



# **Responding to Trends in Biology Education Research**

by:

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# Higher Education

# Facts and Figures

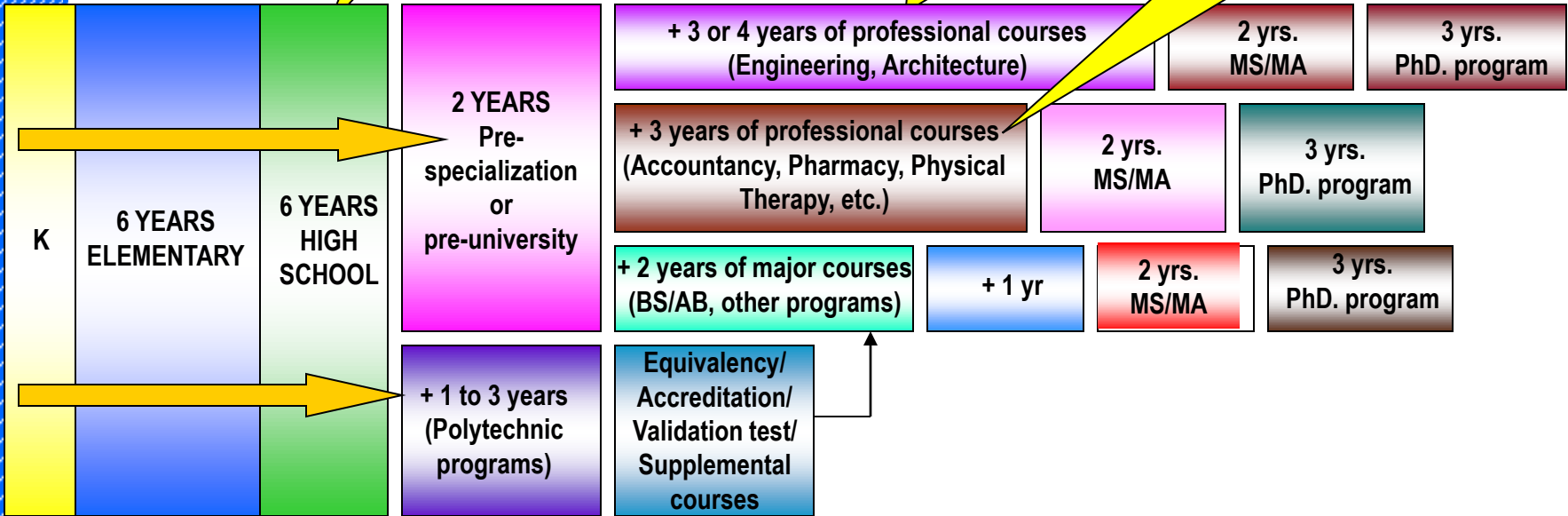


# Proposed Curricular Reforms in Higher Education

NCAE/  
(SAT)

In compliance with  
Washington Accord,  
APEC Registry

In compliance with  
Bologna Accord



**Notes:**

1. Entry to higher education requires taking the Scholastic Aptitude test (SAT).
2. Entry to polytechnic programs does not require SAT.
3. Graduates of polytechnic programs who wish to pursue higher education must undergo equivalency/ validation test)
4. Pre-specialization program is composed of general education courses which will develop competency/ occupational skills, computer literacy of the students.



