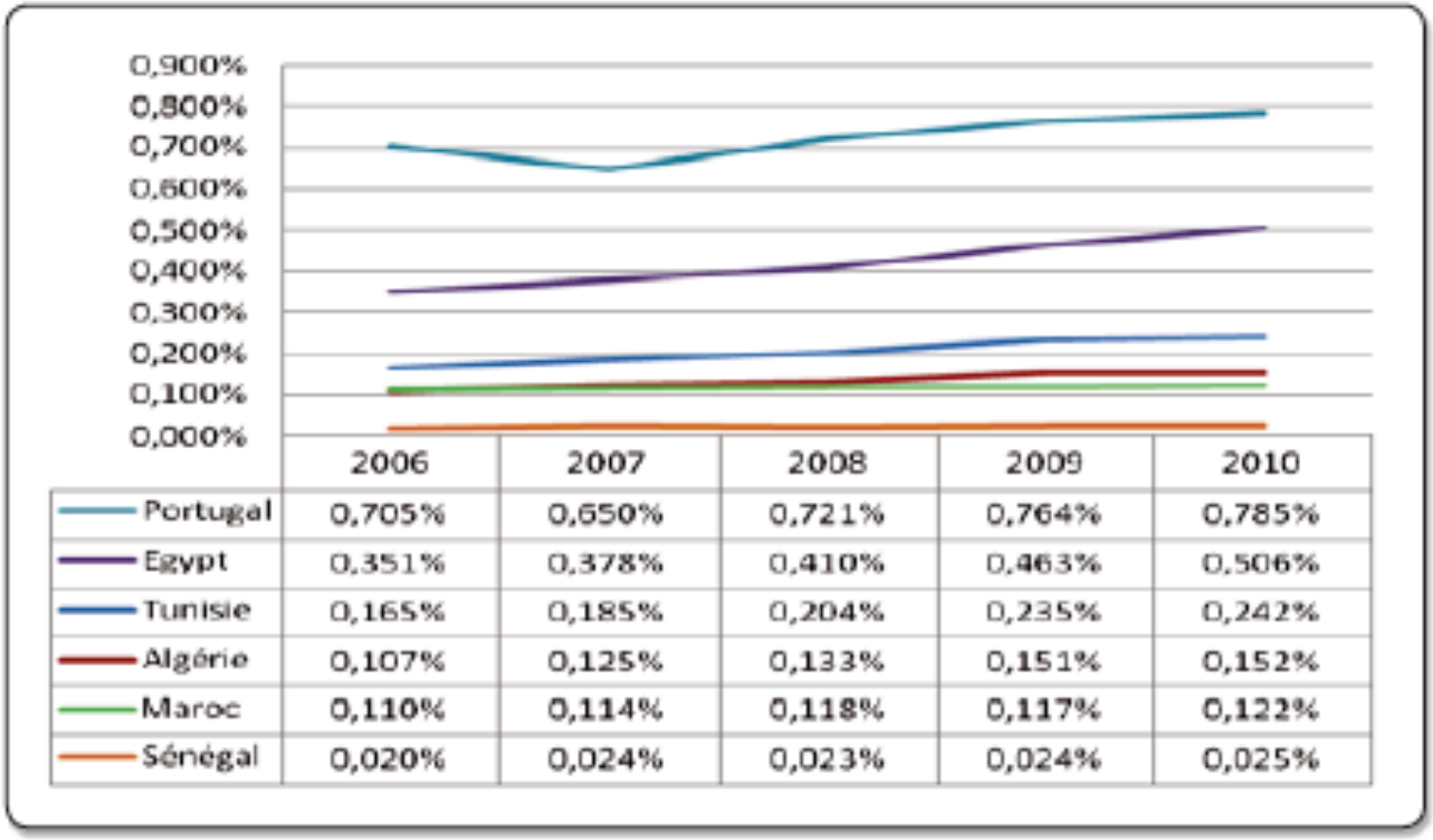
Contribution to the international output

Tableau 10. Part mondiale (%) des publications du Maroc et d'autres pays pour l'année 2010

	Maroc	Tunisie	Algérie	Egypte	Portugal	Sénégal
Parts mondiales (toutes disciplines confondues)	0,122%	0,208%	0,135%	0,425%	0,727%	0,023%
Parts mondiales en Sciences Exactes et Naturelles	0,130%	0,213%	0,168%	0,440%	0,865%	0,020%
Parts mondiales en Sciences d'Ingénieur et Technologies	0,117%	0,280%	0,250%	0,543%	0,922%	0,013%
Parts mondiales en Sciences Médicales	0,094%	0,176%	0,030%	0,370%	0,462%	0,030%
Parts mondiales en Sciences Agricoles	0,123%	0,331%	0,109%	0,498%	0,977%	0,054%

