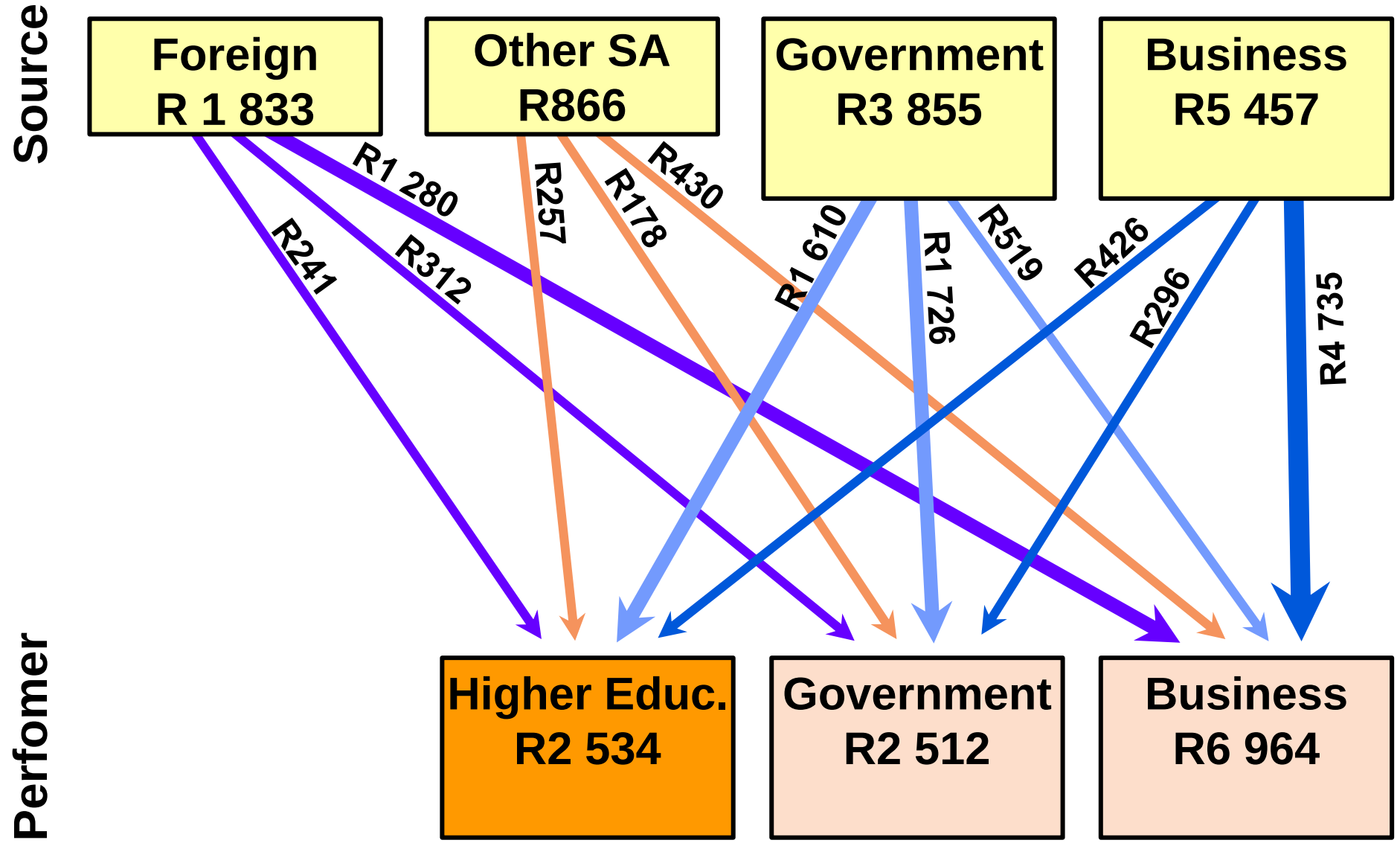
The Higher Education Research Landscape in South Africa

Walter Claassen (2 November 2006)

Major Flows of Funding for R&D

(2004/2005, in millions)



Content

1. The *new landscape* of higher education in South Africa
2. The performers
3. The funding environment
4. Aspects of the national research scene (as applicable to higher education)

New/Present Higher Education Landscape, as in 2006: Types of Institutions

Universities (11)

many with faculties of engineering,
some with medicine

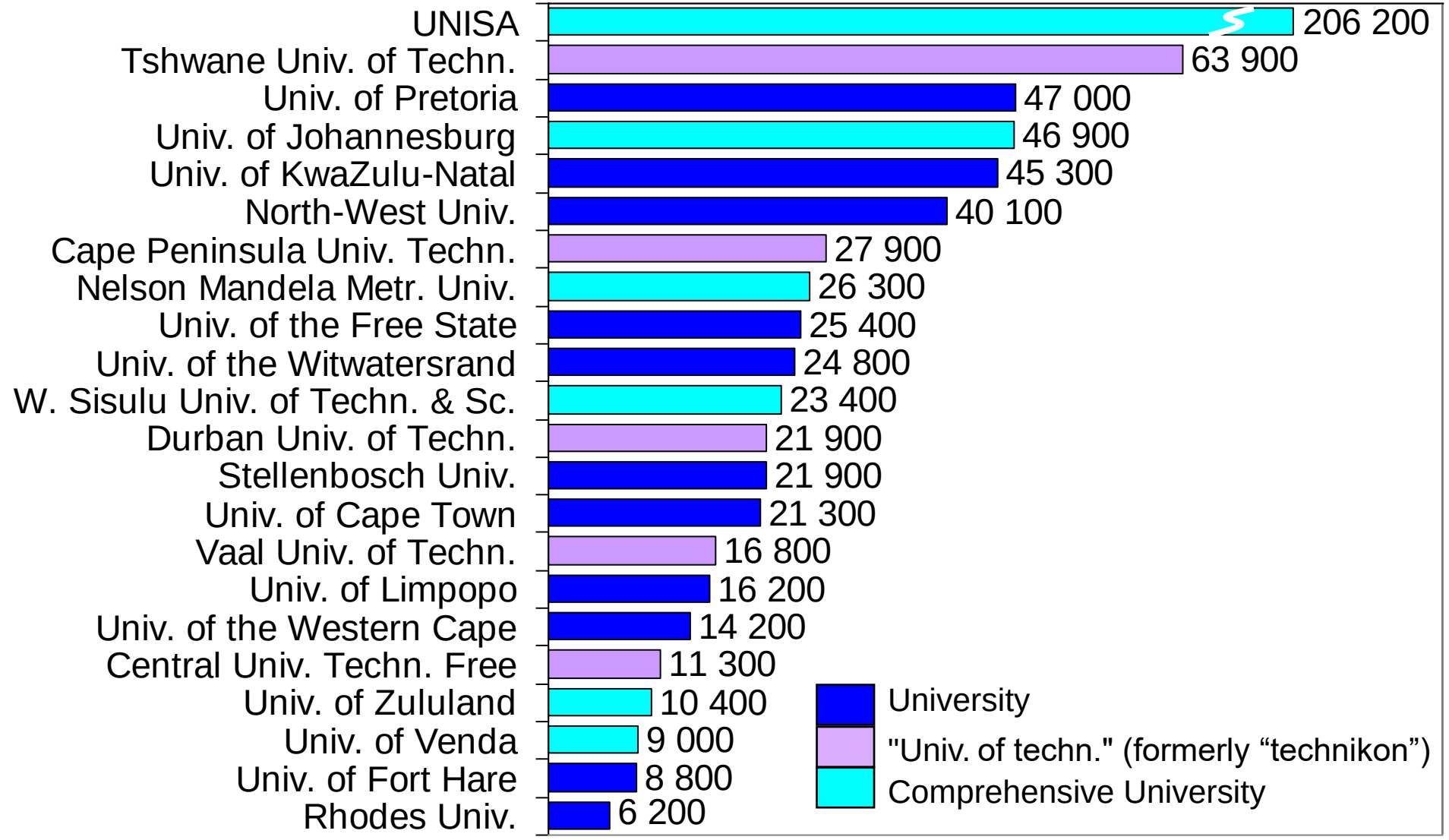
Universities (6)

"comprehensive institutions"
(i.e. university *&* technikon programmes)
simply called "universities"

"Universities of Technology" (5)

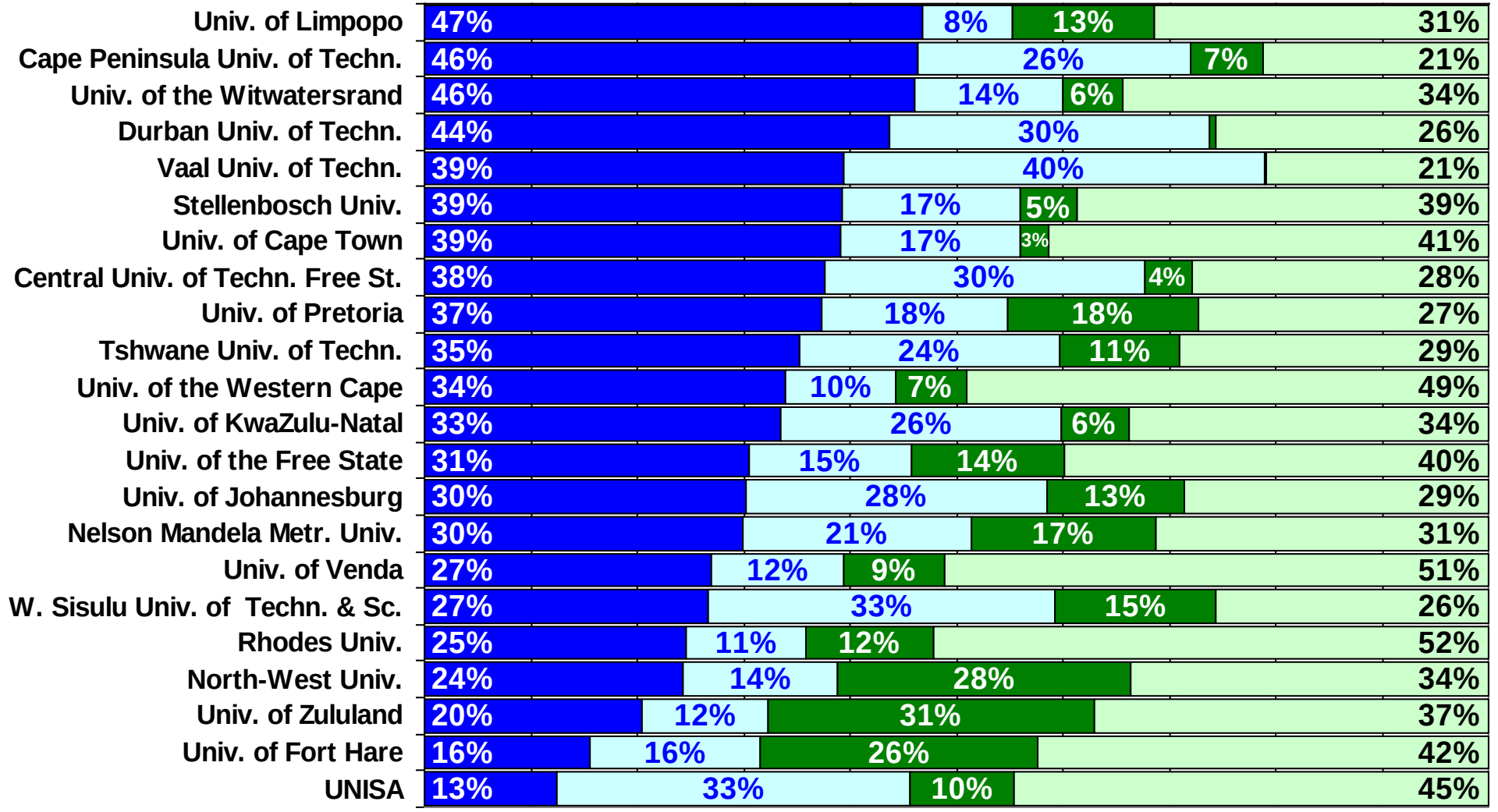
formerly "technikons",
not (yet) the likes of "technical universities" in Germany

New Higher Education Landscape (2006)
(after Mergers and Incorporations*)

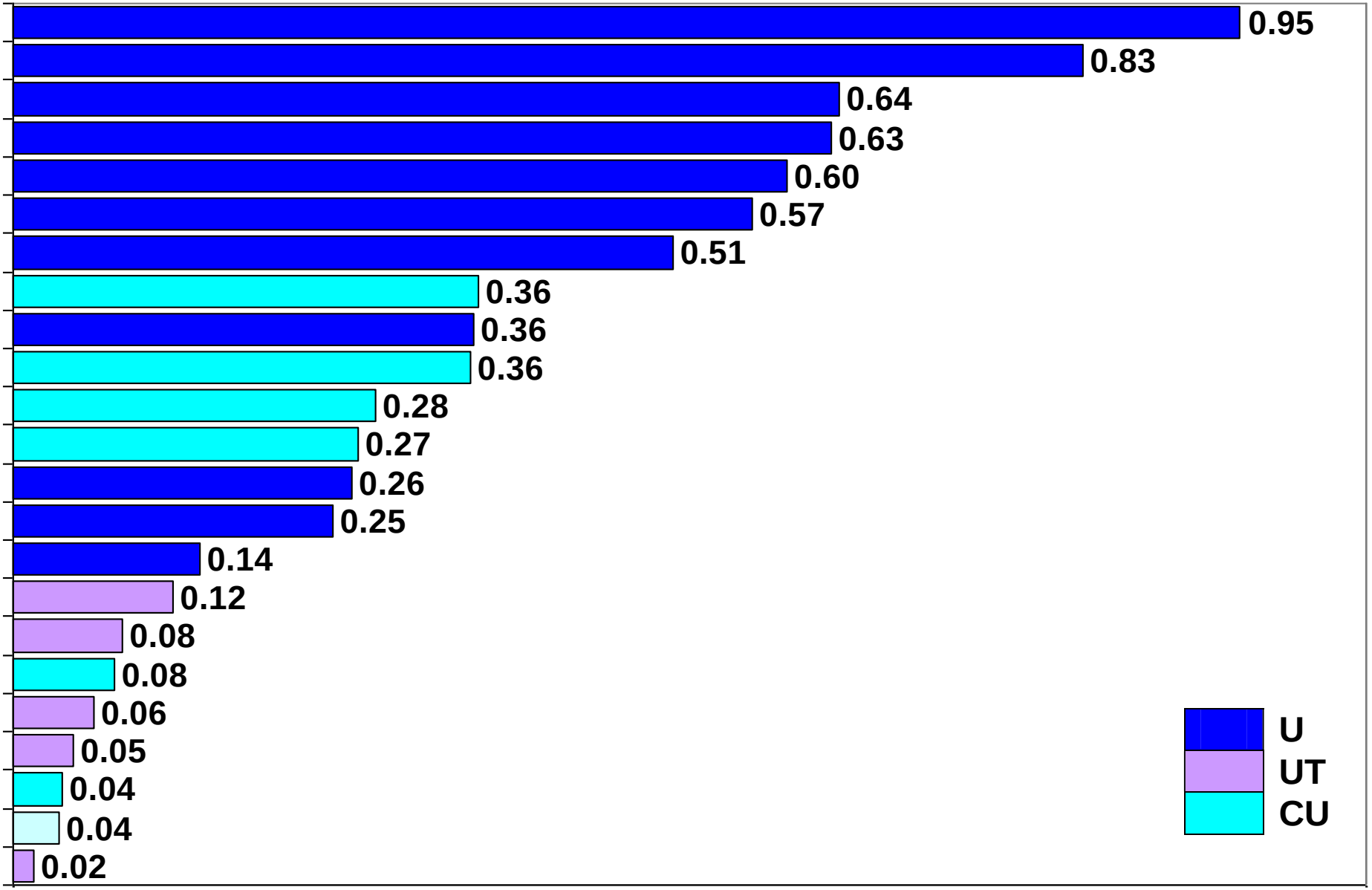


[*Source: HEMIS, 2004*] * *Projected enrolments of HE institutions in 2006, based on 2004 headcounts*

SA: Total FTE Enrolments (Contact + Distance) by Broad Field of Study (2004)



Research Publications (Av. 2003 & 2004) (all publications) Per Staff



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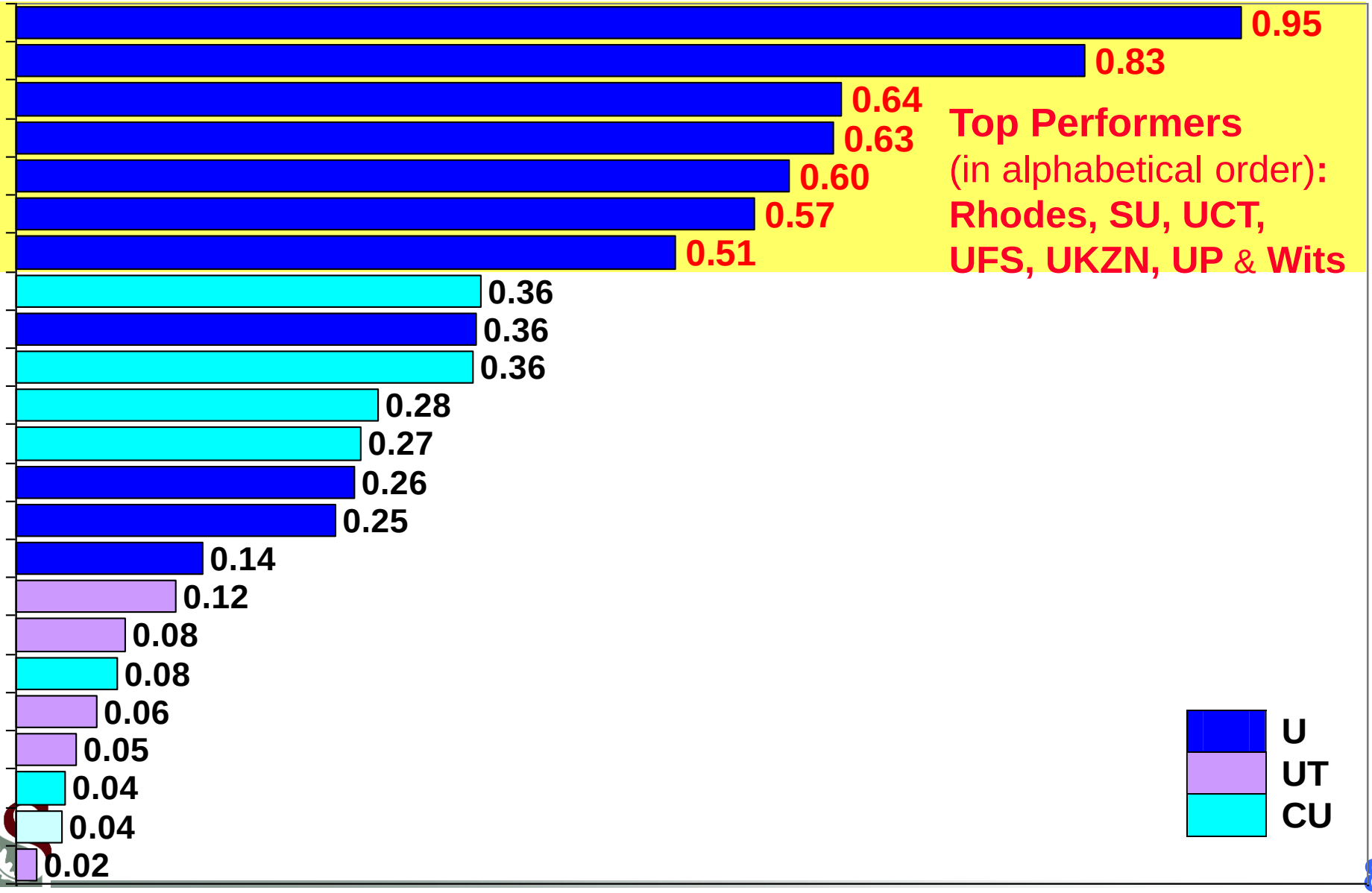
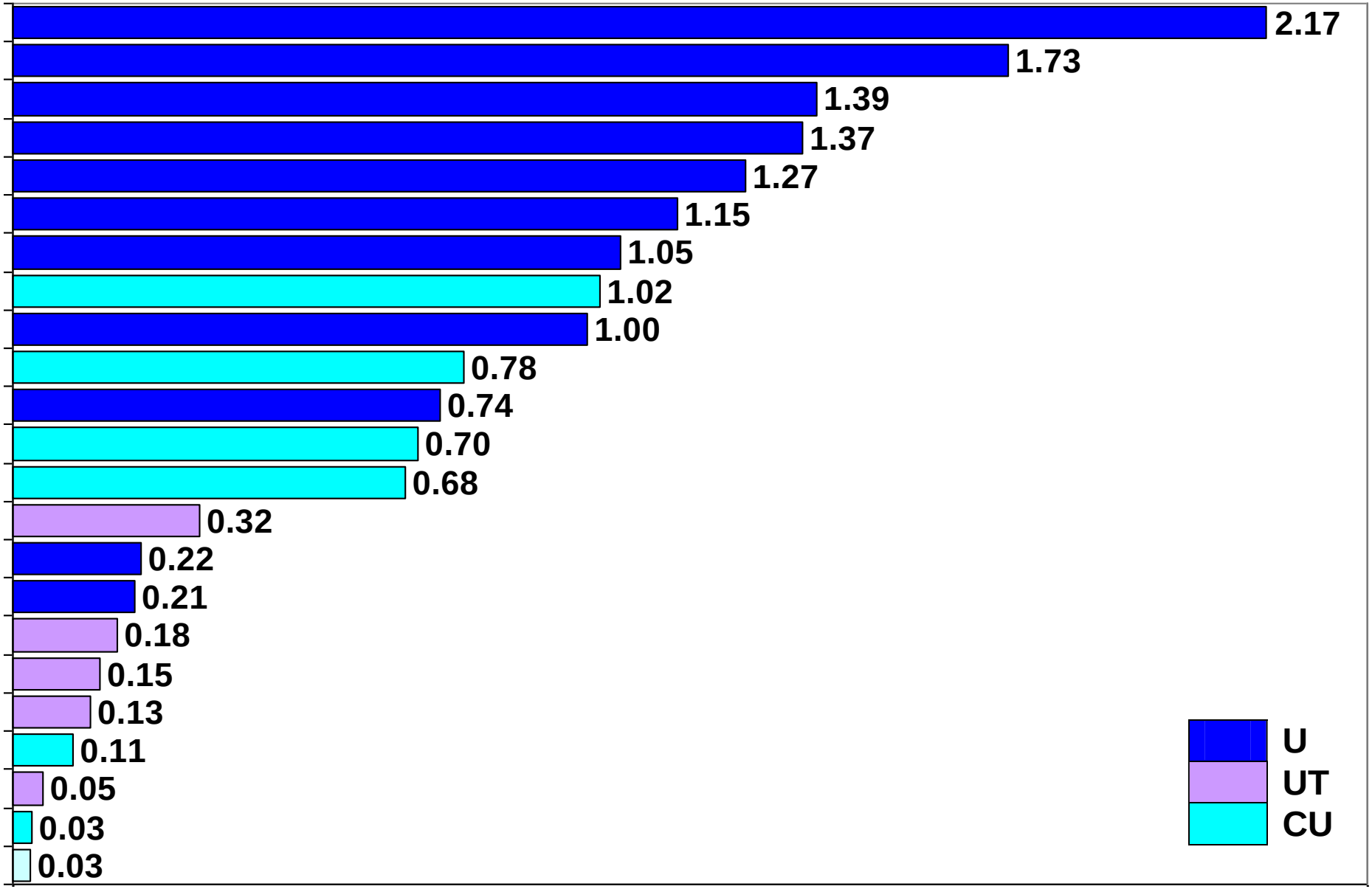