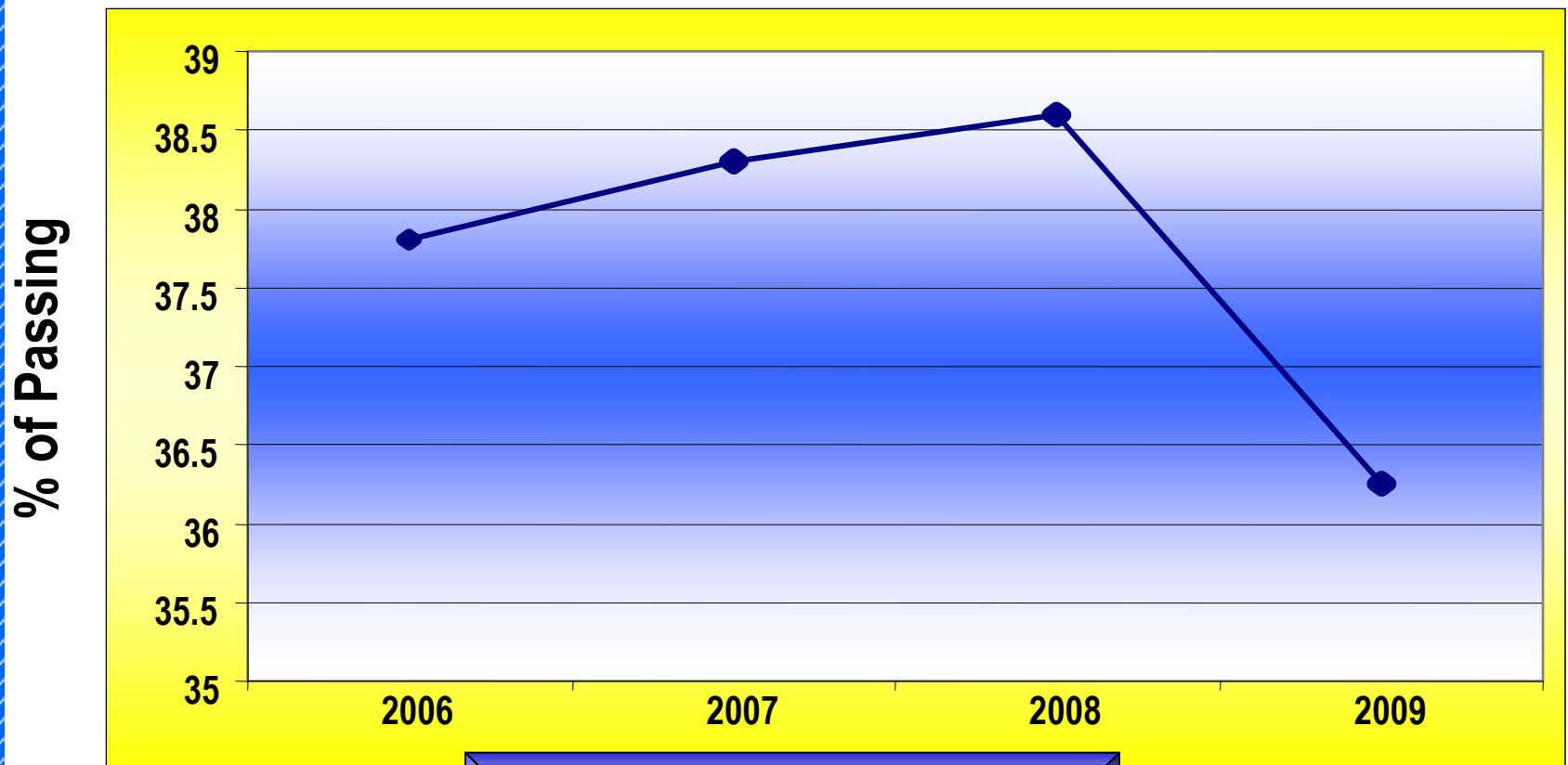
# Deteriorating Quality of Higher Education

- **Declining Performance of Graduate**
- **Inadequate Faculty Credentials**
- **Lack of Accreditation of HEIs and Programs**
- **Unplanned Expansion**
- **Inadequate Facilities**
- **Declining Global Competitiveness**