Sources Thomson Scientific ; INIST-CNRST

Evolution of the part of contribution in the international research



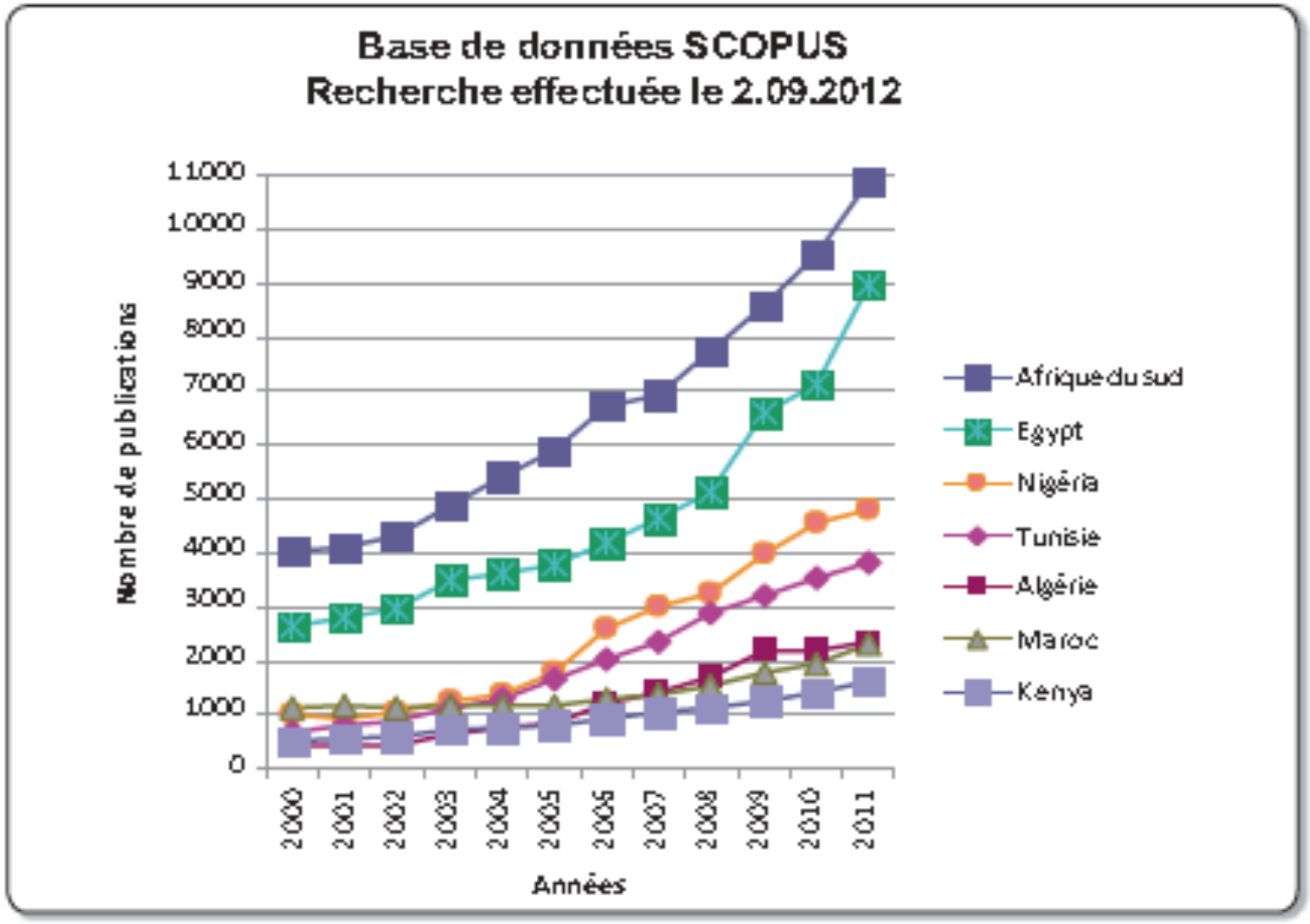
	2006	2007	2008	2009	2010
Portugal	0,705%	0,650%	0,721%	0,764%	0,785%
Egypt	0,351%	0,378%	0,410%	0,463%	0,506%
Tunisie	0,165%	0,185%	0,204%	0,235%	0,242%
Algérie	0,107%	0,125%	0,133%	0,151%	0,152%
Maroc	0,110%	0,114%	0,118%	0,117%	0,122%
Sénégal	0,020%	0,024%	0,023%	0,024%	0,025%

Graphique 11. Evolution de la part mondiale (%) des publications du Maroc et de quelques autres pays

Scientific output during the last decade

Tableau 12. Production scientifique dans la base de données SCOPUS et comparaison avec quelques pays africains