Weighted Research Output (2004)

(DoE: Masters x1; Publications x 1; Doctoral x3): Per Staff



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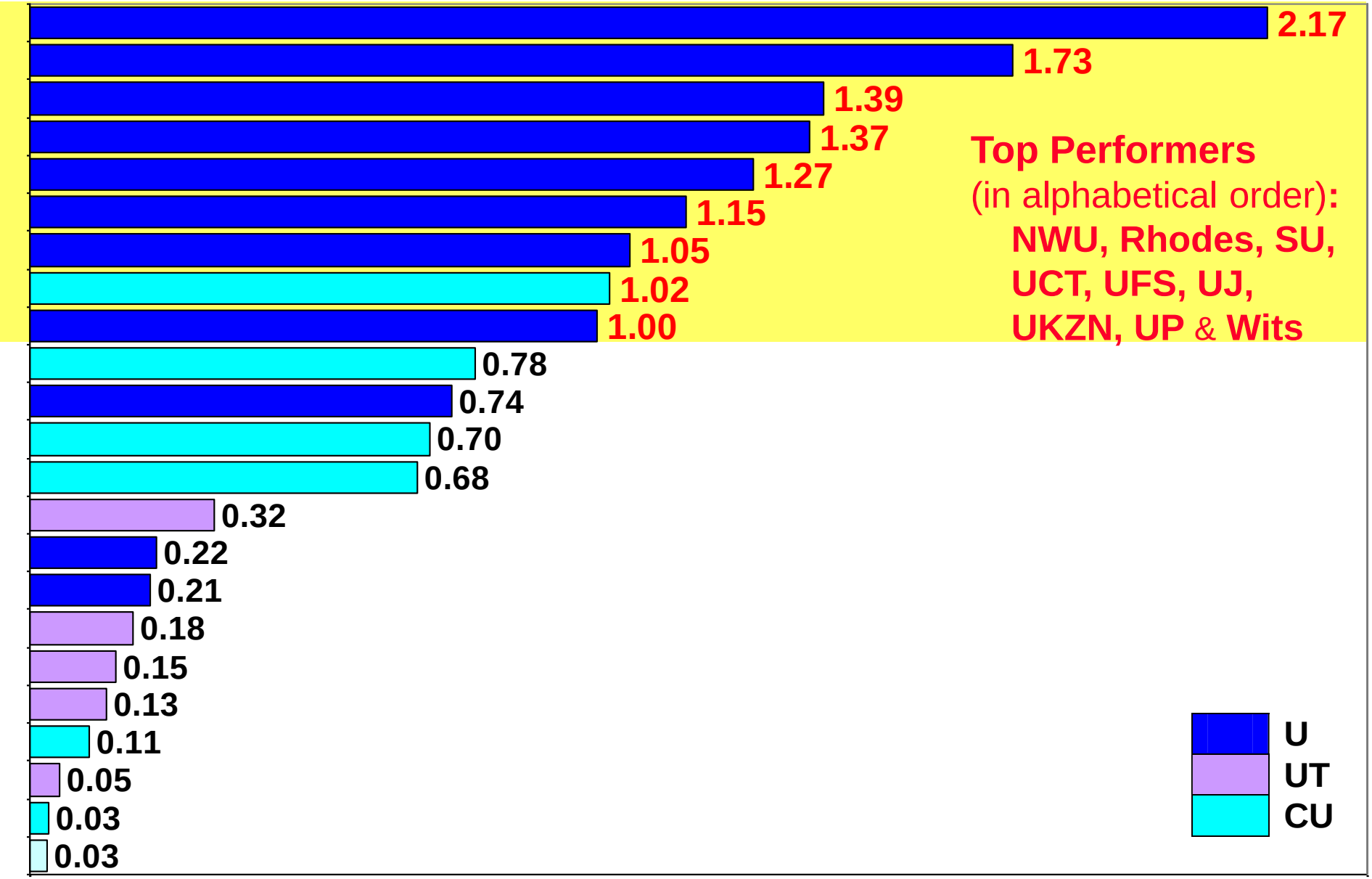


Rated Researchers (NRF) as % of Instruction/Research Staff (2005/6)

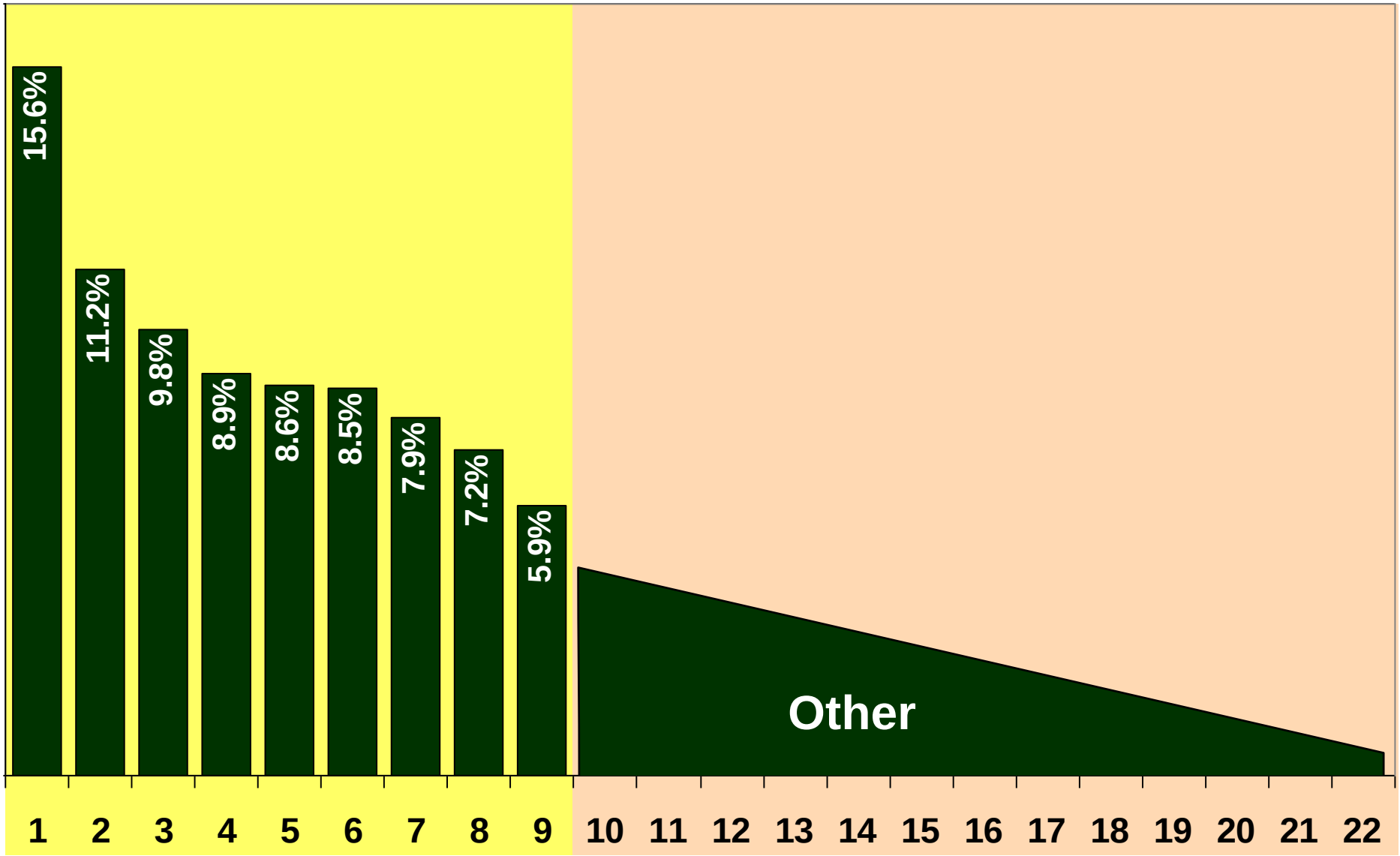
Univ.	Rated Res.	Instr. / Res. Staff
	262	33.0%
	220	28.3%
	47	15.8%
	161	13.7%
	65	13.5%
	72	12.5%
	177	11.3%
	85	11.2%
	152	11.0%
	50	8.7%
	64	6.8%
	12	5.7%
	75	5.6%
	5	2.1%

Ratings: 2005, as in March 2006

Staff: 2004 (most recent HEMIS information)

Master's & Doctoral Degrees Awarded as % of SA Totals for these Degrees

(largest players 2004)



[*Source: HEMIS, 2004*]

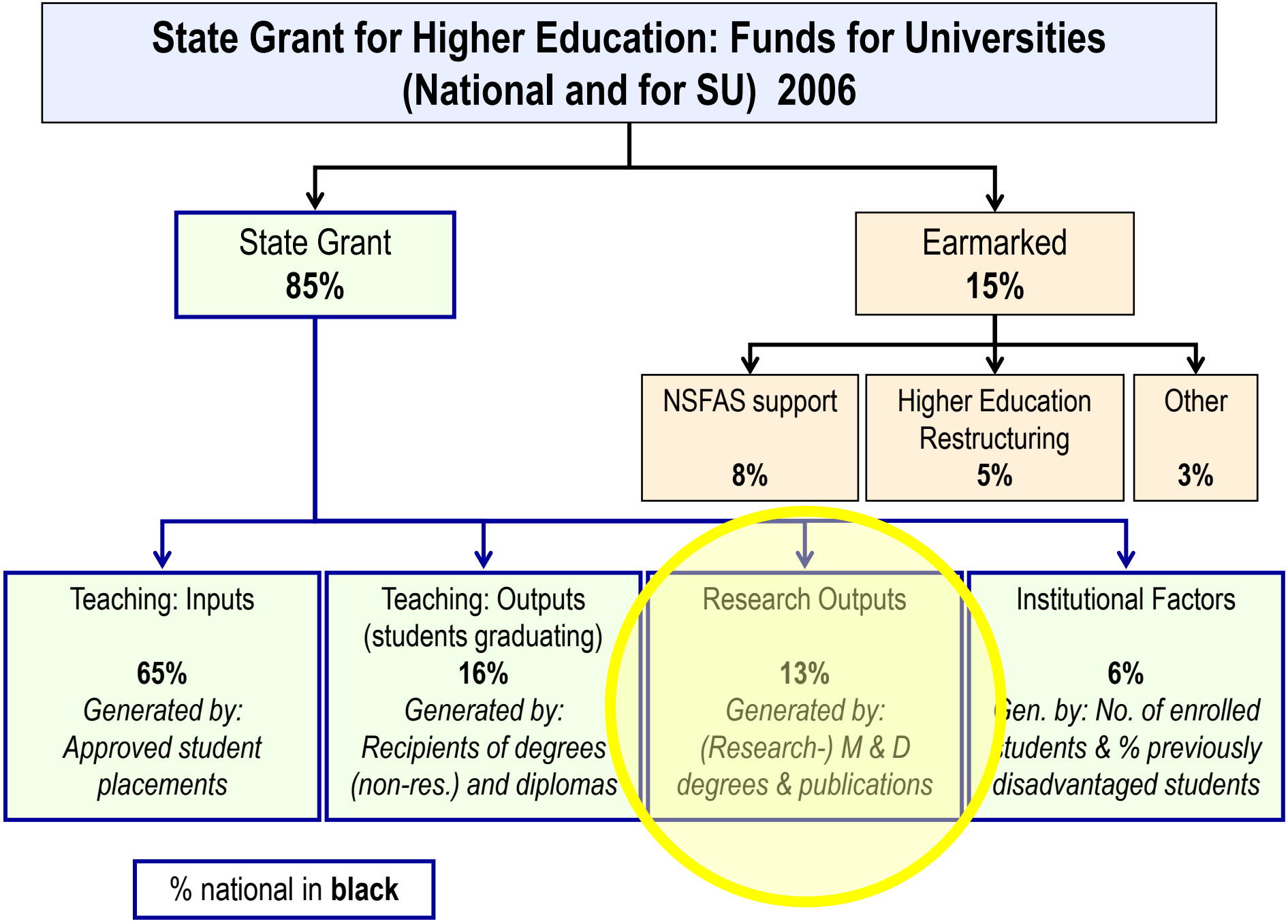
Distribution of Research amongst Universities in SA

- Research publication outputs:
  70% of the publ. output units are produced by:
  6 universities (SU, UCT, UP, Wits, Natal, UNISA)

- Master's and doctoral degrees (general)
  Two-thirds of master's and doctoral degrees are produced by (out of 22):
  6 universities (SU, UCT, UP, Wits, NWU, UNISA)

- Master's and doctoral degrees (in SET)
  Two-thirds of master's and doctoral degrees are produced by:
  5 universities (SU, UCT, UP, Wits, Natal)

State Grant for Higher Education: Funds for Universities (National and for SU) 2006

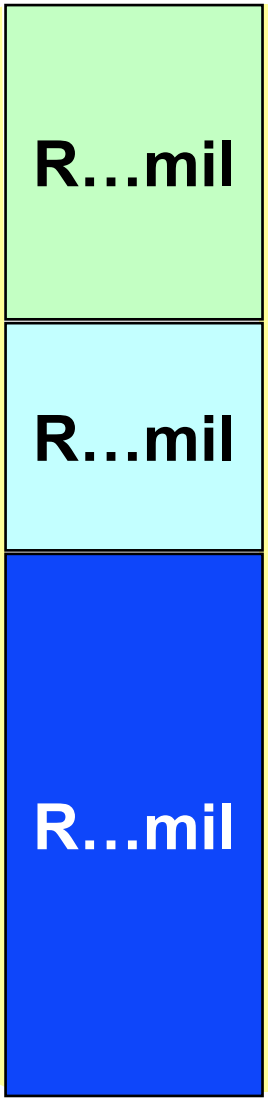


State Grant (2006)
Component: Weighted Research Outputs: Composition

Research Outputs

13%

Generated by:
(Research-) M & D degrees & publications



M degrees (res.): mmm
Weight: 1

D degrees: ddd
Weight: 3

Publ. units: ppp
Weight: 1

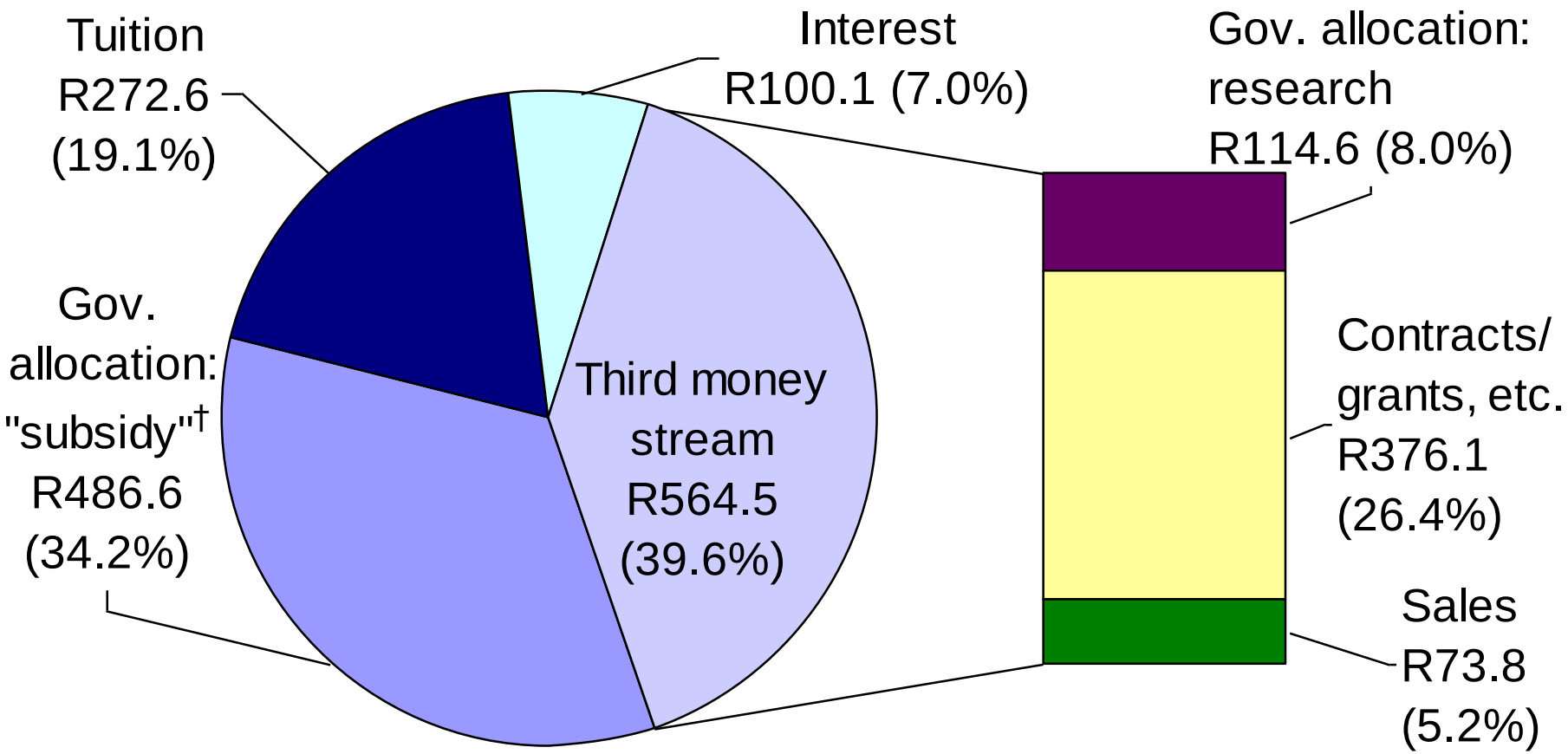
Amount linked to publ. unit: R 80 000
(for state grant for 2006)