# Deteriorating Quality Declining Performance of Graduates

## Performance in Licensure Exams

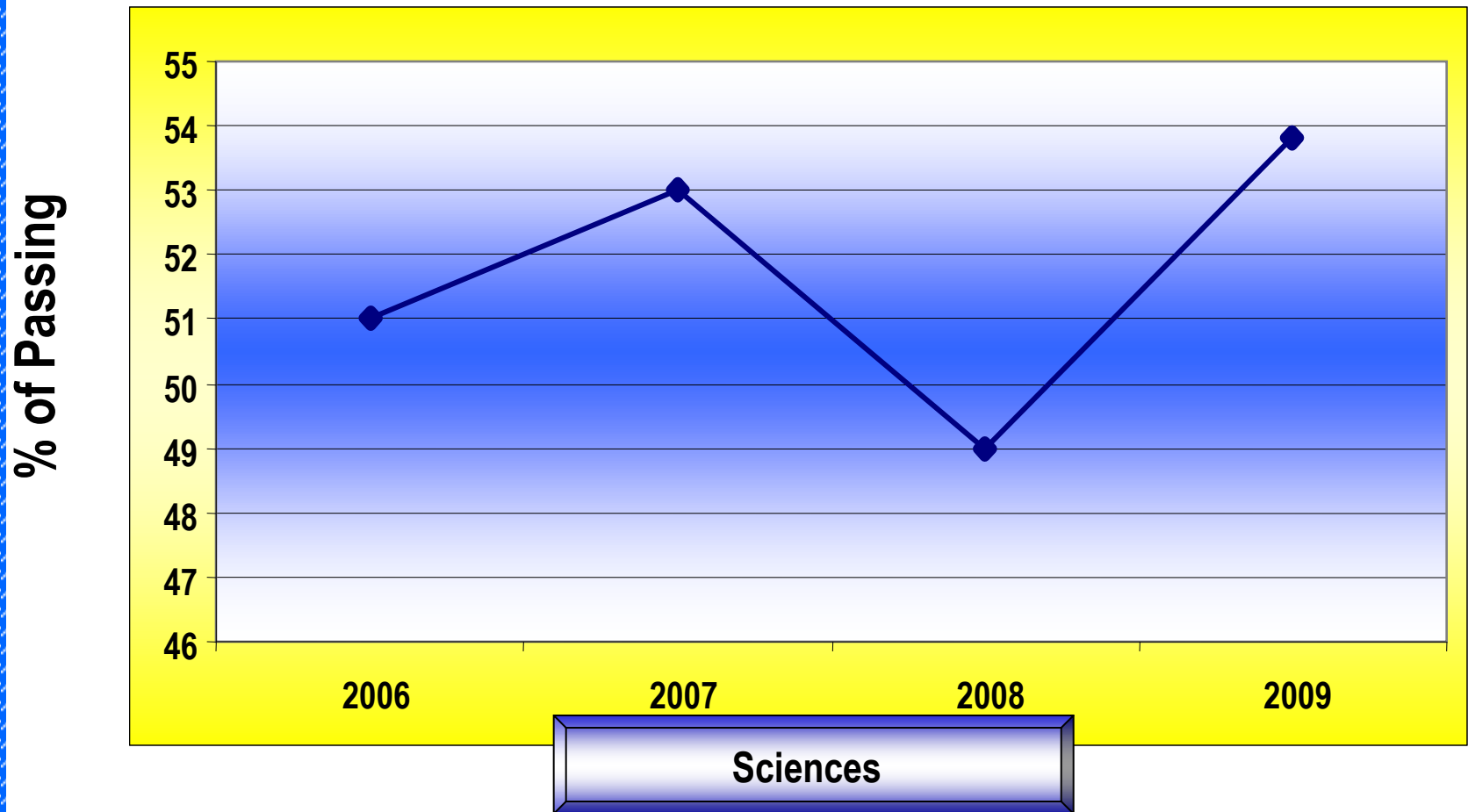


Across all disciplines



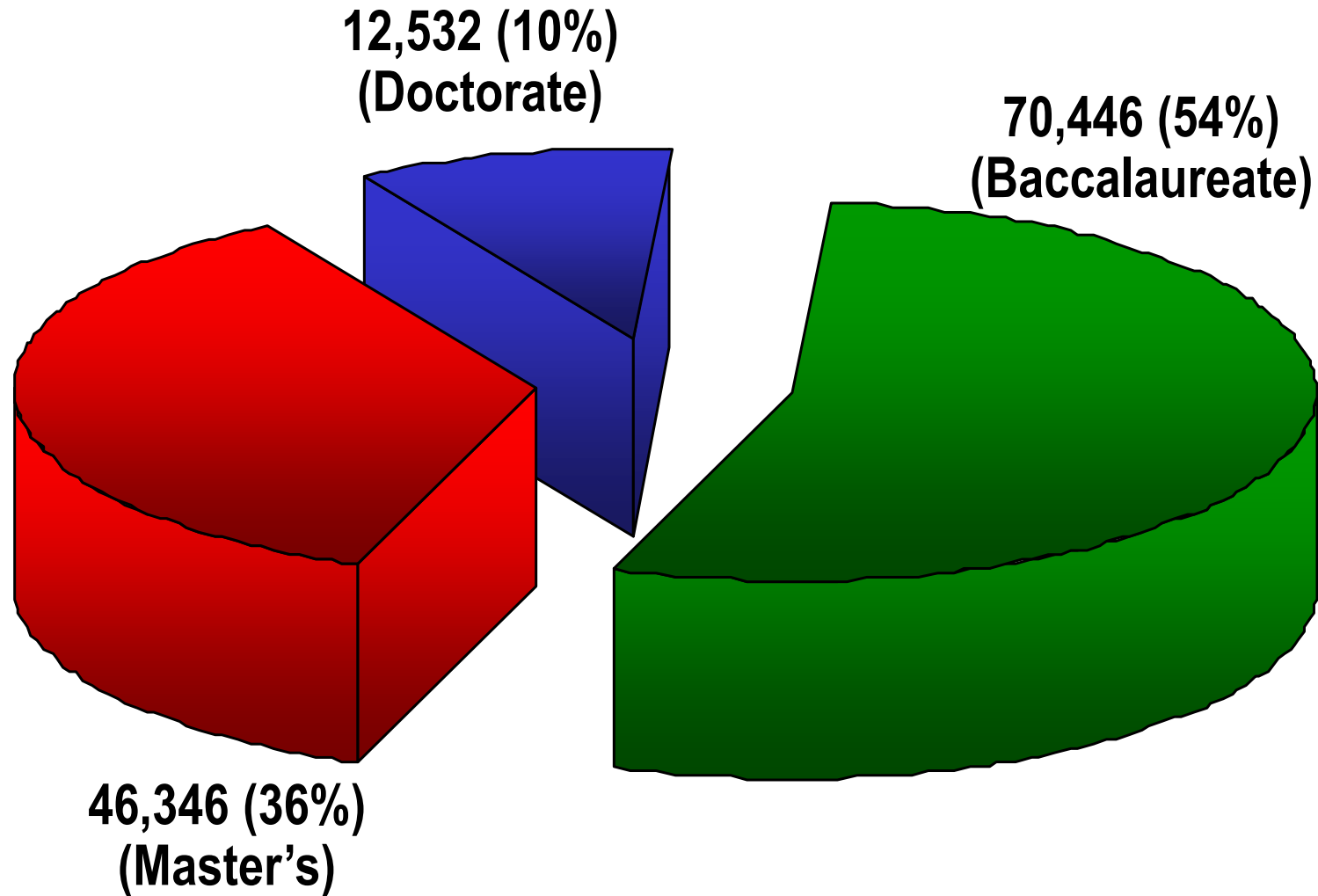
# Deteriorating Quality Declining Performance of Graduates