Années	Pays						
	Tunisie	Algérie	Maroc	Afrique du sud	Egypte	Nigéria	Kenya
2000	692	441	1147	4028	2653	1019	540
2001	828	454	1178	4114	2823	952	563
2002	882	464	1153	4337	2984	1049	614
2003	1137	654	1197	4900	3513	1260	735
2004	1322	755	1171	5415	3620	1395	761
2005	1668	854	1189	5912	3773	1800	818
2006	2041	1234	1303	6741	4179	2591	952
2007	2361	1428	1380	6925	4636	3022	1073
2008	2908	1723	1544	7747	5148	3254	1149
2009	3216	2190	1788	8583	6611	3999	1270
2010	3534	2200	1967	9521	7147	4562	1419
2011	3824	2352	2323	10862	8969	4818	1622



Graphique 13. Nombre de publications dans la base de données SCOPUS

Graduated students

Tableau A9 Diplômés de l'enseignement supérieur délivrés en 2005 et en 2009		
Pays	Nombre de diplômés	
	2005	2009
France	664 711	621 444
République de Corée	607 982	595 127
Espagne	298 448	310 452
Turquie	258 858	488 803
Malaisie	202 705	206 588
Egypte	-	416 470
Romanie	156 565	310 886
Portugal	70 023	76 567
République tchèque	54 341	96 207
Maroc	48 162	70 780
Algérie	-	154 838
Jordanie	42 294	49 574
Tunisie	28 565	65 630
Sénégal	-	-
Source : Institut de Statistique de l'UNESCO		

Graduated students

Very few graduates find positions as researchers in the government research centres and institutions. The majority of university graduates remain unemployed or find jobs unrelated to their studies.

This ‘educated unemployment’ is the result of a mismatch between university output and labour market requirements.

Obstacles faced the development of the scientific research

Arabic countries have been steadily losing scientists.

- Immigration of the confirmed researchers
- students studying overseas do not return home.

Higher Education system produces less good students and science:

Reduction of Education Expenditure.

great density of students.

Passive learning and lack of critical thinking.

The research in hard sciences in Arabic countries suffers from a deficiency in state-of-the-art equipment; this makes advanced technology research difficult to pursue.

The research expenditure is very low. Governments are the major funding source of research activities

The university budget allocated to the individual researcher for supporting research reaches the sum of US $ 150 in certain countries.

Insulation of the reseachers

With such a small research budget for the universities, researchers cannot move to attend international meetings nor national meetings. They to pay with their own budget.

In theses conditions we can be expected a research of quality.

Others reasons for the decline in research in Arabic countries

Absence of a strategic plan for research at the governmental level and the poor economic condition of university staff.

lack of a motivation for research:

Except for a few still enthusiastic researchers there is little interest in science and conducting research for improving knowledge.
Research activities are directed to producing theses for post-graduates in order to obtain degrees and for promotion.

The deterioration in research calls for urgent actions to improve the quality of Higher Education and research in Arabic countries.

It is not a novel proposition, that improving quality involves a financial investment that includes increasing salaries, improving research facilities, and enhancing "teaching and research capacities."

Despite the deterioration in the research environment, there are still good researchers who are well-trained scientifically, and who can produce quality research if they are given the right opportunity.

They must be supported by being allowed access to data, up-to-date bibliographic material, sophisticated equipment, good remuneration, and professional acknowledgment.

Steps forward for improving situation

The deprived research environment and lack of a strategic plan for research within university causing the deterioration in research, calls for urgent actions to improve the quality of HE and R&D in Arabic universities.

An encouraging trend is that higher authorities in some countries have recognized the HE problems and made steps forward to improve situation.

The Ministry of Higher Education presented a twenty-five step strategic plan to improve Egyptian universities. The proposed reforms are designed in part to improve the quality of higher education to balance quality and quantity and to improve facilities for scientist. It also called for new sources of financing for the national universities.

It is difficult to be innovative in recommendations for improving HE and research in Egypt. This issue had been frequently discussed in numerous local and international reports. The

The two main topics often addressed are increasing the budget for HE and R&D as well as improving the professional quality of both the teaching and research staff in the university.

Universities can attain a high level only with highly qualified academic staff, which should be addressed by a reform in the education system. One of the surest ways to improve universities and their teaching of science is through a system of accreditation that monitors and ensures quality.

Research in universities should be directed toward the country needs for growth and development to involve the private sector in financing the research.

Optimistic note

At national level

Algeria: strong programme for supporting and boosting the scientific research

Inject 100 billions dinars to boost the scientific research between 2008 et 2013 to improve the equipment and the situation of the researcher

Morocco: it is expected that the government will allocate 500 MDH (62 million US$) to the R&D in the next three years

Annual Allocation for researcher motion: 1 500 US$/annum

At International

We request the IUCr to continue and to extend the progamme initiative in Africa and beyond

We also ask G. Desiraju, C. Lecomte and M. Zema to maintain their involvement in the programme IYCr: what's next.