South African Research Journals

1. Recent report, *Report on a Strategic Approach to Research Publishing in South Africa*, by ASSAf (commissioned by DST)
2. Wide media coverage ("shocking finding")
3. The report shows the following (amongst others):
   a) *Too many* research journals for the small number of researchers in SA
   b) *Quality* of many research journals leaves much to be desired
   c) Poor *visibility* (international) of research journals
      - seldom (or never) cited
      - many are not tracked in ISI (or other) well-known indexes
   d) Many authors publish too often in research journals that are (too) *narrowly associated* with the universities/departments involved
      - sometimes on account of specialization
      - sometimes on account of other factors
   e) Research journals *not readily accessible* (internationally)
4. Various recommendations have been made
5. The report has attracted a lot of attention; at all universities

Total 2005 Income

(Excluding non-recurrent items and accommodation)
(total income amount of R1 424 million)

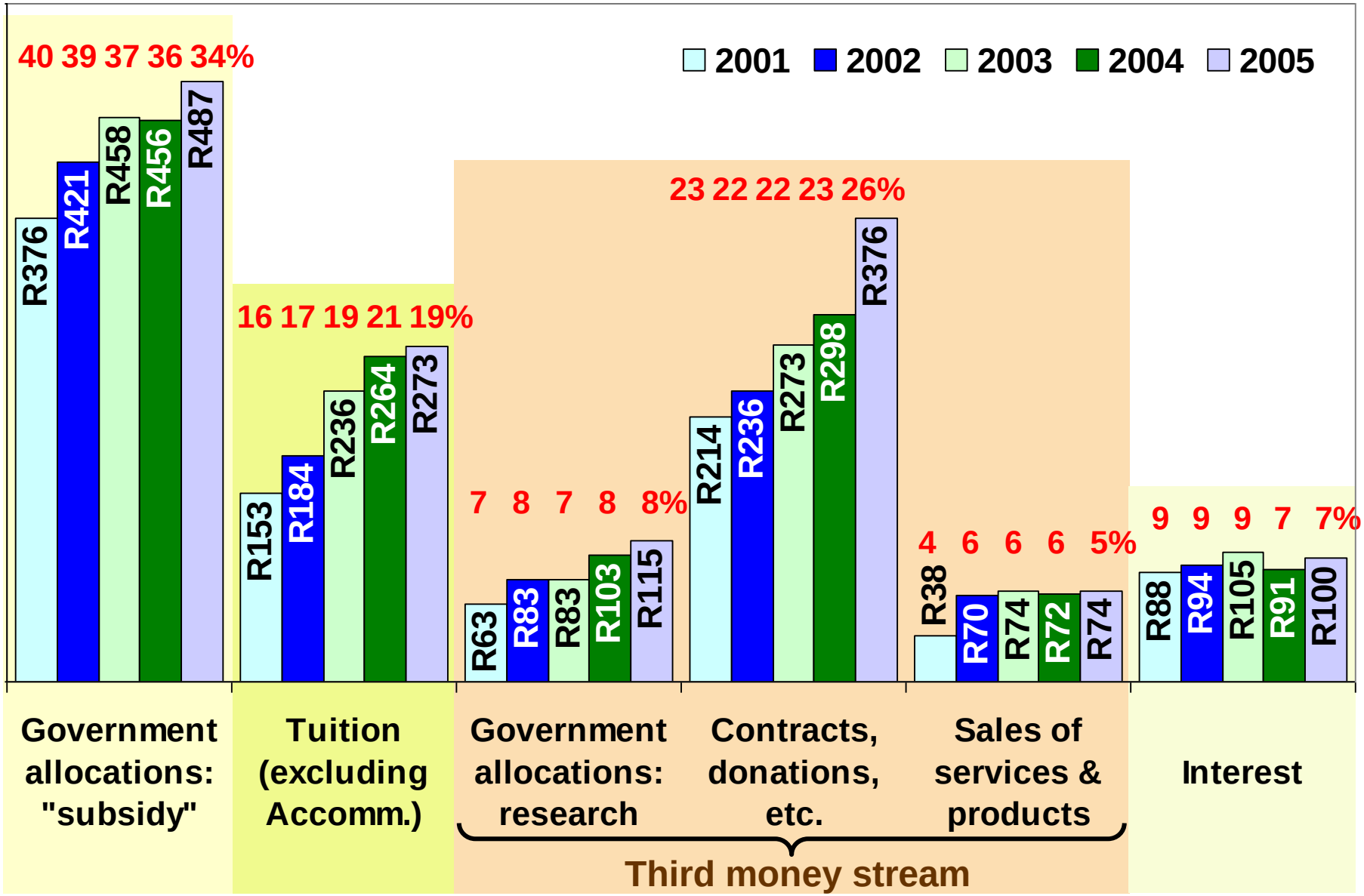


† based on student numbers and research publications

(in millions)

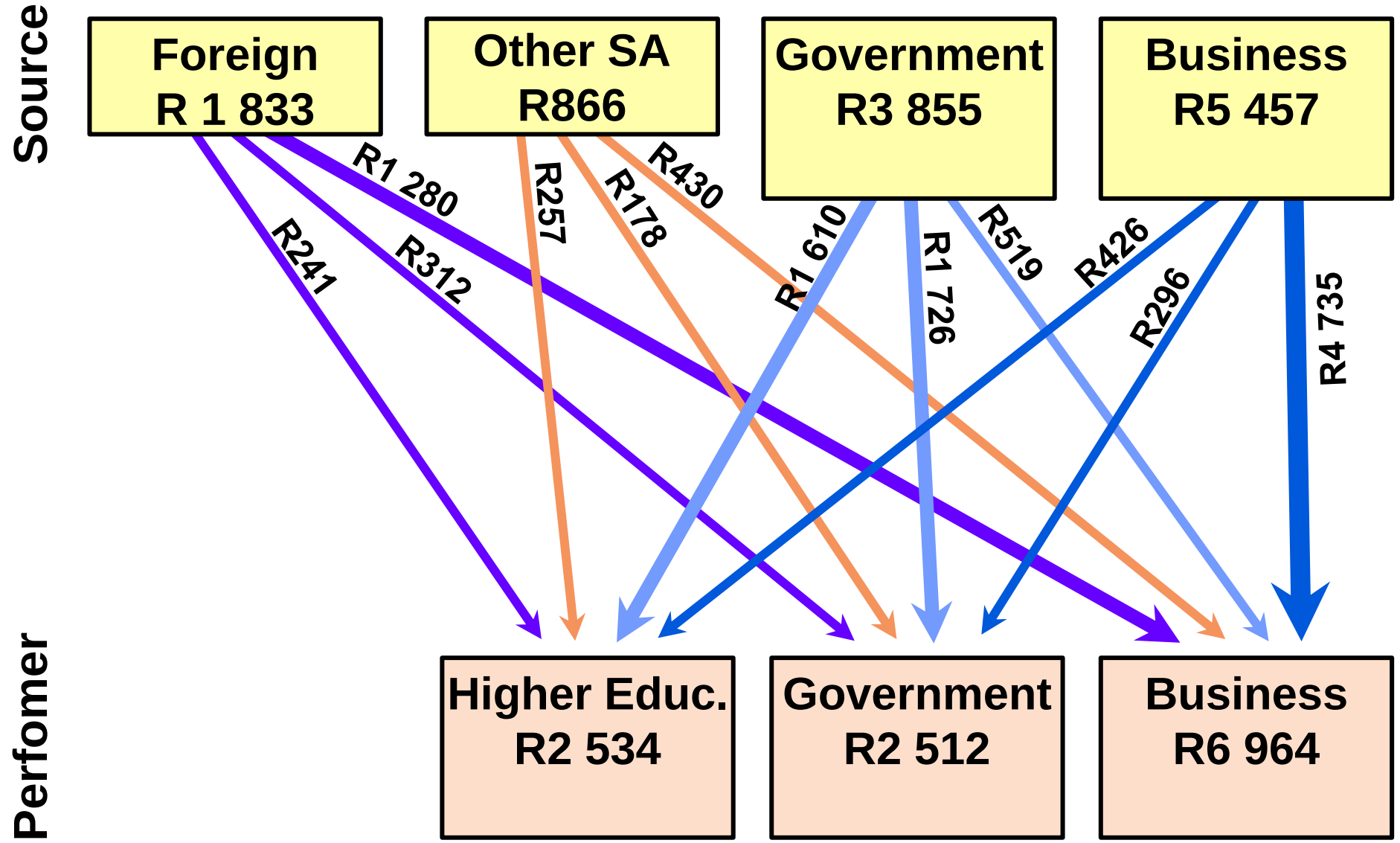
Timeline of Income per Category (2001 – 2005) (Excl. Non-recurrent items and Accommodation)

(three elements of 3MS indicated *separately*) (in millions)



Major Flows of Funding for R&D

(2004/2005, in millions)



Important new initiatives

(As background: National R&D Strategy; Now also:-)

1. Accelerated and Shared Growth Initiative for South Africa (AsgiSA)
   - growth; employment; improvement of infrastructure; etc.
2. Joint Initiative for Priority Skills Acquisition (*JIPSA*)

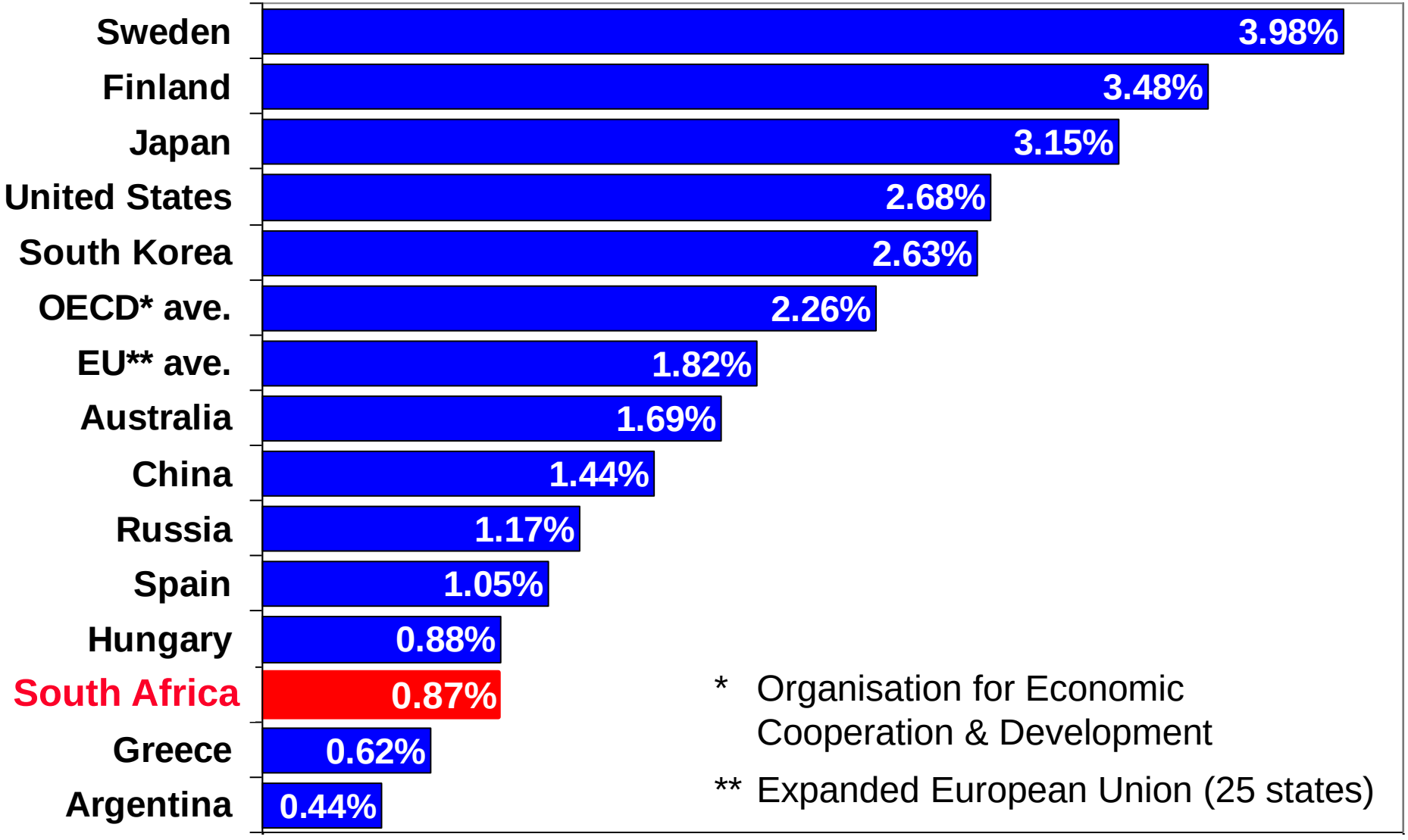
Expectations regarding:

a) Expertise in a number of priority areas

b) Human resources

c) International competitiveness

Gross Expenditure on R&D as % of GDP 2004 (International Comparisons)



R&D Expenditure …: Overview

1. Steady increase in national expenditure on R&D:
   - in 2003/04: 0,81% of GDP
   - for 2004/05: 0,87% of GDP
   - for 2008/09: target of 1%
2. Decrease in percentage of state expenditure on R&D:
   - contribution of private sector presently more than 50%
   - contribution of foreign funding to R&D: from very small (1994) to >10% in 2003/04
3. DST (Department of Science and Technology) brings strong interventions and investments:
   - for the so-called “technology missions”
   - infrastructure / equipment
   - new programmes in targeted areas
   - programmes aimed at alleviation of poverty
4. High expectations nationally regarding the “delivery” of larger numbers of *students in SET* (Science, Engineering and Technology)

Other initiatives

- Research Chairs (SARCHI) (NRF, with DST)
  - "210 by 2010"; ca. 20 in 2006
  - Exceptional support for a "mini centre of excellence" (about R2,3m per year per research chair, for 2 periods of 5 years, for research groups and running costs)
  - Strong competition
- Institutional Research Development Programme (IRDP) in research niche areas (RNA's)
  - Extension of programme formerly only available to historically disadvantaged institutions
  - ca. 80 RNA's

Aspects of the national research scene (2006)

1. Much more complex than five or ten years ago:
   a) more institutions to keep account of (e.g. DST and/or NRF together with other state departments, e.g. DME [SANERI])
   b) separate agendas of DST and NRF
      - NRF *bottom up* (programmes that one applies for; limited funding available)
      - DST programmes *top down* (looking for quick results; much more funding available)
   c) Human capacity problems at some state institutions (high "turnover" of staff) having a serious effect on institutions
2. National strategies are being drawn up for specific technologies (e.g. nanotechnology) and funding being made available…but the funding is far too limited to establish these specializations
3. New sources are becoming available / accessible.

Aspects of the national research scene (2006) (contd.)

4. Partnerships are on the *increase* (and are becoming *more complex*) (universities and industry; universities in other countries; universities and science bodies in other countries)
5. The expectations are complex and sometimes unrealistic, for example:
   a) exceptionally high increase in doctoral degrees
   b) immediate / fast results
   c) good results but with little funding
6. Increased demands made on offices for research support at universities (lots of individual programmes; very complex legal requirements and contracts; IP matters; complex auditing requirements)

Thank you

Transformation of higher education in South Africa

Two major documents determine and guide the transformation of higher education in South Africa, the second making strong demands especially on research-intensive institutions:

- National Plan for Higher Education (2001) (Dept. of Education)
- South Africa's National Research and Development Strategy (2002) (Dept. of Science and Technology)

National Plan for HE

Five key policy goals and strategtic objectives:

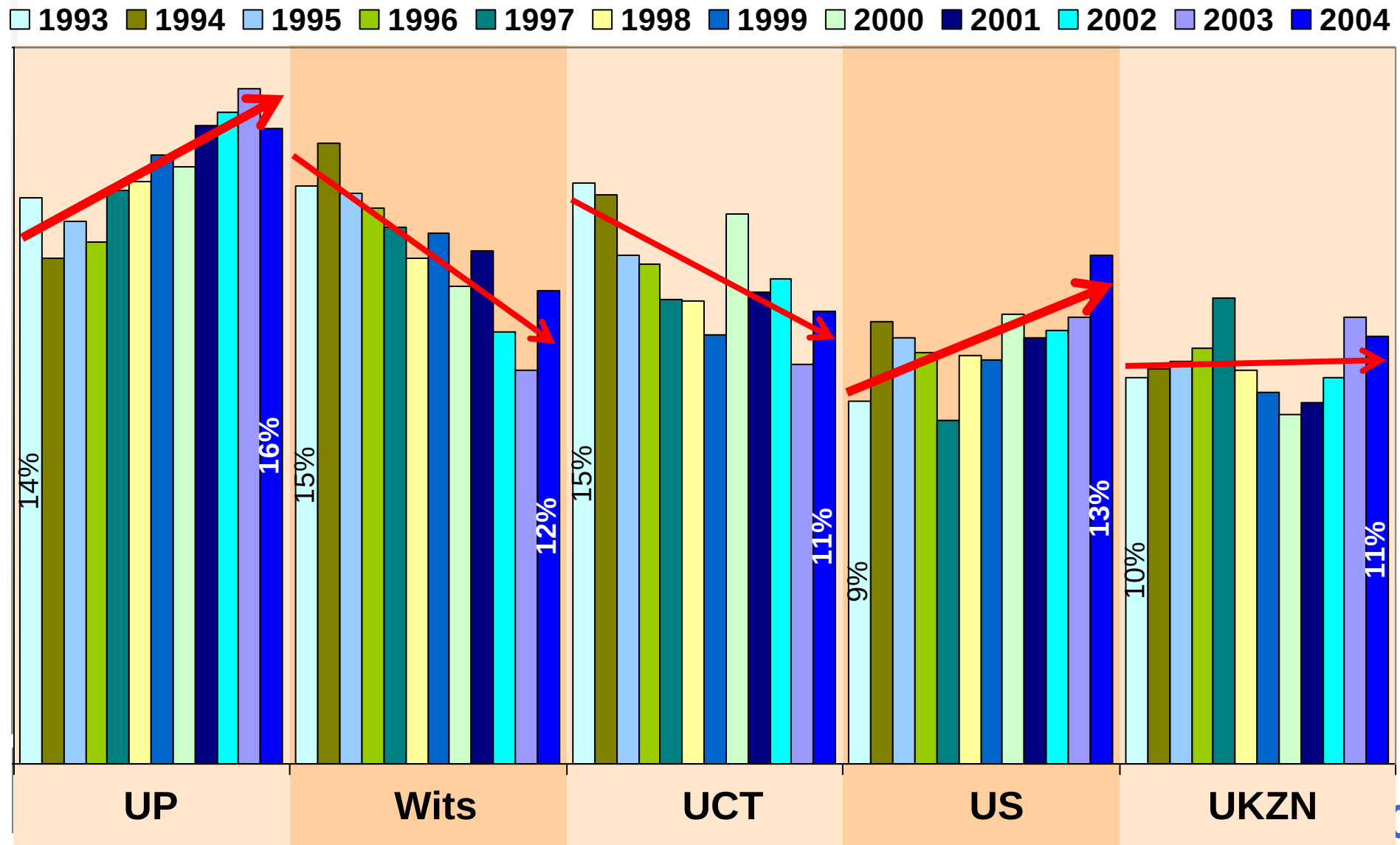
- To provide increased access to HE to all, irrespective of race, gender, etc. ... and to produce graduates with skills and competencies needed
- To promote equity of access and to redress past inequalities... staff and student profiles to reflect demographic realities of SA society
- To ensure diversity in the organisational form and institutional landscape of HE through mission and programme differentiation
- To build high-level research capacity to address the research and knowledge need of SA
- To build new institutional and organisational forms and new institutional identities through regional collaboration.