## Performance in Licensure Examinations



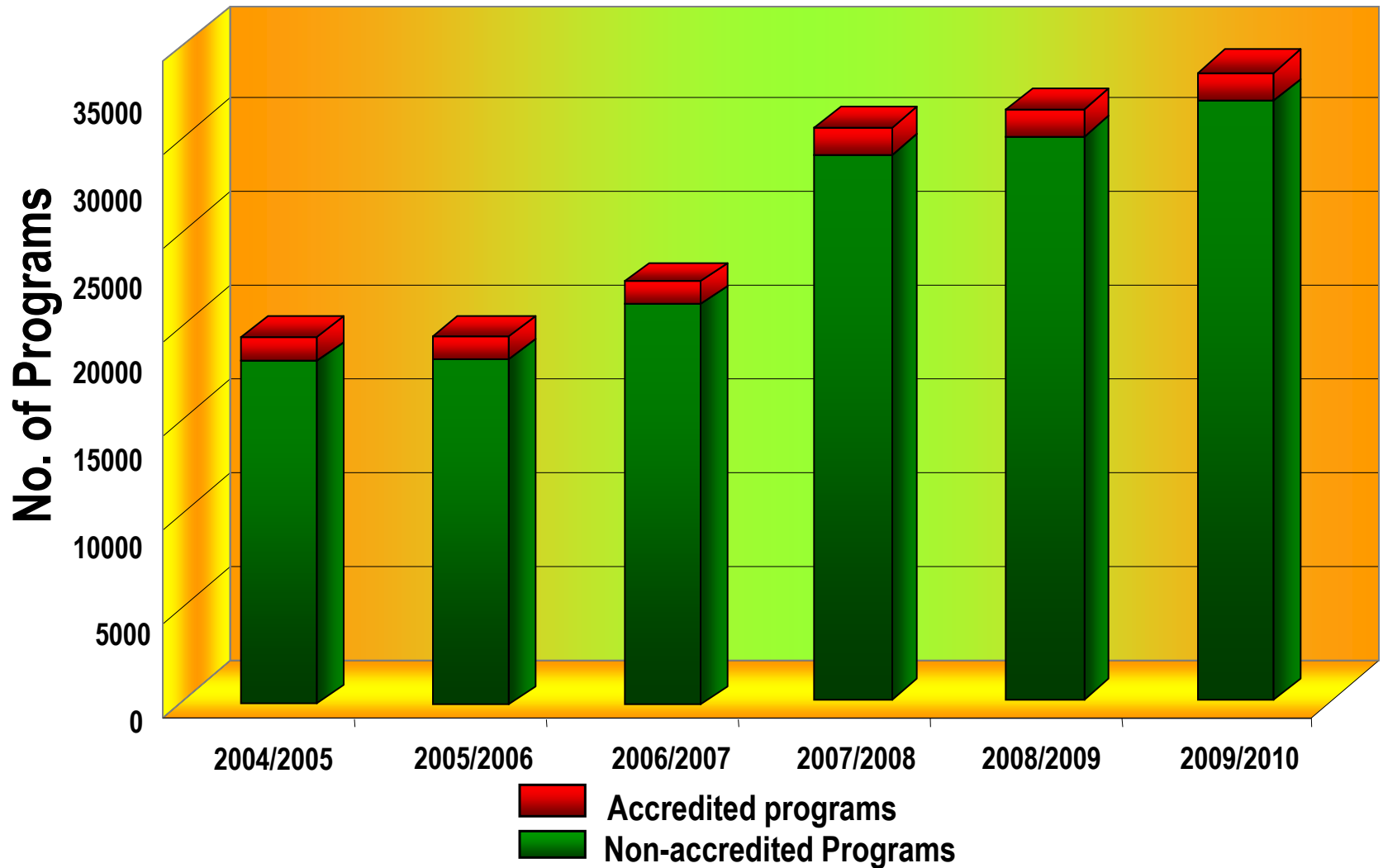


# Deteriorating Quality Inadequate Faculty Credentials





# Deteriorating Quality Lack of Accreditation of HEIs and Programs







## Deteriorating Quality Inadequate Facilities

**Among the 1791 HEIs, only 83 HEIs can be assumed to have adequate facilities**

**Private HEIs 60**

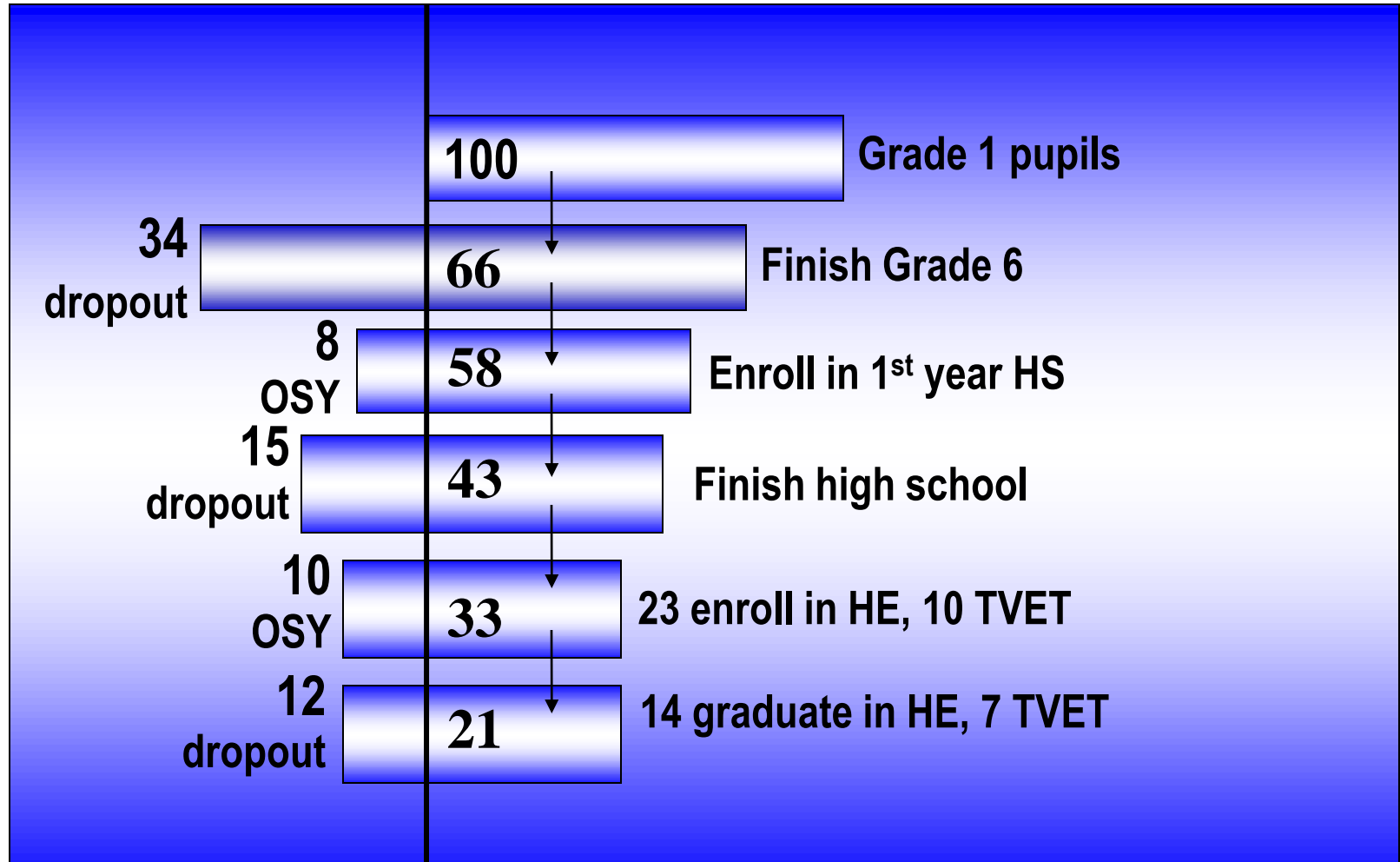
*(Autonomous/Deregulated)*

**Public HEIs 23**

*(COEs/CODs)*



# Limited Access Low Completion Rate





# Strategic Objectives and Recommendations

✓ Rationalization of Higher Education

✓ Improving Quality and Standards

✓ Increasing Access to Quality  
Higher Education



# Rationalization of Higher Education

✓ **Aligning Higher Education with National Development Goals**

✓ **Developing Typology of HEIs**

✓ **Mapping of HEIs and Programs**

✓ **Amalgamation of HEIs**



# Rationalization of Higher Education

✓ **Moratorium of New HEIs and Programs**

✓ **Harmonization of Public and Private HEIs  
(Leveling the playing field)**

✓ **Rationalization of Credentials**



## **Improving Quality and Standards**

**✓ Updating and Upgrading of Programs**

**✓ Strengthening of Accreditation**

**✓ Phase-out Closure of Substandard  
HEIs and Programs**

**✓ Meeting of International Standards**

**✓ Expansion of Faculty Development**



# Legislative Proposals

✓ Amendments of RA 7722

✓ Bill on the Establishment and Operation of Local Colleges and Universities (LUCs)

✓ Creation of a National Student Loan Board



# Legislative Proposals

- ✓ **Amendments of the Expanded GASTPE Law**
- ✓ **Bill on the Typology of HEIs**
- ✓ **Regional University Bill**





**CHED Memorandum Order (CMO) 24, Series of 2005, also known as the “Minimum Policies and Standards for Bachelor of Science in Biology program”, is one of the policies that was adopted to strengthen the biology discipline as a breeder science. CMO 24, Series of 2005 primarily seeks to improve and update the teaching of biology in higher education institutions (HEIs) and establish the research culture of the program.**



# State of the BS Biology Program

- ▶ **Survey of major quantitative indicators**
- ▶ **Data on faculty qualification, faculty development, student enrollment and graduation, curriculum, equipment and facilities, library and journals subscription, and qualifications of the dean and program head. Most of the indicators were surveyed for current information, while students enrollment and graduation was surveyed covering a 10year period (1998-2008)**



## Research Findings:

# Curriculum

- ▶ Mean units revealed that on the average, private HEIs offer more subjects (=units) in the BS Biology program compared to state-run institutions.
- ▶ Department with a multifaceted faculty profile are able to offer different specialized tracks in the program such as botany, marine biology, ecology and environmental science
- ▶ Very few departments are able to implement the Cell and Molecular Biology course due to the lack of trained faculty and appropriate equipment for the laboratory components



## Number of units in major curricular components in a BS Biology program

Components	Units in Private Institutions (N=45)					Units in State Institutions (N=39)				
	Mean	Mode	Range		SD	Mean	Mode	Range		SD
			Min	Max				Min	Max	
GE Units	50.33	42	27	87	4.45	46.44	39	33	77	10.3
Non-biology tool courses	35.63	35	8	84	10.67	36.89	35	24	57	6.08
Core courses	45.28	40	25	82	11.05	43.03	40	12	72	9.13
Science electives	18.26	24	0	33	9.82	23.42	24	0	45	9.6
Free electives	6.53	6	0	21	4.45	4.39	6	0	21	4.08



## Research Findings:

# Faculty

In terms of academic load or aggregate load in the university, the range is 18-35 units and the usual load is 24 units. The usual teaching load is 24 units in private HEIs and 18 units in SUCs.

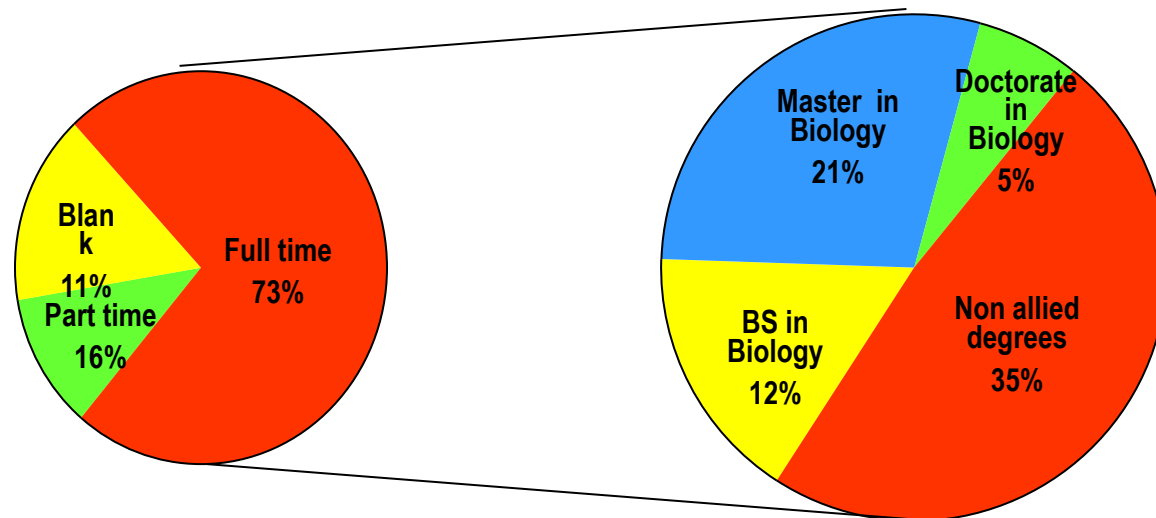
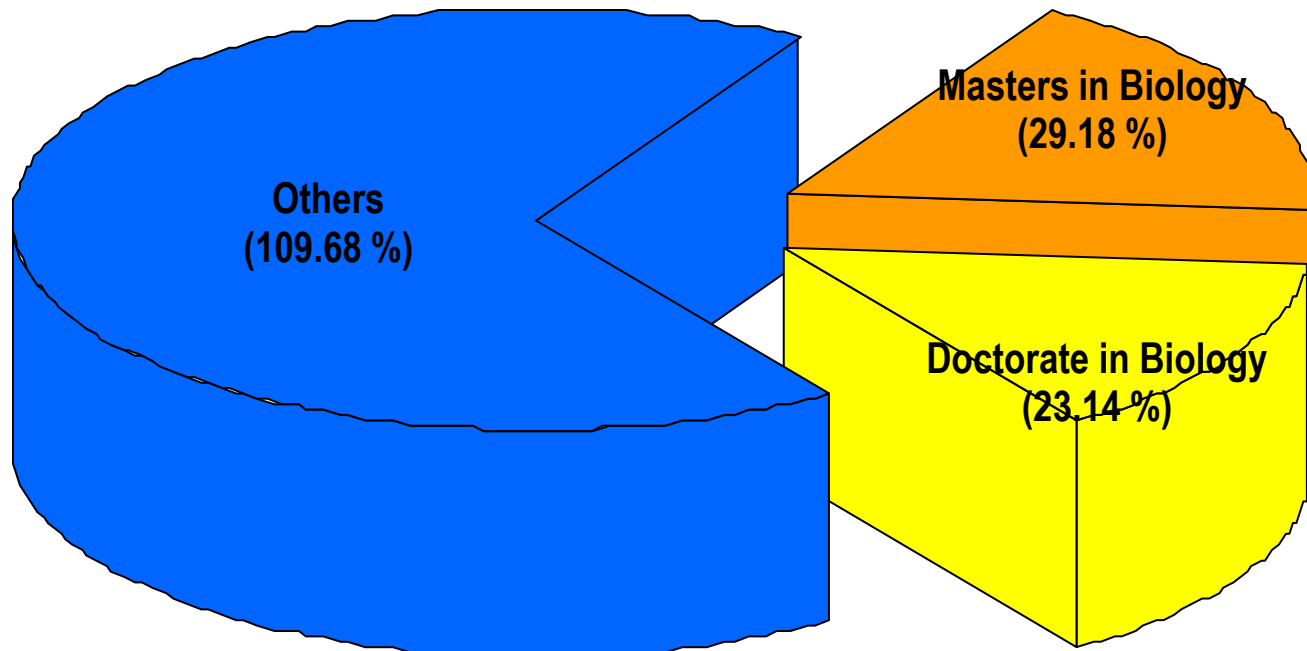