National Res. & Dev. Strategy

Three operational objectives:

- Innovation (Achieving mastery of technological change in our economy and society)
  - a.o. innovation activities linked to universities
- Human capital and transformation in science, engineering and technology (Increasing investment in SA's science base)
  - a.o. the need to focus on centres and networks of excellence (also at universities)
- Alignment and delivery (Creating an effective government science and technology system)

Contribution of Top Universities to the National Total of Research Publications



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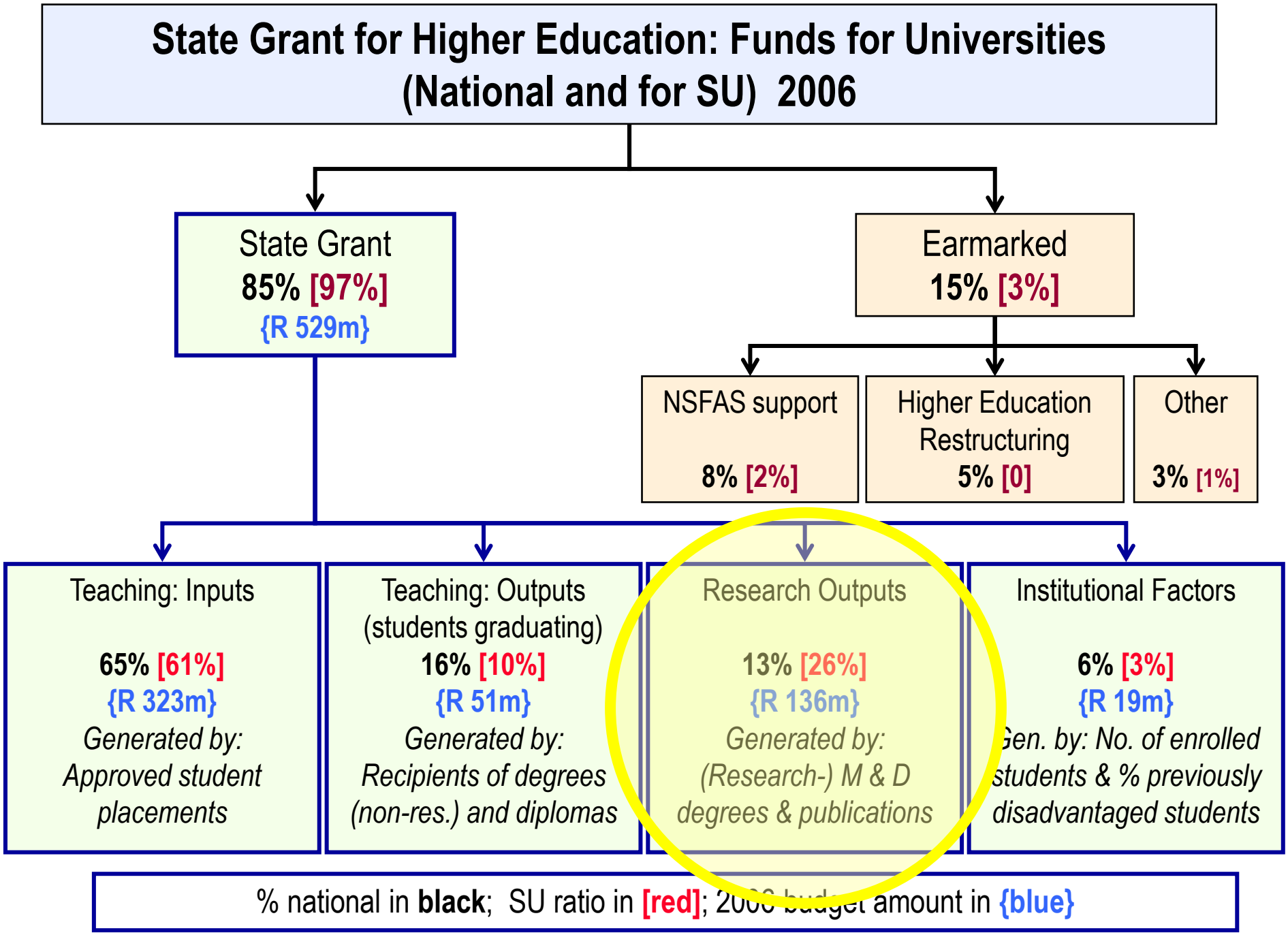
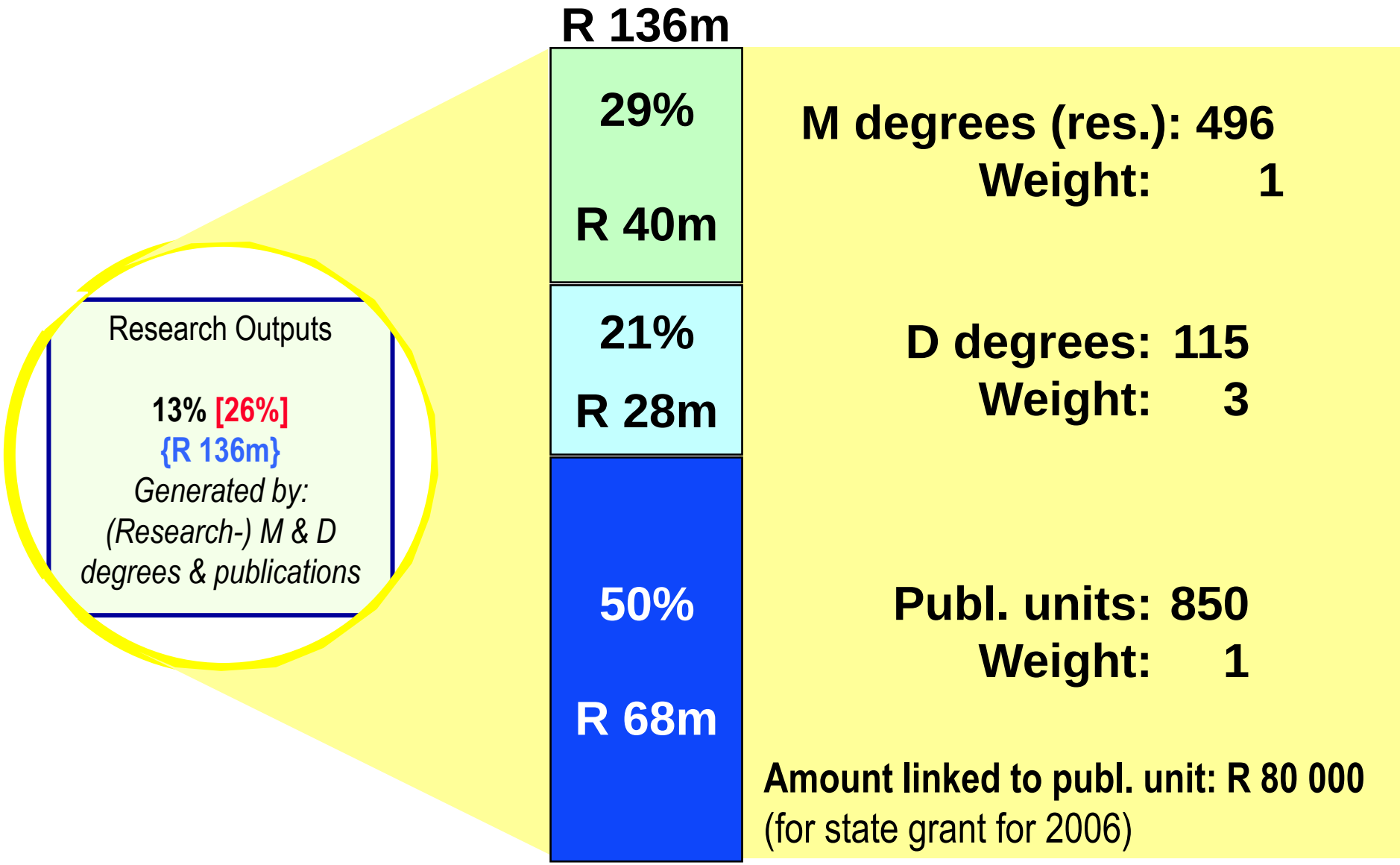
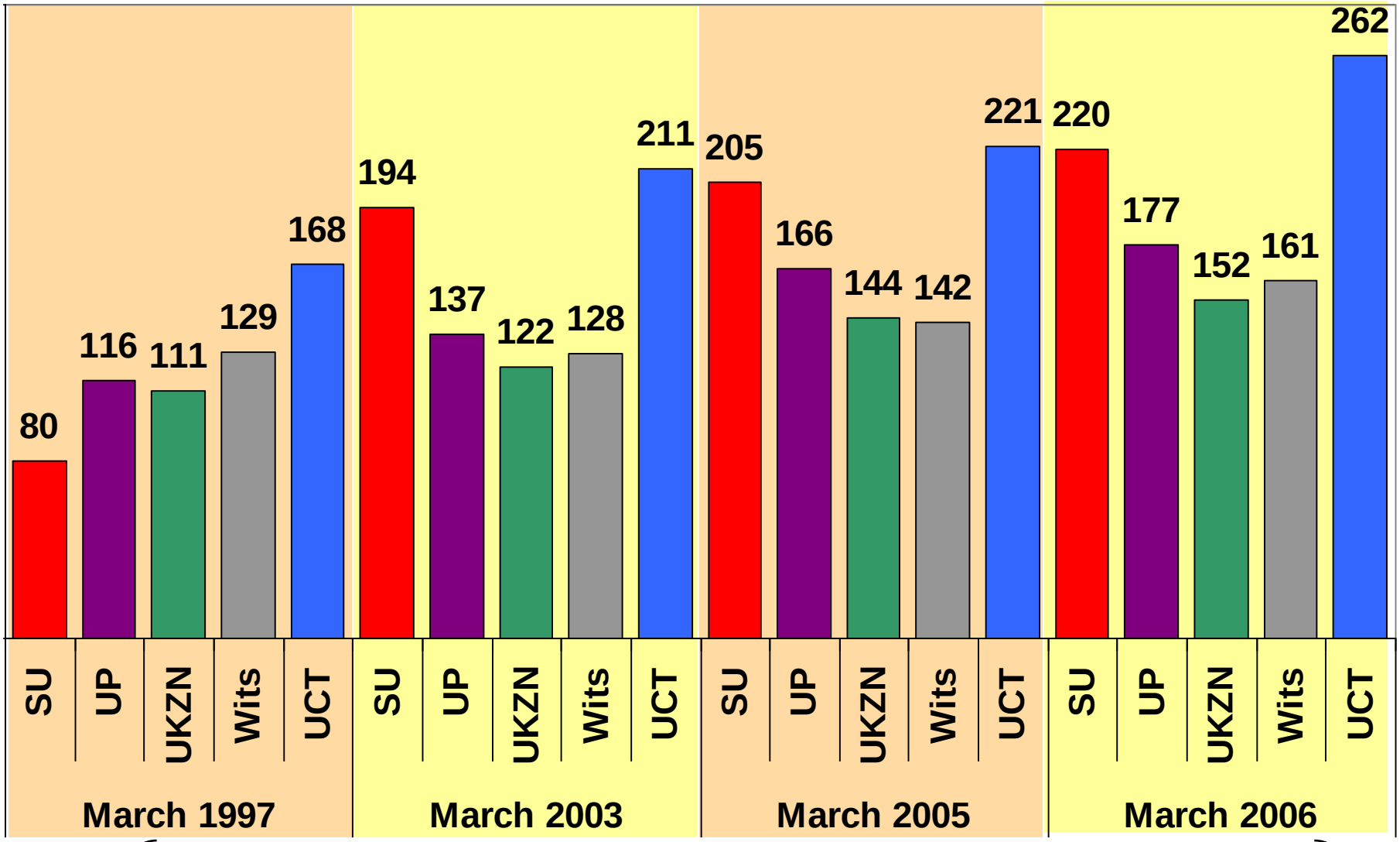


State Grant (2006)
Component: Weighted Research Outputs: Composition



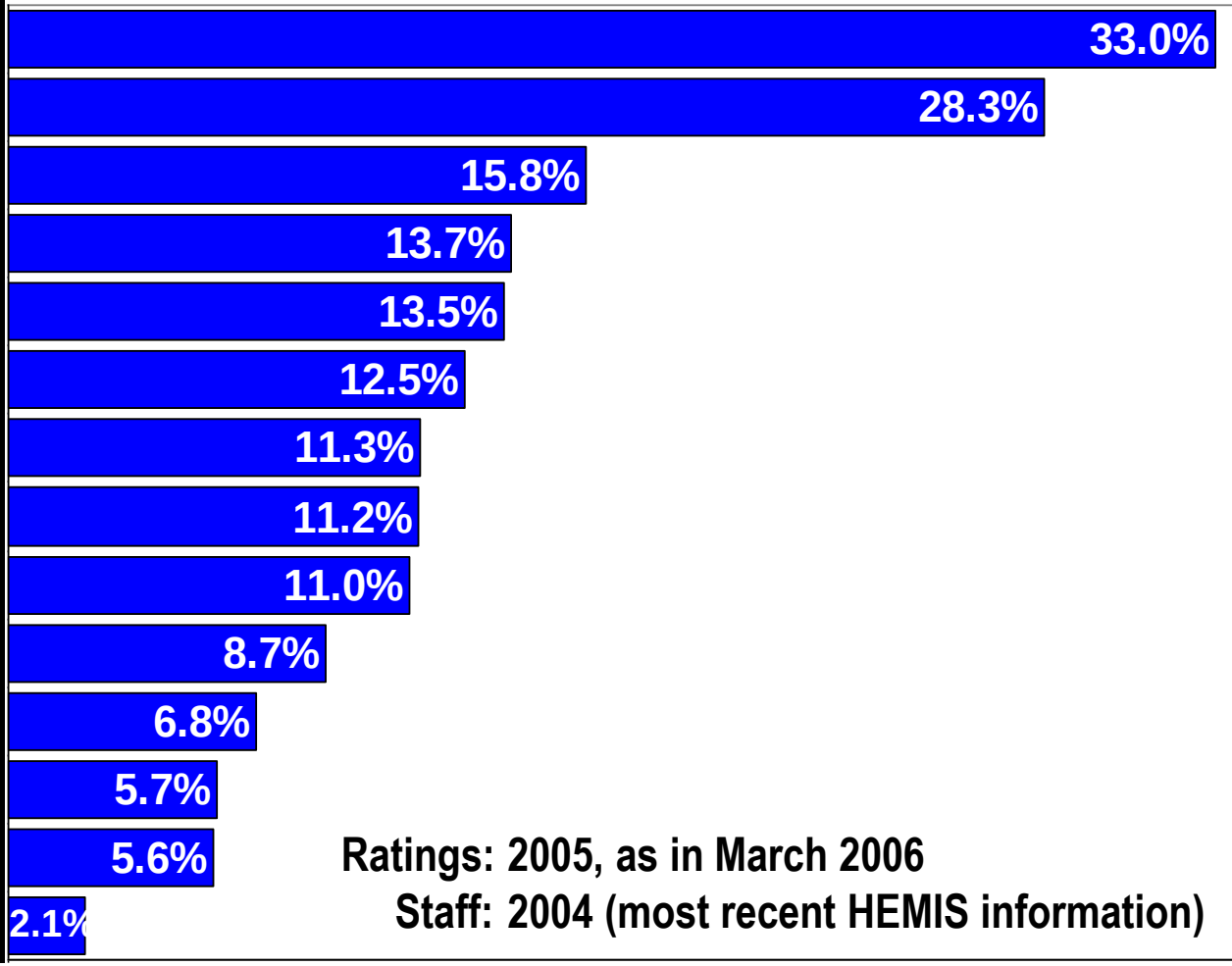
Rated Researchers (NRF)
Top 5 institutions (1997-2006)



Official numbers middle March: indicates the number of rated researchers *in the previous year*; fluctuations due to retirements and transfers between institutions

Rated Researchers as % of Instruction/Research Staff (2005/6)

Univ.	Rated Res.	Instr. / Res. Staff
UCT	262	795
SU	220	778
Rhodes	47	298
Wits	161	1 175
UWC	65	480
UFS	72	577
UP	177	1 573
NWU	85	758
UKZN	152	1 386
NMMU	50	576
UJ	64	943
UniZul	12	210
UNISA	75	1 335
UFH	5	239



Ratings: 2005, as in March 2006

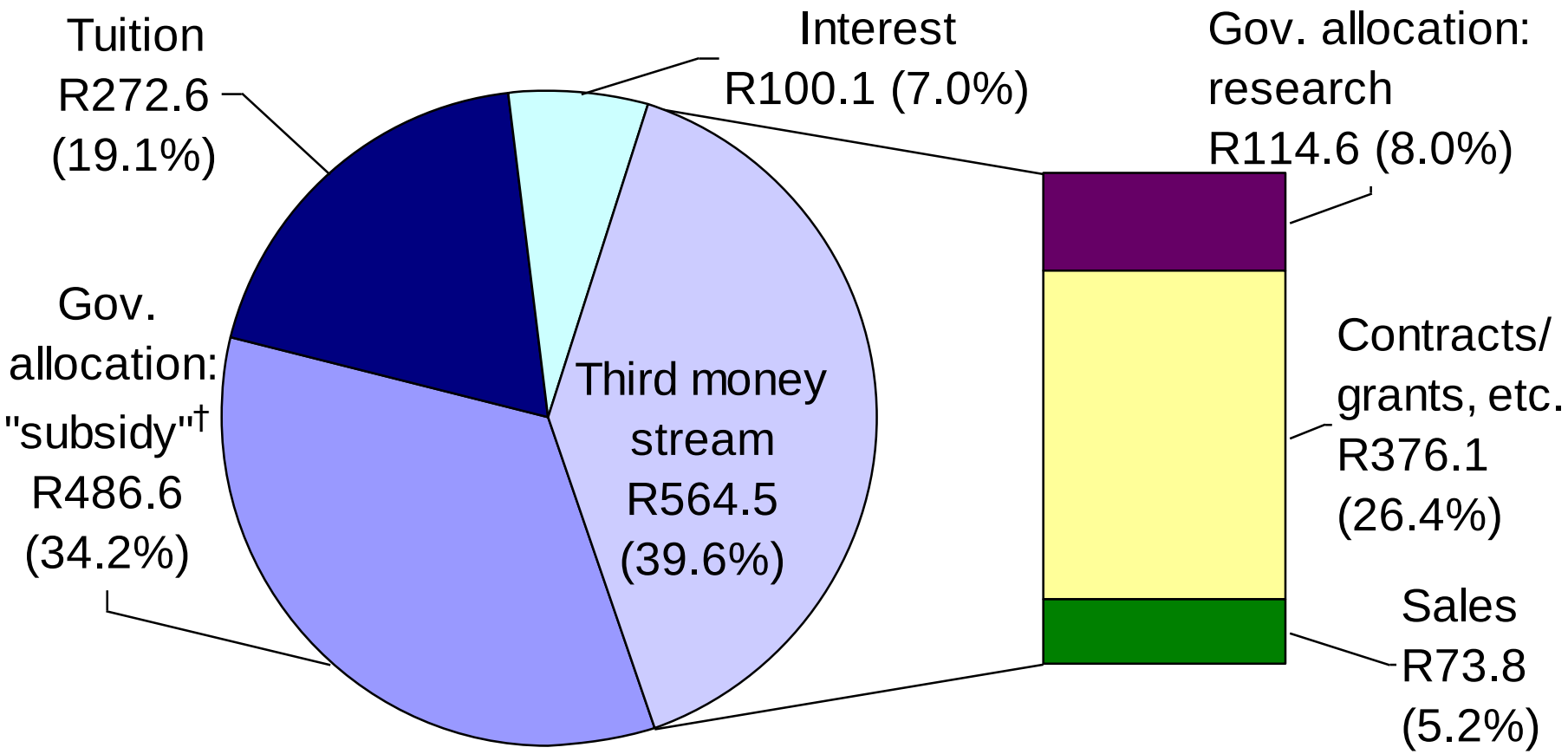
Staff: 2004 (most recent HEMIS information)

DST/NRF Centres of Excellence

- CoE for **Invasion Biology** (CIB) [**SU**]
- CoE for **Epidemiological modelling and analysis** (SACEMA) [**SU**]
- CoE for **Biomedical TB-research** [**SU** & **Wits**]
- CoE for **Strong Materials** [**Wits**]
- CoE in **Birds** as Keys to understanding and maintaining Biodiversity [UCT]
- CoE for Chemical Processing: **Catalytic Science** Engineering and Technology Development [UCT]
- CoE in **Tree Health Biotechnology** at FABI [UP]