Fig. 1 Qualifications of faculty in the BS Biology program



# Research Findings: **Faculty**



**Fig. 2 Faculty upgrading situation in the BS Biology HEIs (Others include education)**



# Research Findings: Faculty

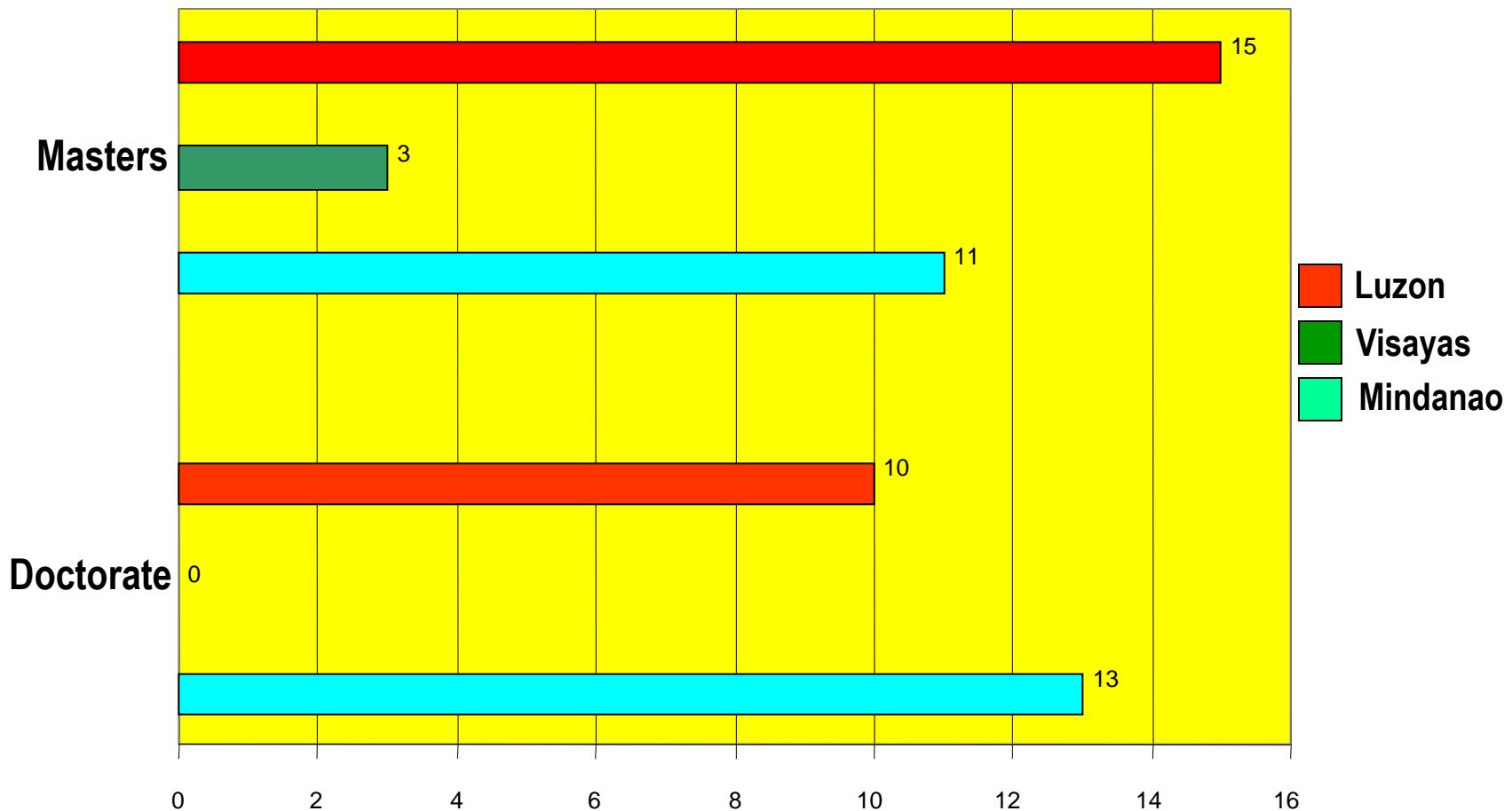


Fig. 3 Faculty with on-going degrees in biology and related fields per island cluster