Total 2005 Income of SU

(Excluding non-recurrent items and accommodation)
(total income amount of R1 424 million)

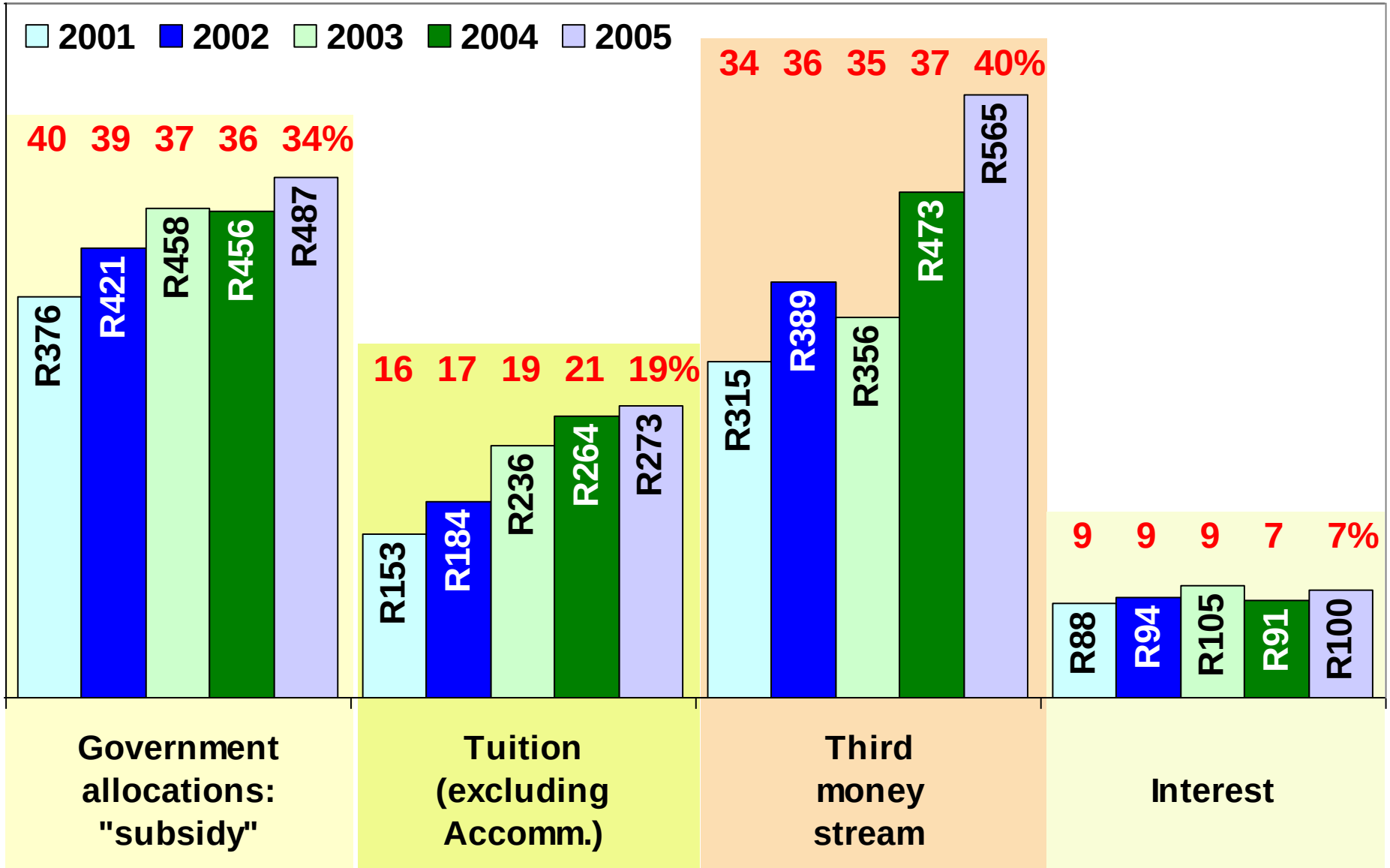


† based on student numbers and research publications

(in millions)

Timeline of Income per Category (2001 – 2005) (Excl. Non-recurrent items and Accommodation)

("third money stream" indicated *as a whole*) (in millions)



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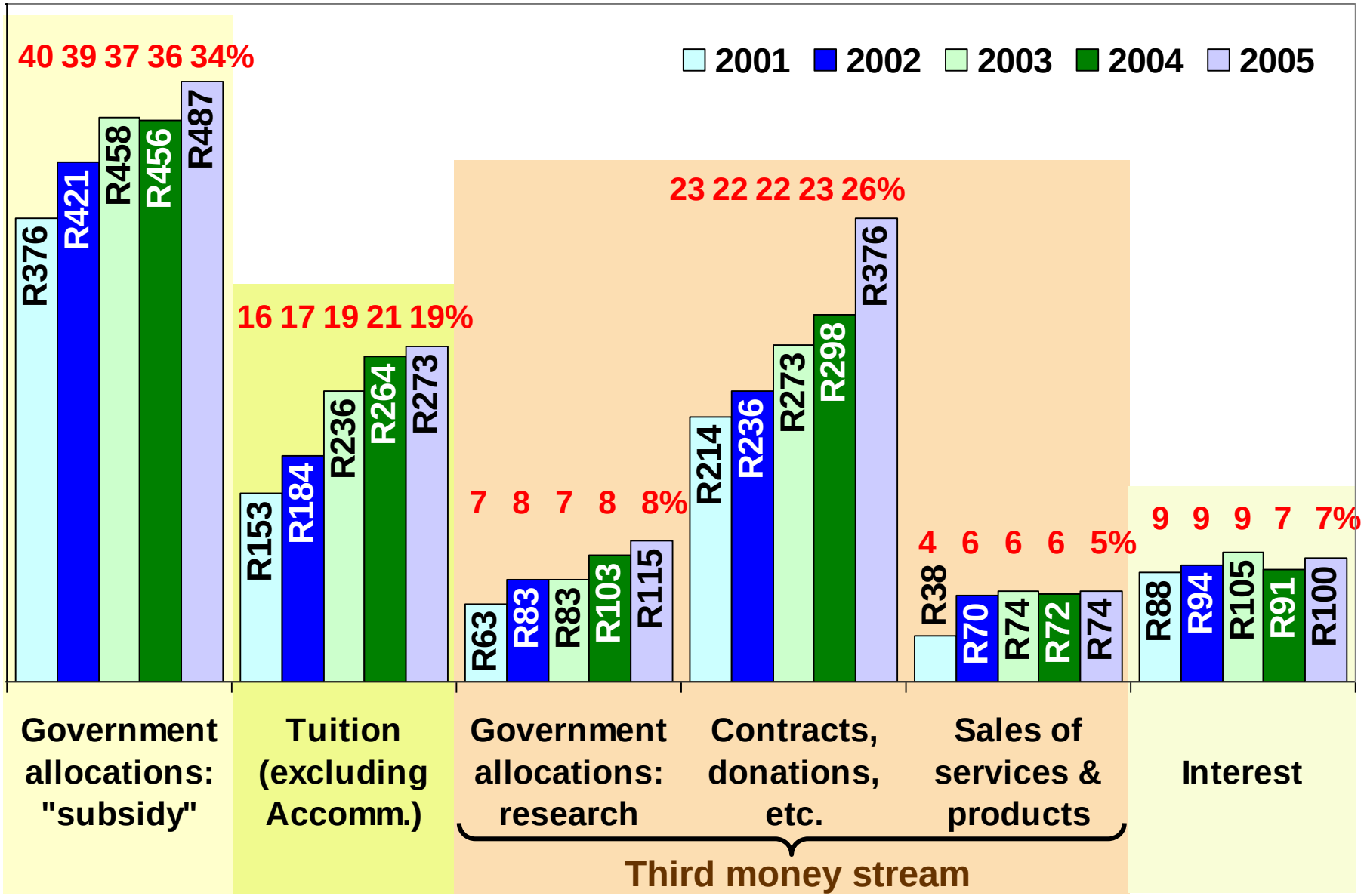
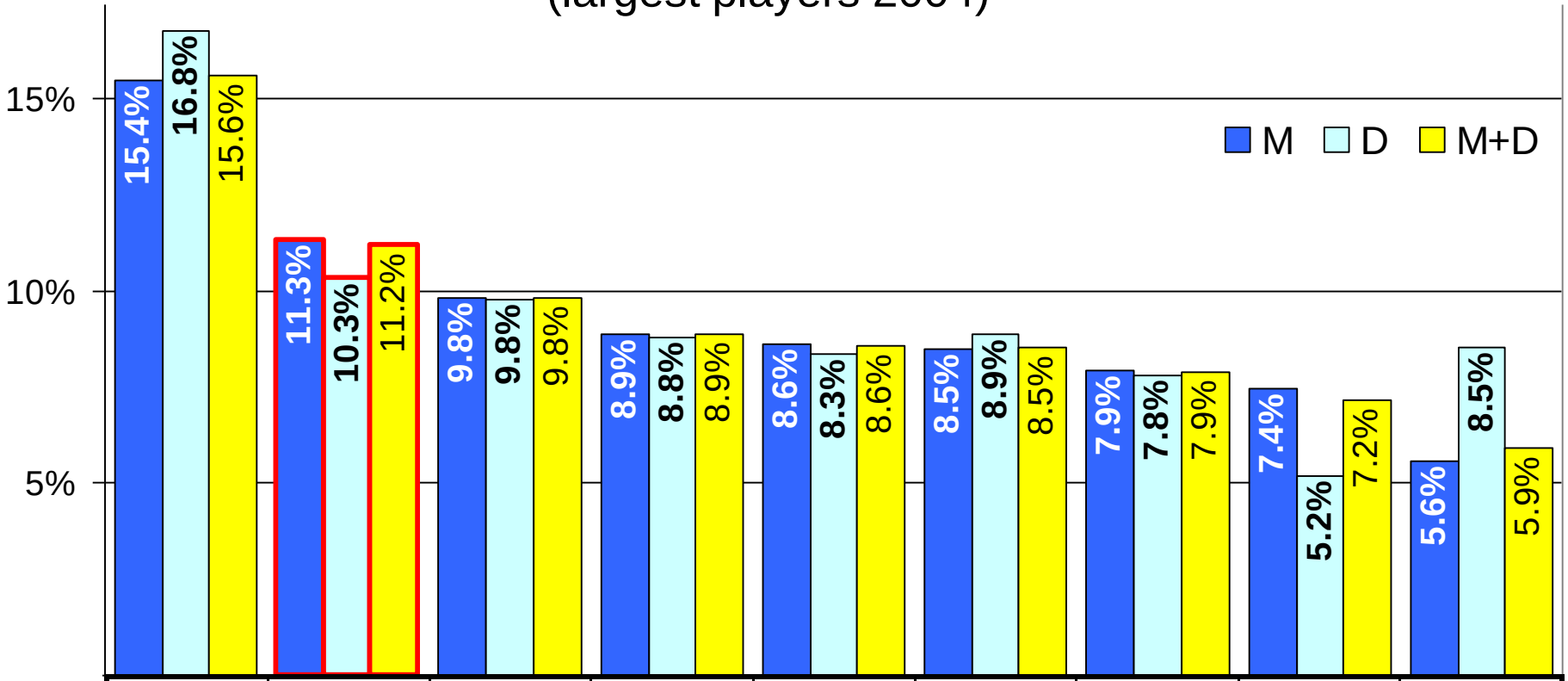
(three elements of 3MS indicated *separately*) (in millions)



Master's & Doctoral Degrees Awarded as % of SA Totals for these Degrees

(largest players 2004)



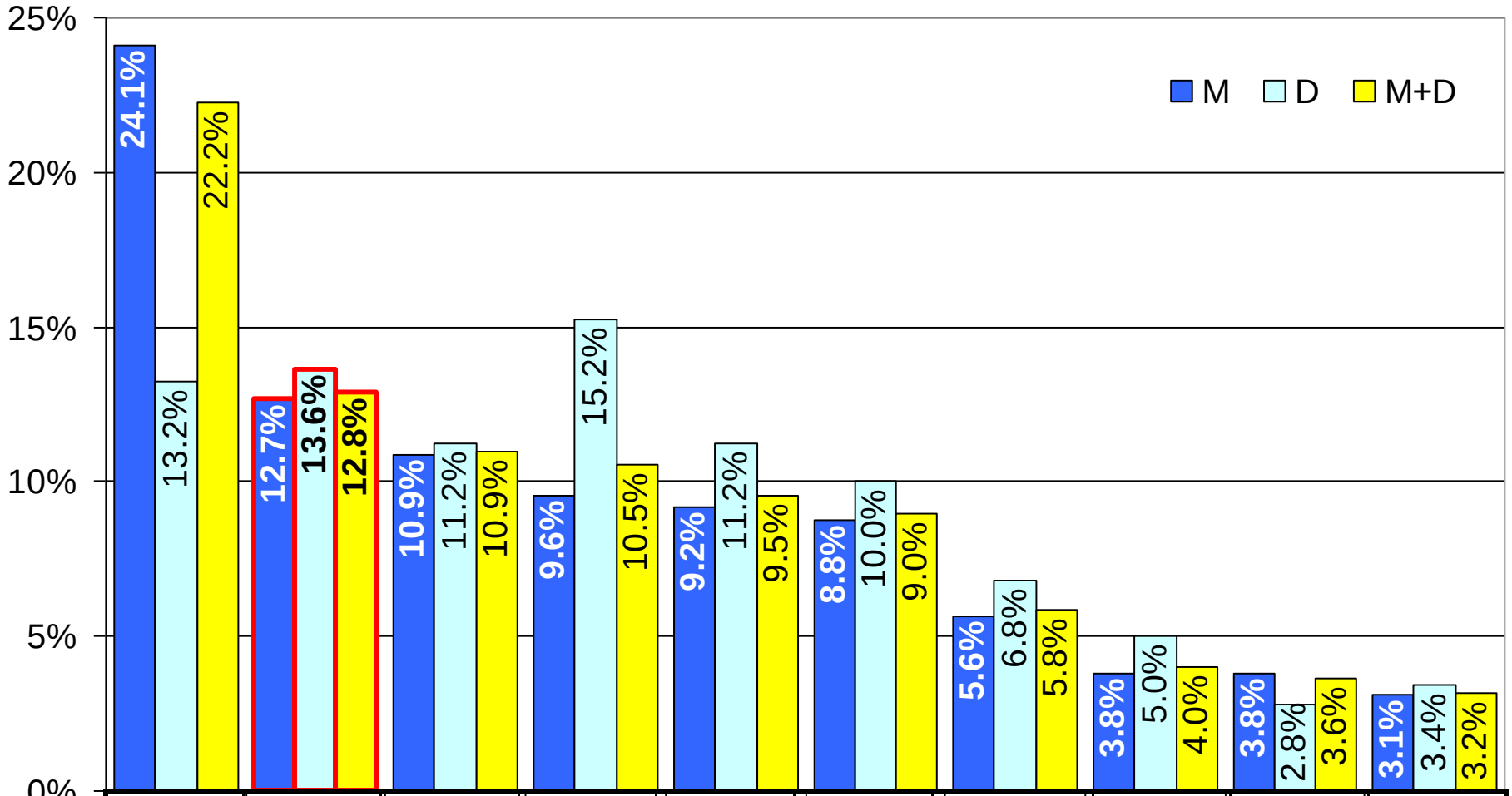
	UP	SU	UNISA	UKZN	Wits	UCT	NWU	UFS	RAU
D	187	115	109	98	93	99	87	58	95
M	1 223	894	778	702	683	671	626	589	441
M+D	1 410	1 009	887	800	776	770	713	647	536
Rest	9 261	4 264	14 011	7 554	3 897	4 424	8 944	4 416	6 566
Total	10 671	5 273	14 898	8 354	4 673	5 194	9 657	5 063	7 102

Take into account the relative size of institutions (enrolled students ["Enr."]):

Enr.'04	46 971	21 887	206 187	45 342	24 766	21 321	40 145	25 351	30 736

[*Source: HEMIS, 2004*]

M & D Degrees in SET* Awarded as % of SA Totals for these Degrees (largest players 2003)

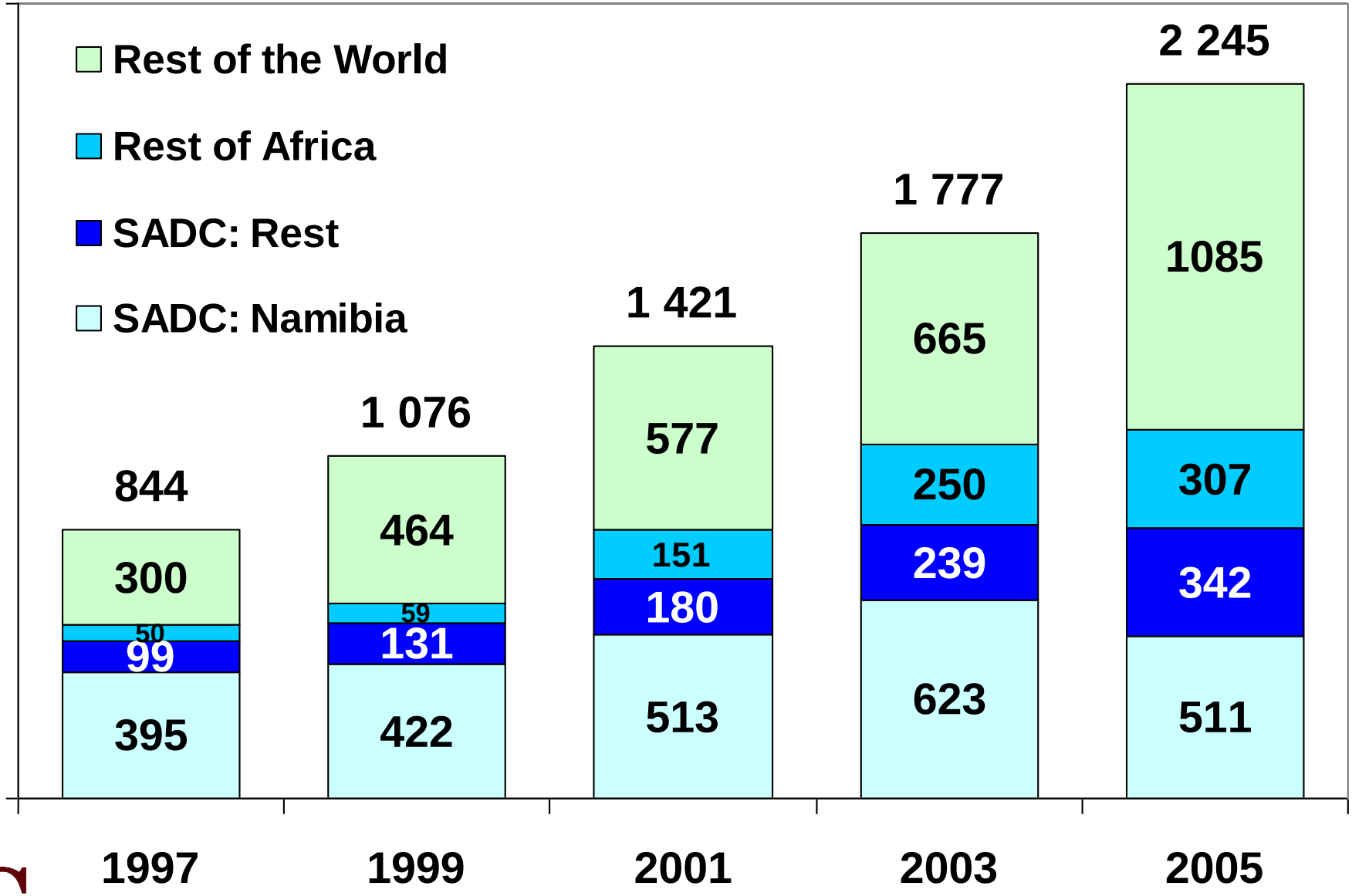


	UP	SU	Wits	UCT	Natal	UFS	PUCHE	RAU	UPE	UWC
D	66	68	56	76	56	50	34	25	14	17
M	578	304	261	229	220	210	135	91	91	75
M+D	644	372	317	305	276	260	169	116	105	92
Enr.'03	40 773	21 395	22 181	19 560	29 028	17 451	25 442	22 134	21 335	12 729

*Science, Engineering and Technology

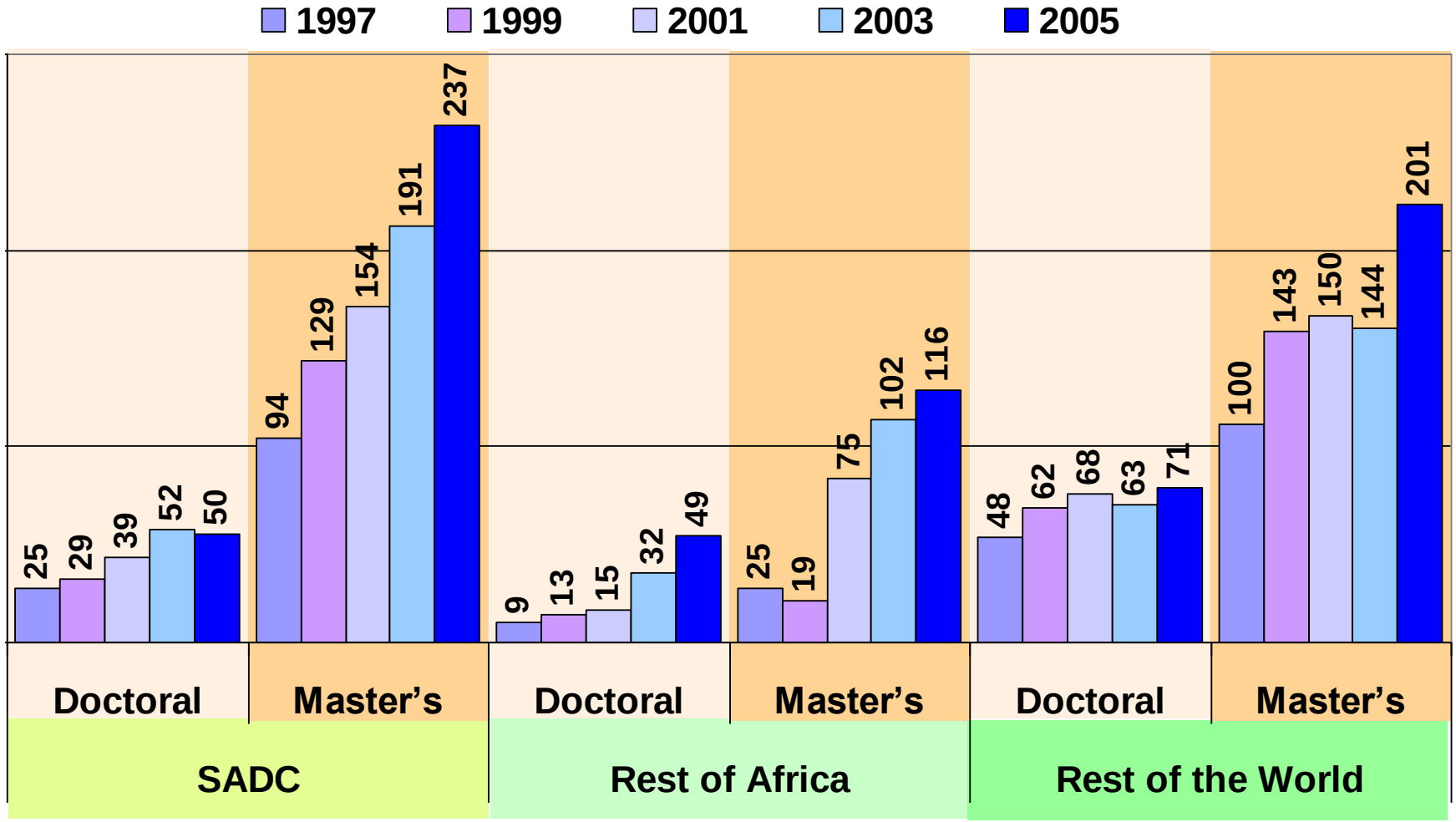
[*Source: HEMIS, 2004*]

International Students at Stellenbosch Univ.



[International students: 10.2% of residential students of SU in 2005]

SU: International Students: M & D Students Enrolled



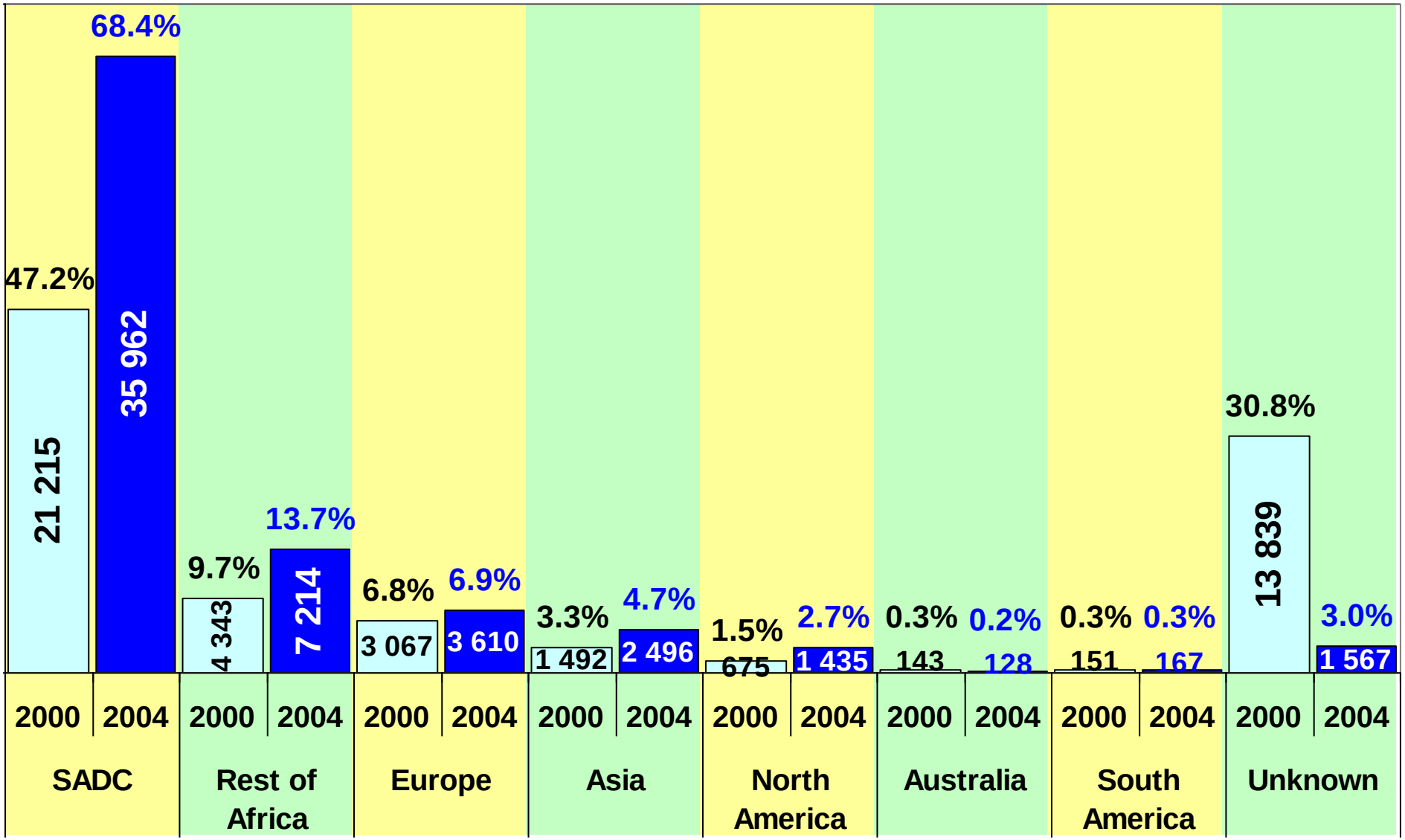
Transformation and quality assurance

Three instruments for maintaining / developing / promoting quality amidst the challenges of the market place, transformation, internationalisation, etc.:

a) programme accreditation and programme qualifications framework
b) funding formula (students in different categories: fields, levels of study, levels of success [throughput]; different limits of growth)
c) quality audits
(Higher Education Quality Committee [HEQC]; SU's audit in October 2005; report still outstanding)

SA: International Students by Region

(2000 & 2004)



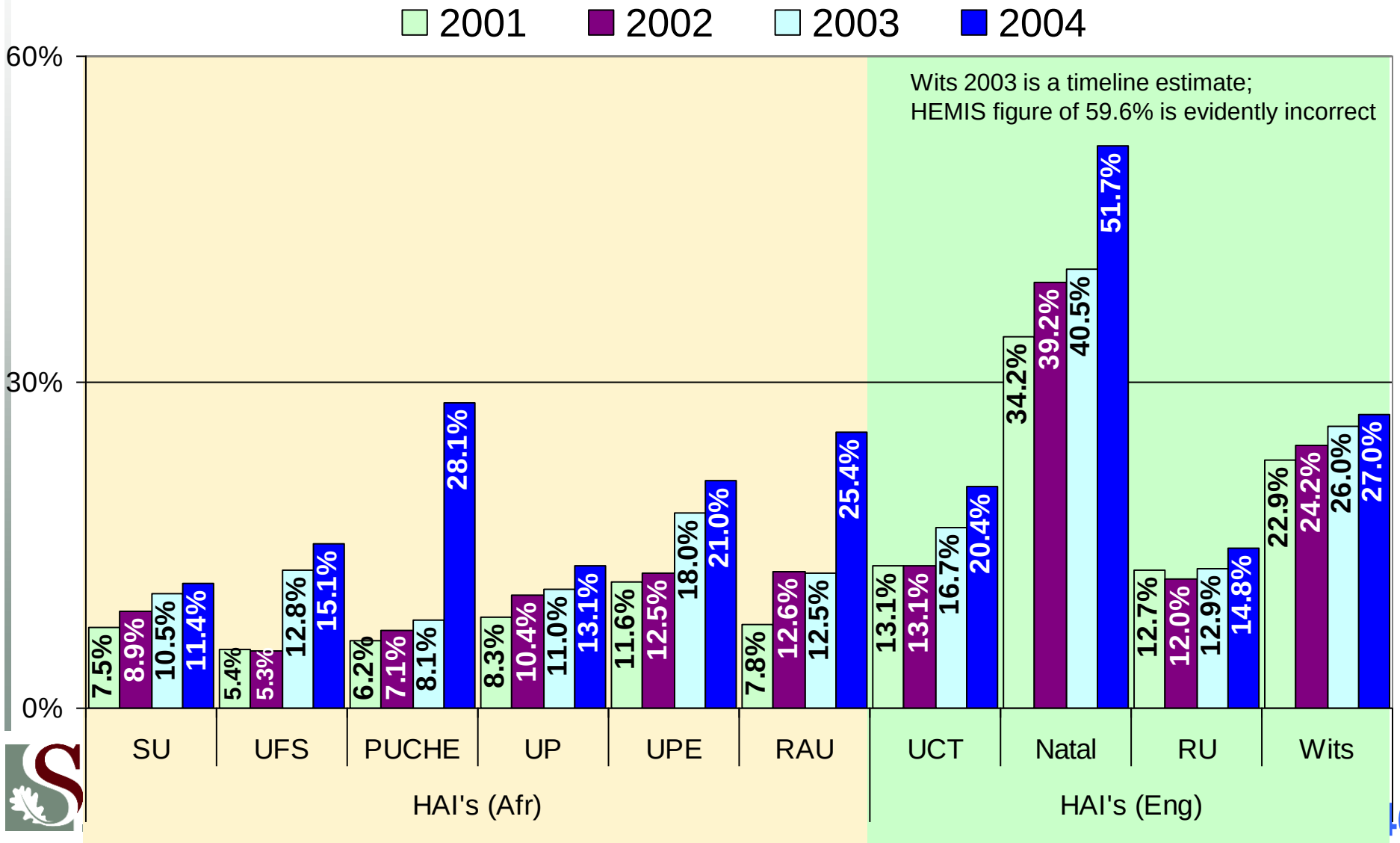
STIAS (Stellenbosch Institute for Advanced Study): Overview

1. Activities began in 2000
2. Main building and wine cellar renovated in 2001 and 2002
3. Award from the Wallenberg Foundation: R22m for research and seminar centre (RSC)
4. Plans finalized in June
5. Building (RSC) started: August 2006

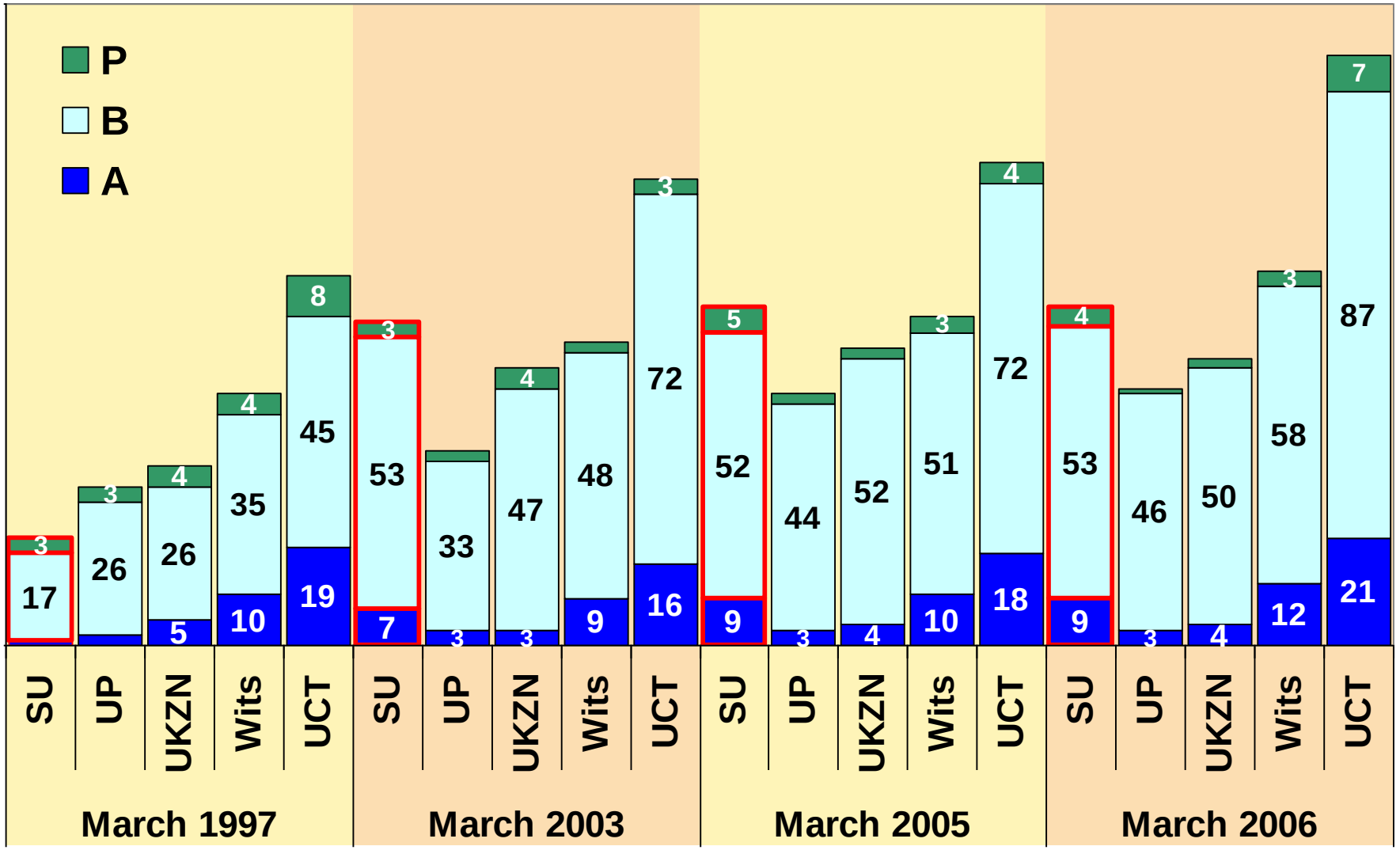
   Anticipated completion of building: October 2007

   Building costs: R32m
6. Further support is being sought for accom-modation units for fellows, and trust funds for programmes

% Black Staff (Instruction & Research) at HWU's over Time (2001-2004)

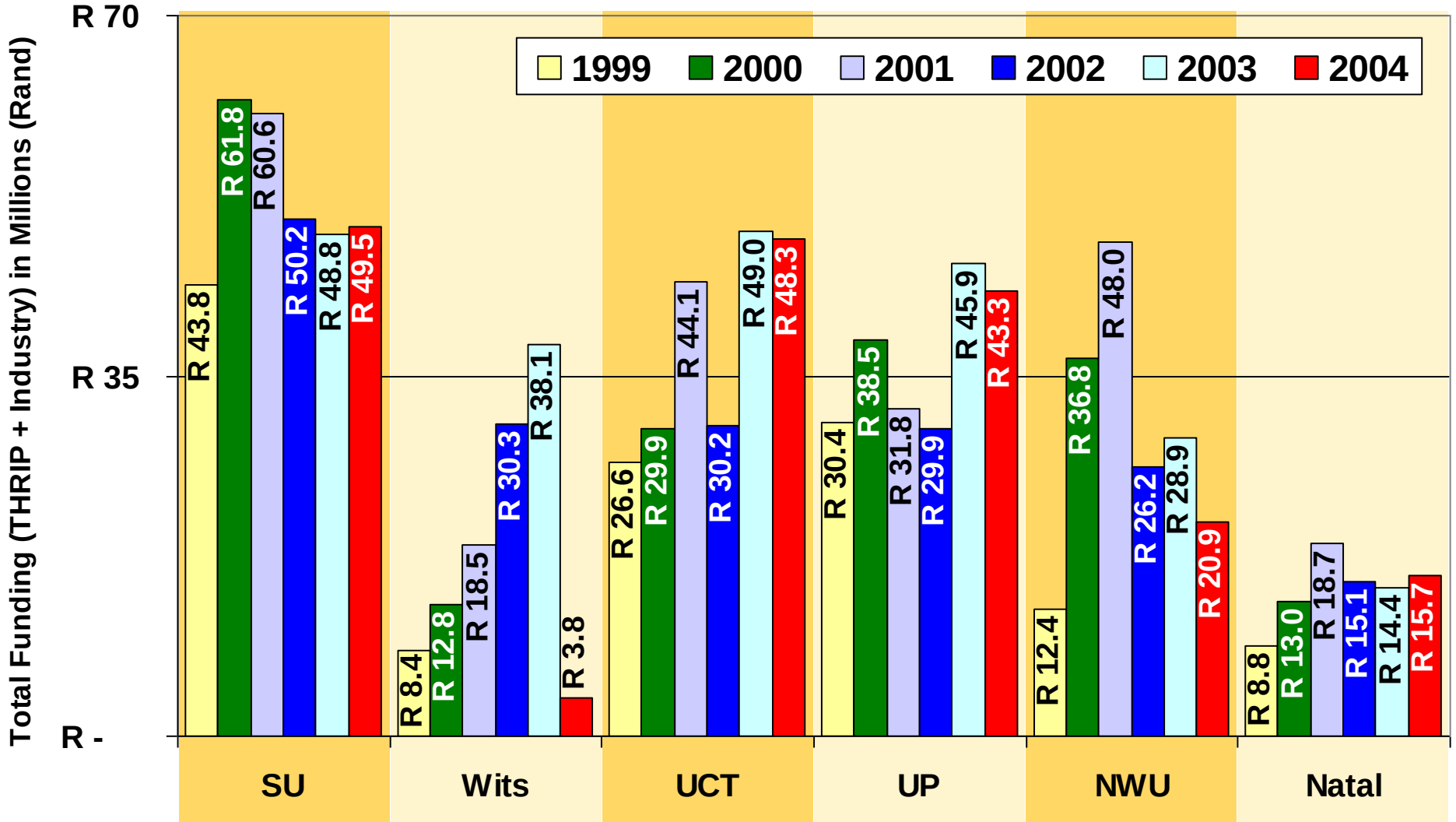


A-, B- & P- Rated Researchers (NRF)
Top 5 institutions (1997-2006)

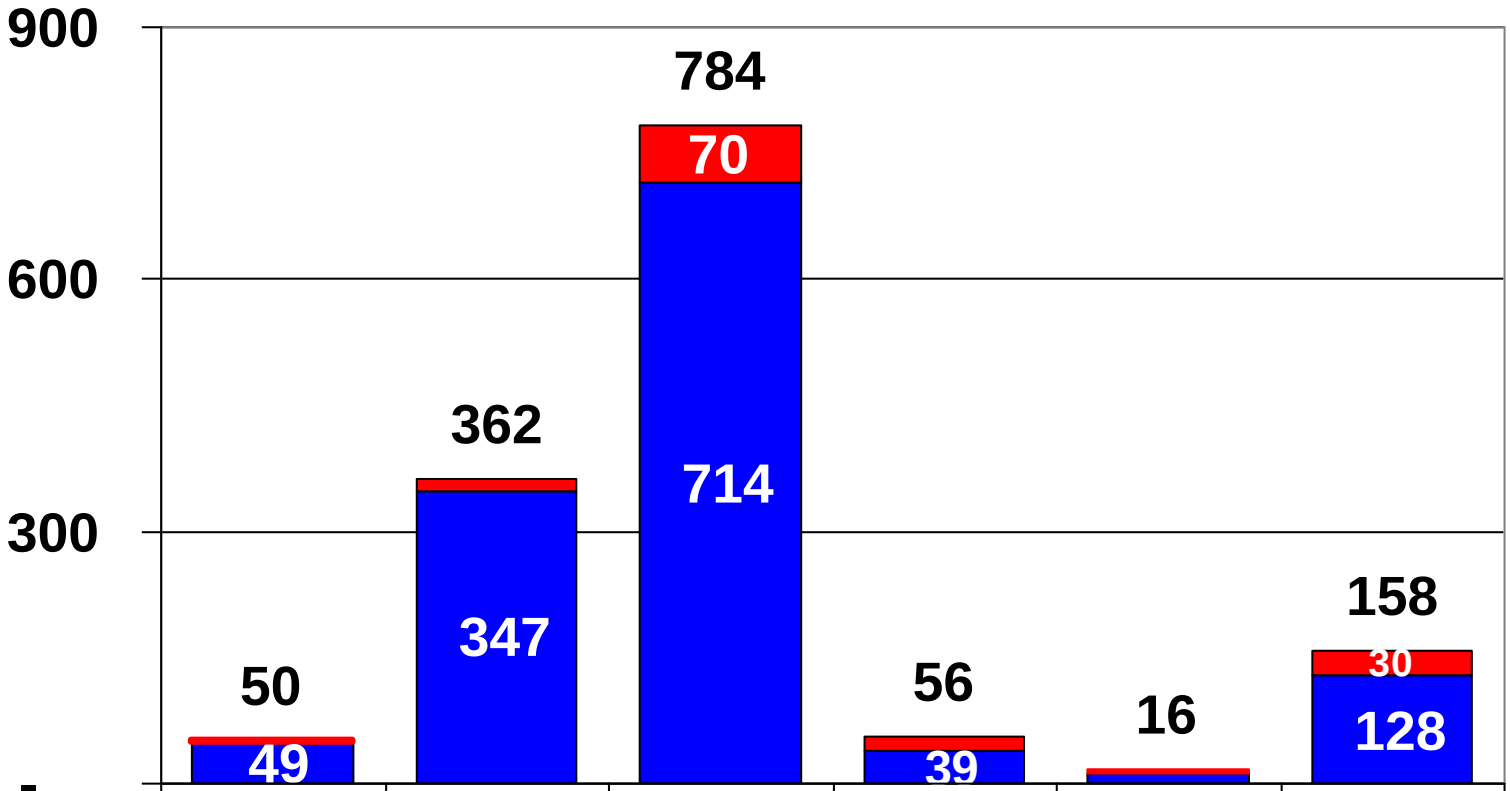


Official numbers middle March: indicates the number of rated researchers *in the previous year*; fluctuations due to retirements and transfers between institutions

Performance of Universities Regarding THRIP Funds (1999-2004)
Total Funds

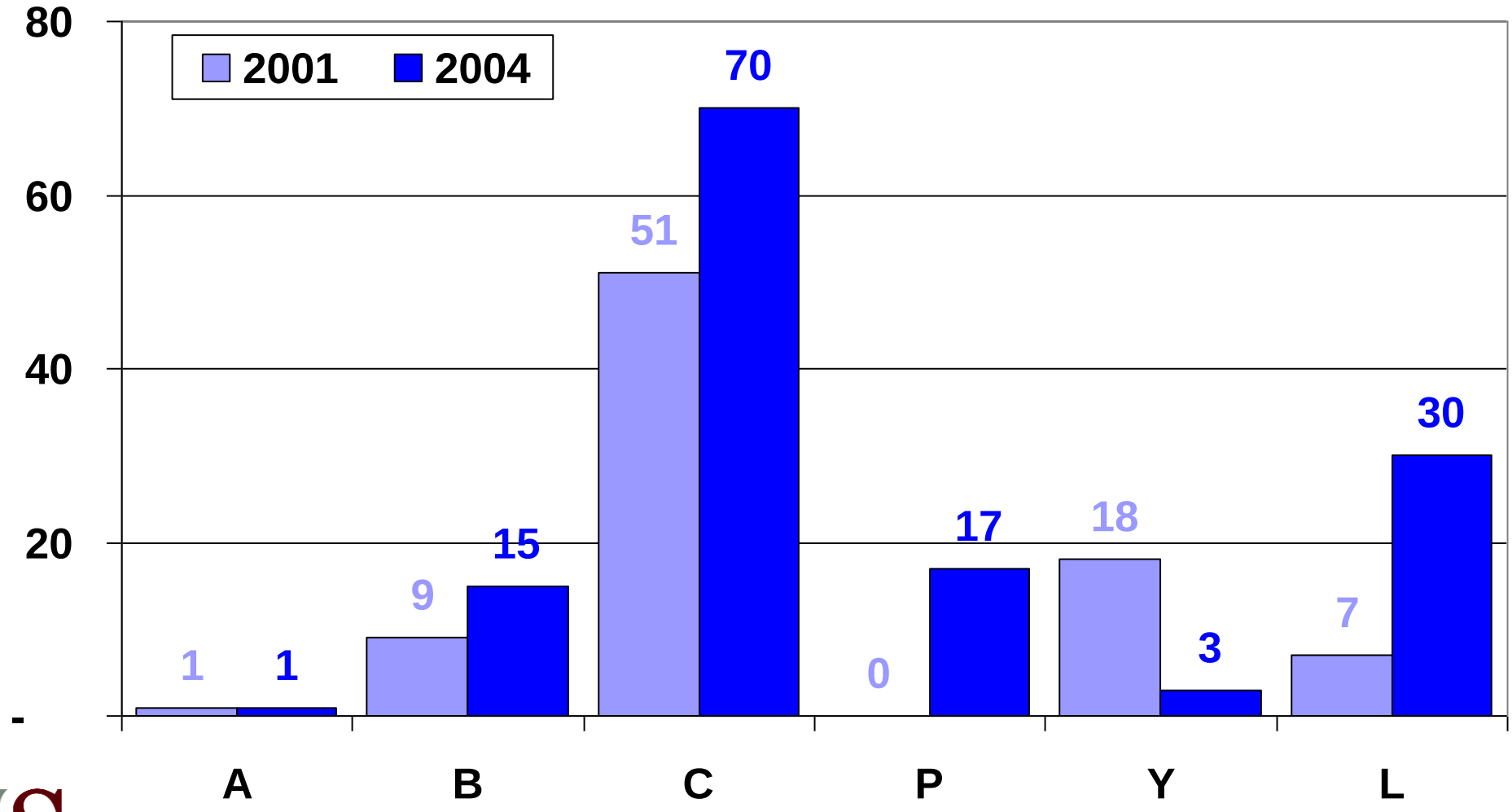


NRF Rated Researchers Black and Other (2004)

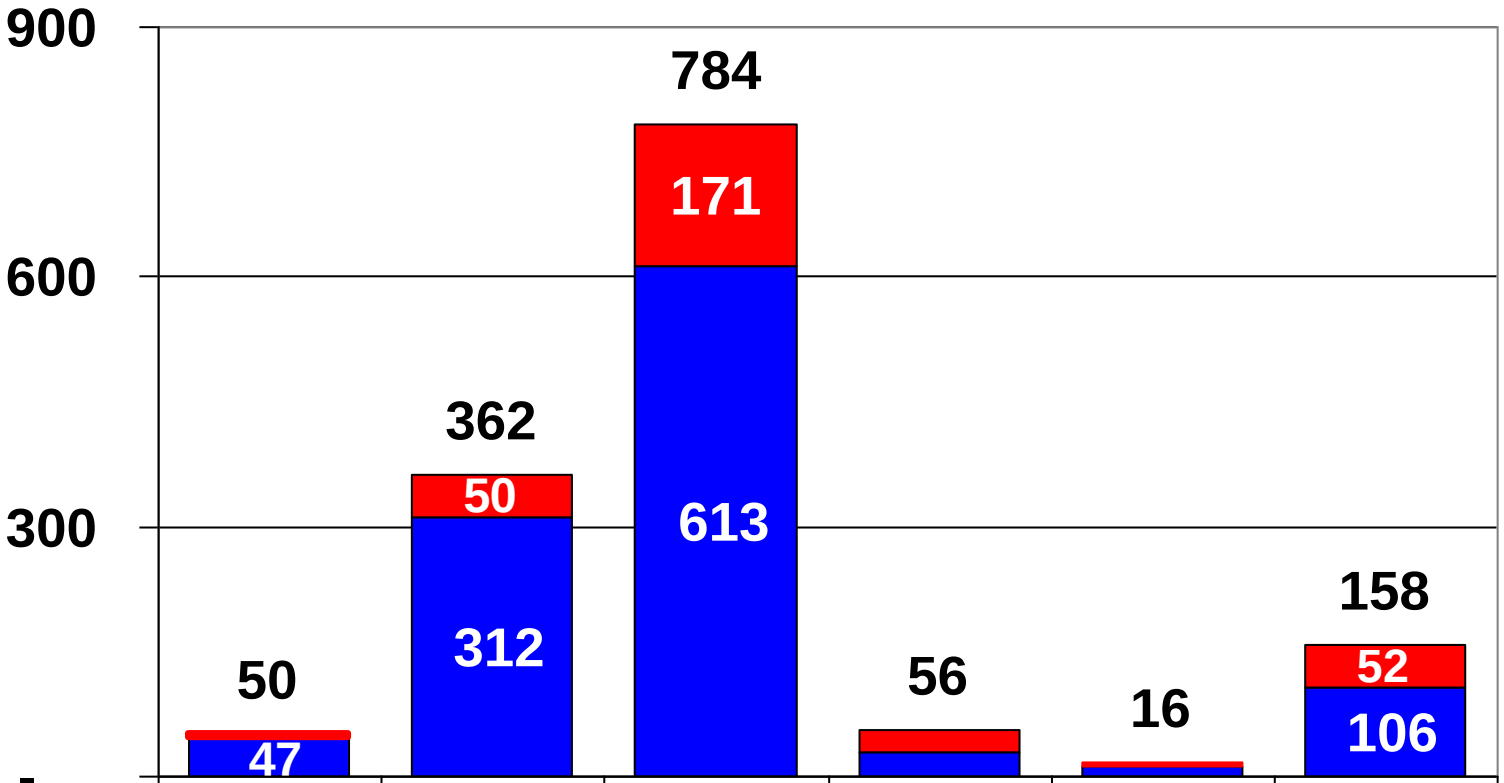


	A	B	C	P	Y	L
Total Rated	50	362	784	56	16	158
Black (incl.)	1	15	70	17	3	30
Other	49	347	714	39	13	128

NRF Rated Black Researchers (2001 & 2004)

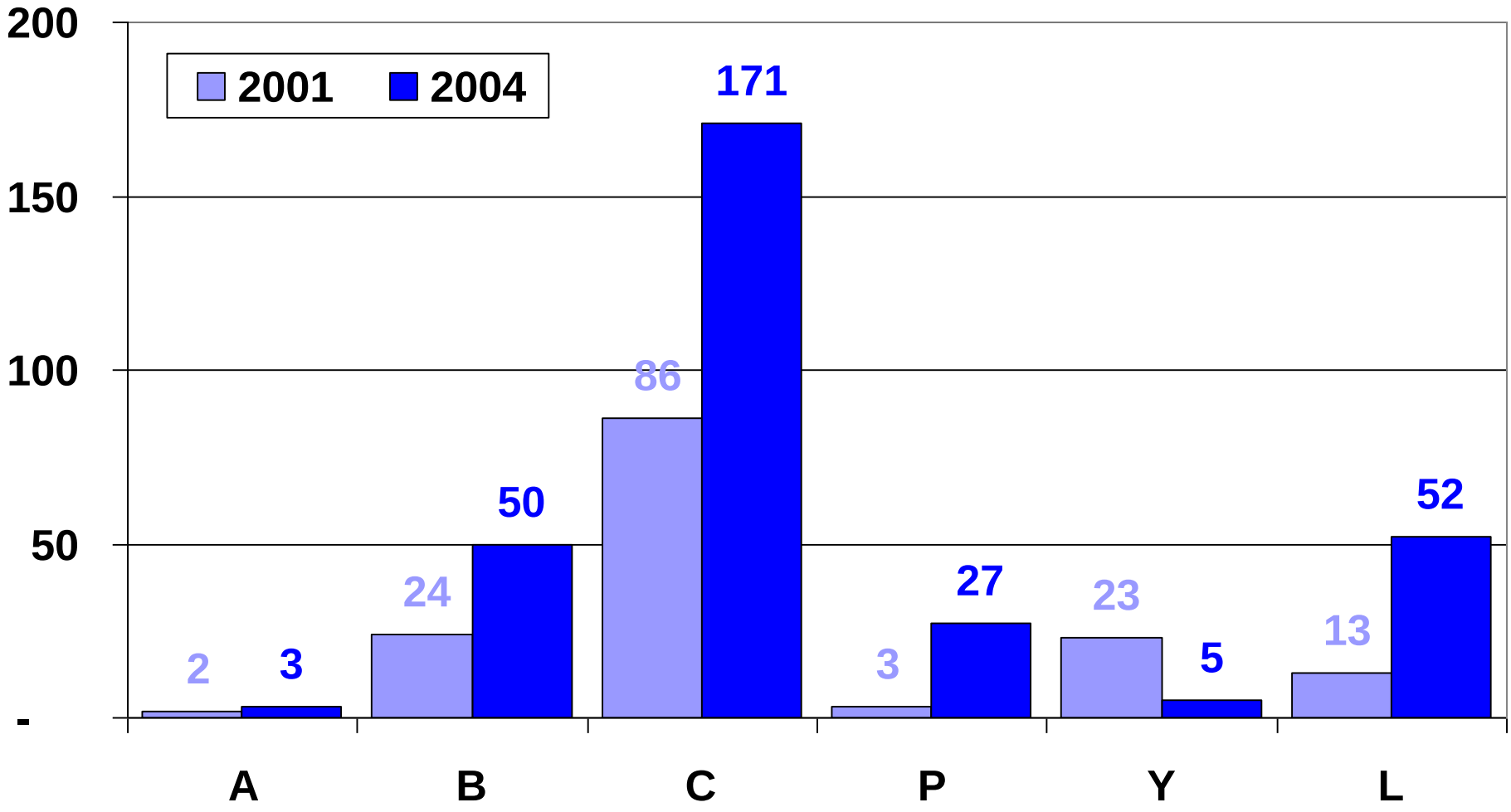


NRF Rated Researchers Women and Other (2004)

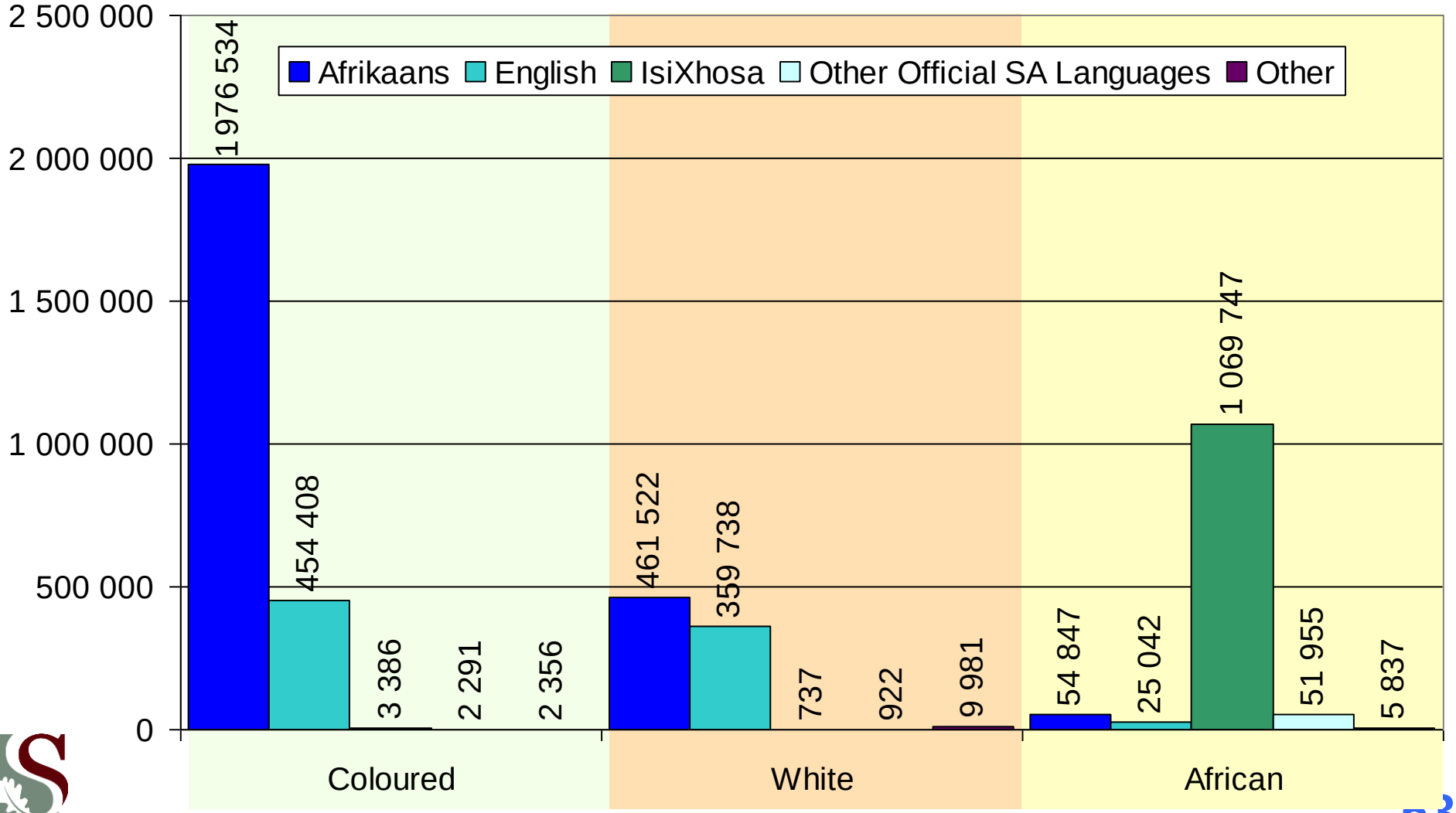


	A	B	C	P	Y	L
Total Rated	50	362	784	56	16	158
Woman	3	50	171	27	5	52
Other	47	312	613	29	11	106

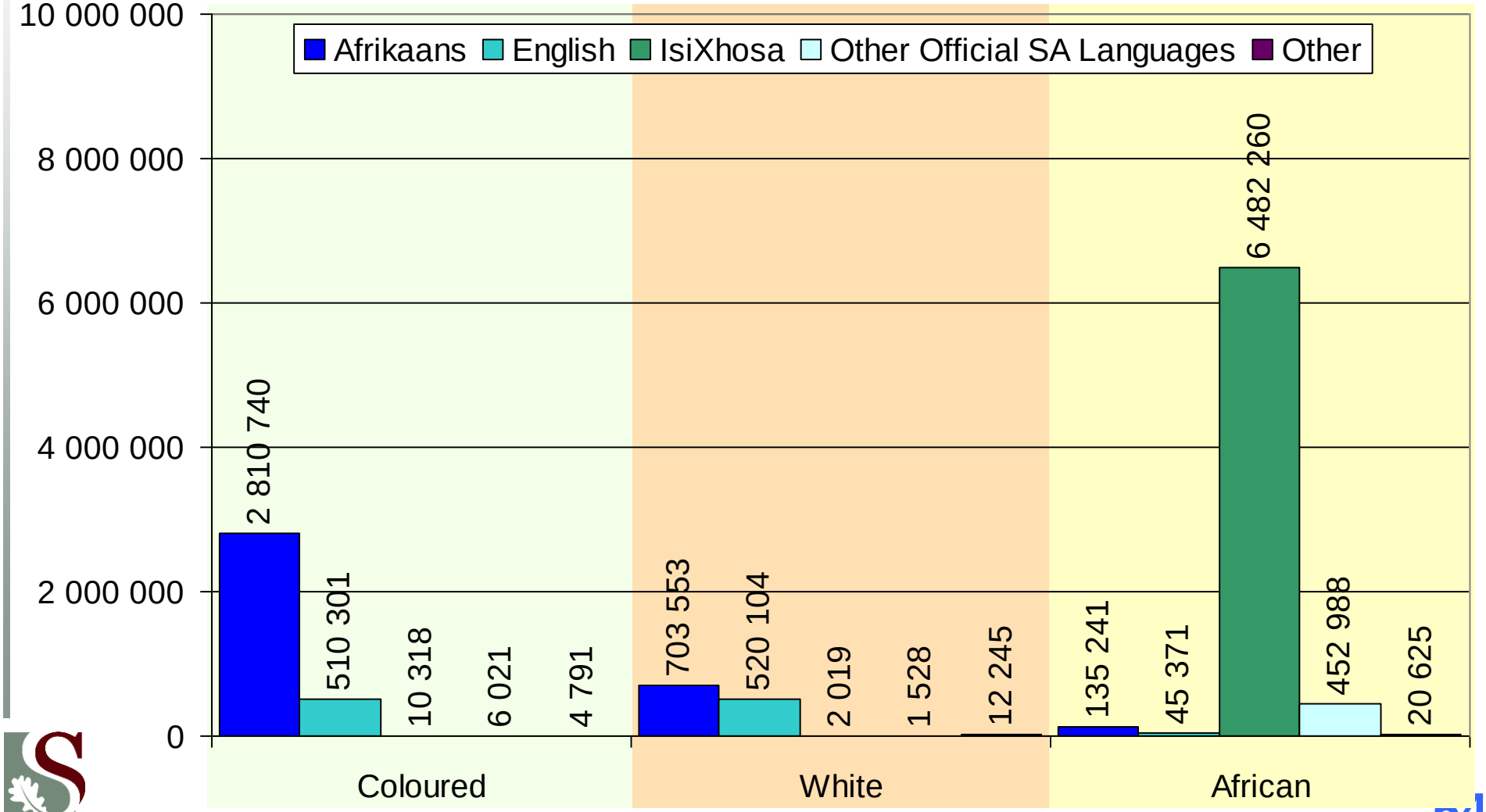
NRF Rated Woman Researchers (2001 & 2004)



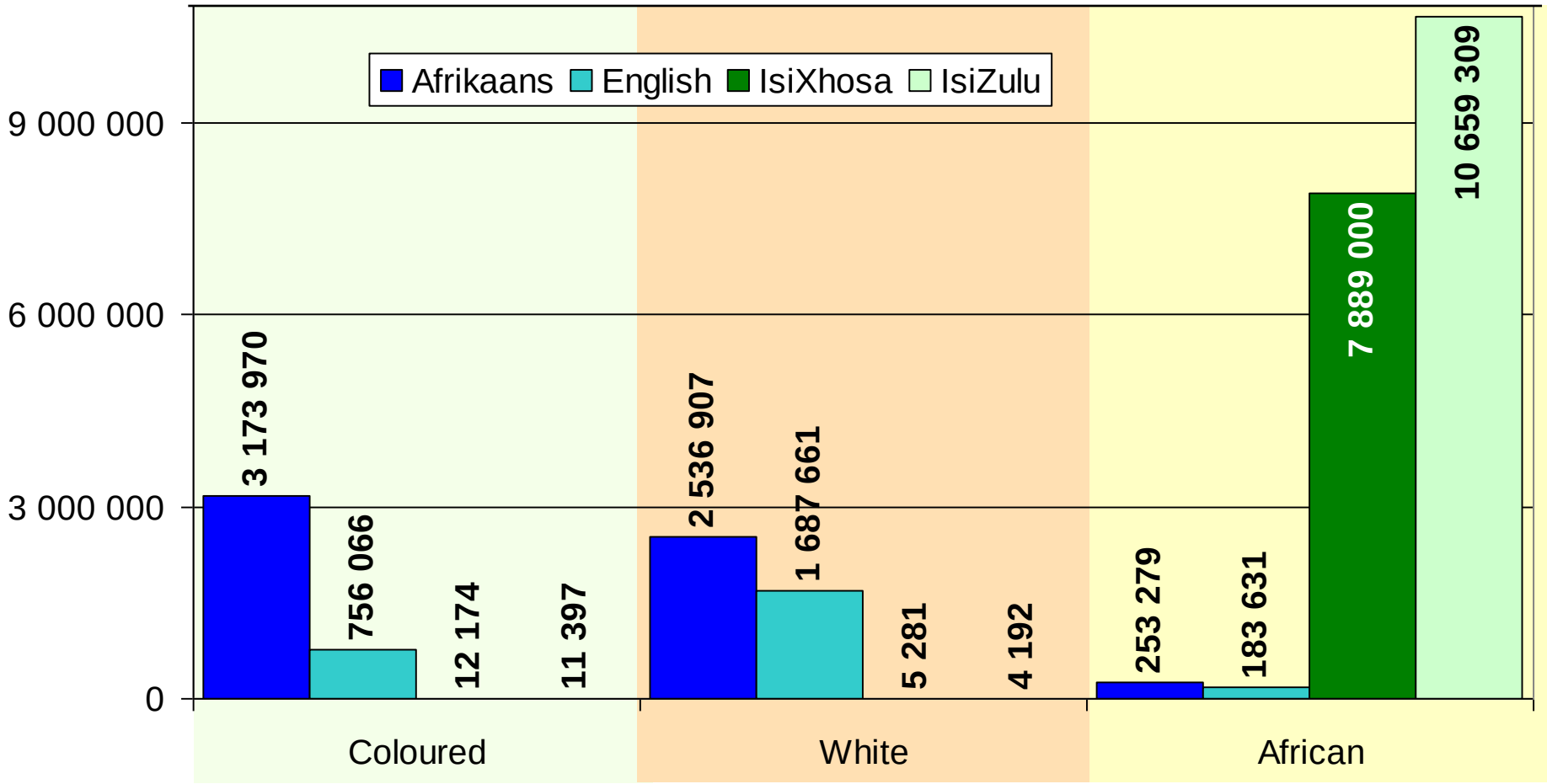
Language Composition (Western Cape) (First Language, Census 2001)



Language Composition (Former "Cape Province", Census 2001)



First Language in SA (Total Population) (Census 2001)



Only the two largest African languages shown here.
Total of all other official SA languages = 16 310 576.

Key Student Statistics

Grand total of students (for the year 2005)	**22 082**
Postgraduate (= 34% of total)	**7 408**
Master's students: Registered (for the year 2005)	**3 846**
Doctoral students: Registered (for the year 2005)	**641**
Percentage of males 1995 / 2005	**56.7% / 48.7%**
Percentage of females 1995 / 2005	**43.3% / 51.4%**
International students in the year 2003 (8.8%)	**2 245**
First-year ("first time entry") enrolment (2003)	**3 583**

Quality of "first time entry" intake for the year 2005:

Students in the two highest M-count categories (20-24 & 25-30)	**61%**
Students with a Grade 12 aggregate of 85% or over (998)	**28%**

Early history in overview

- 1859: Founding of the Theological Seminary of the Dutch Reformed Church
- 1866: Founding of the Stellenbosch Gymnasium, inspired by the Theological Seminary
- 1881: The *Arts Department* of the Stellenbosch Gymnasium developed into the Stellenbosch College
- 1887: Stellenbosch College renamed *The Victoria College of Stellenbosch*
- 1915: Bequest by Mr. Jannie Marais (required by Government to enable an independent – Afrikaans – university [rather than incorporation with Grootte Schuur, in Cape Town])
- 1918: The Victoria College gave way to an independent university, University of Stellenbosch

International Students: Country of Origin* of Students

SADC	
Botswana	44
DRC	36
Lesotho	32
Malawi	24
Mozambique	15
Namibia	511
Swaziland	18
Tanzania	28
Zambia	37
Zimbabwe	102

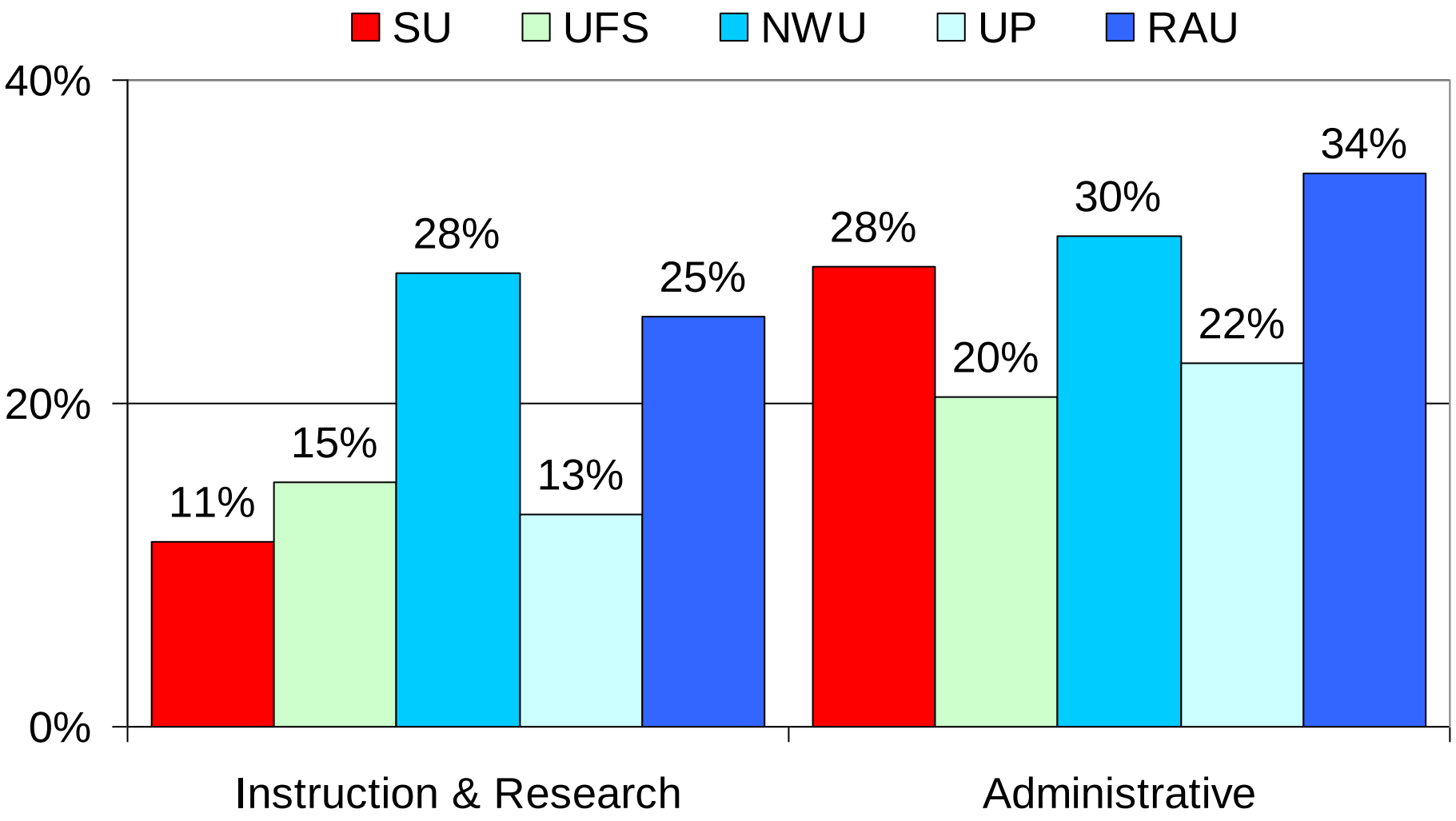
Rest of Africa	
Cameroon	20
Gabon	100
Kenya	38
Libya	20
Nigeria	41
Uganda	22

Rest of the World	
Austria	15
Belgium	37
Canada	17
China	24
France	55
Germany	322
India	22
Korea	33
Netherlands	156
Norway	34
Sweden	27
United Kingdom	79
USA	163

*where there are more than 15 Students per Country

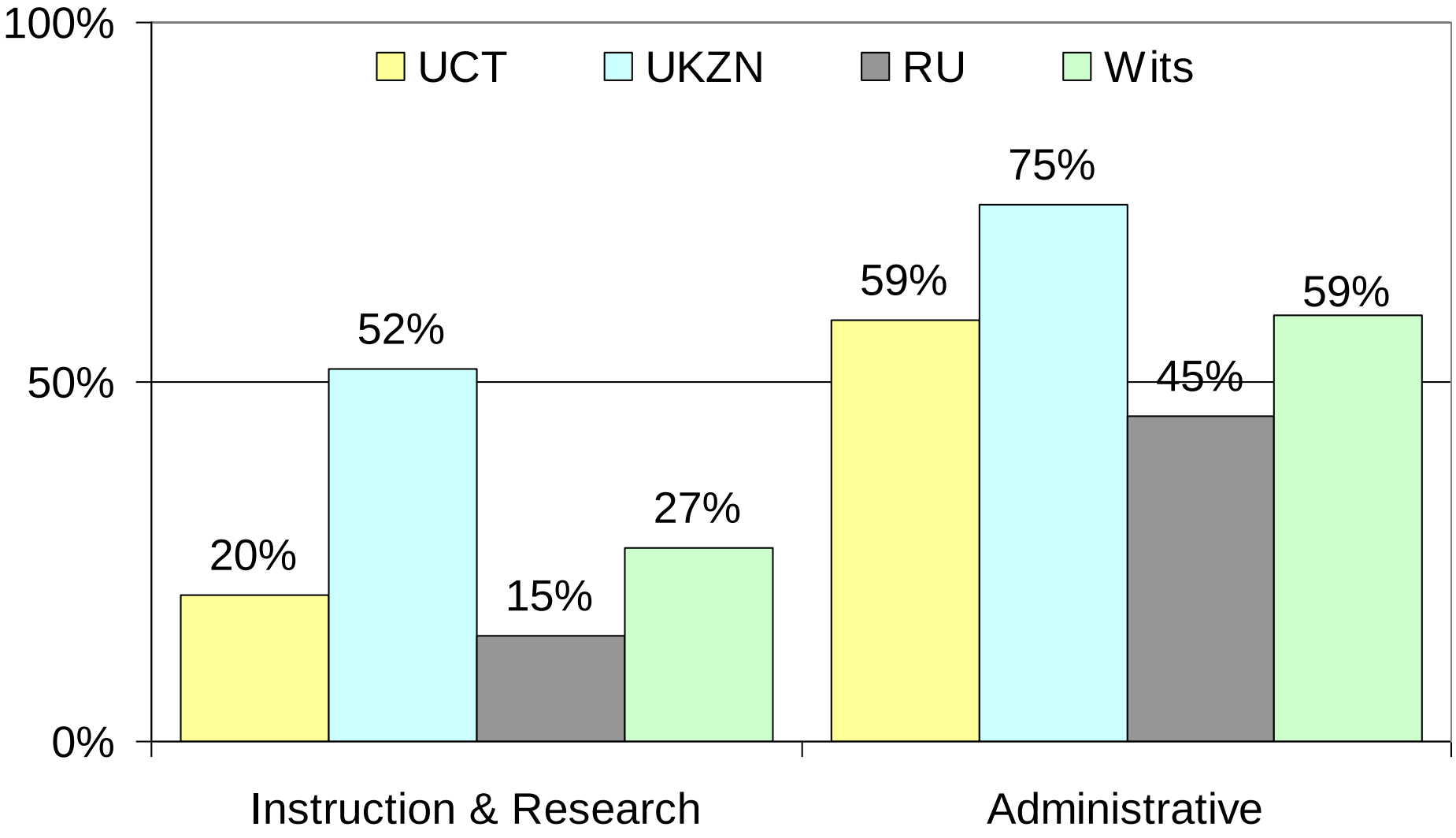
% Black Staff at HWU's (Afr.) (2004)

("Black" includes "Coloured", African and Indian)

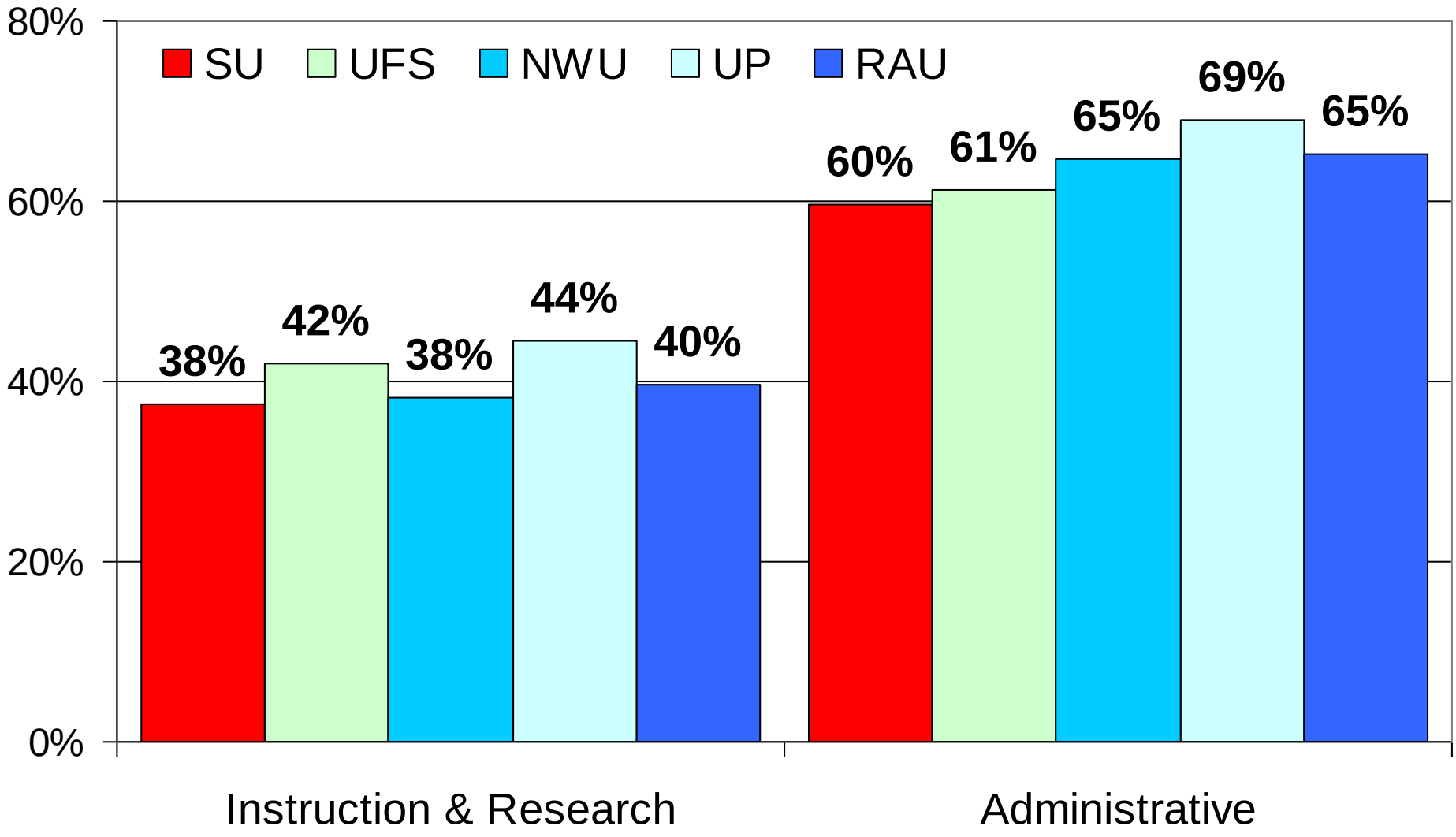


% Black Staff at HWU's (Eng.) (2004)

("Black" includes "Coloured", African and Indian)



% Female Staff at HWU's (Afr.) (2004)



% Female Staff at HWU's (Eng.) (2004)