## Research Findings:

# Facilities

**Most of the laboratories are multi-purpose servicing various courses in biology or courses in other related programs. Specialization of laboratories is generally absent in HEIs.**





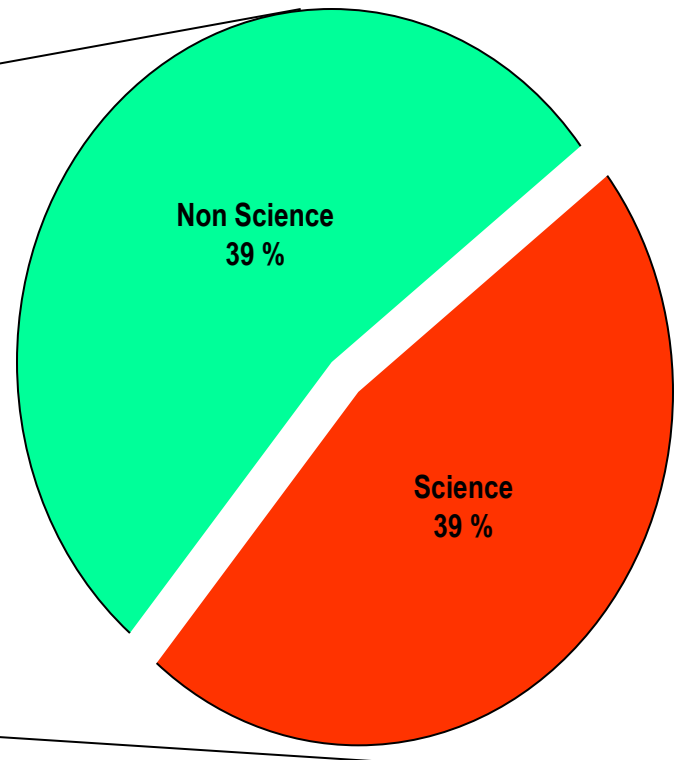
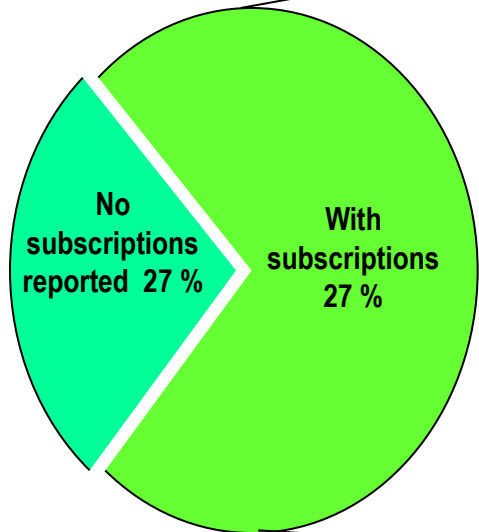
Research Findings:

# Library

- ▶ Most of the libraries are headed by qualified personnel, i.e. they are licensed librarians and have master's degrees.
- ▶ Book holdings in biology are mostly outdated versions.



# Research Findings: Library



**Status of subscription to printed journals**



# Research Findings: **Students**

**The average 10-year graduation rate is 65%**



## Research Findings: Conclusions and Recommendations

- ▶ HEIs generally comply with curricular requirements on the cell and molecular biology requirement. HEI should be given time to develop their facilities for the course and provide appropriate training to faculty.
- ▶ HEIs do not comply with the faculty requirements. A Master of Arts in Education Major in Biology is sufficient to support the research initiatives for biology.
- ▶ HEIs should be given time to adapt to the current policies on faculty qualifications to reverse the effects of lenient regulations implemented in the past.



## Research Findings: Conclusions and Recommendations

- ▶ Faculty development should be along a staffing pattern in the field of Biology as established by the HEIs.
- ▶ There is a perceived failure of faculty development to address the current requirements on scholarships
- ▶ Facilities support from government should be maintained and planned well on a regional basis to target specific gaps.
- ▶ Libraries should update their holdings. Subscription to bona fide scientific journals should be made. Internet connections should be made available in all HEIs to supplement library materials.



## Research Findings: Conclusions and Recommendations

- ▶ Optimum number of students should be maintained for the program to become sustainable.
- ▶ The HEIs may consider innovations or specialization in the BS Biology curriculum.
- ▶ There should be at least a program head of biology with master's degree in biology.
- ▶ There is a need to establish a common norm for research that is expected to be observed/undertaken in HEIs by undergraduate students/faculty.



**What is the direction  
that biology should  
pursue now?**



# Trends in Biology

1. Integration of Information Technology in Biology Education
2. Biodiversity and conservation
3. Applied Biotechnology
4. Bioinformatics
5. Green technology and approaches
6. Cell and Molecular Biology
7. Integration of sustainable concepts and climate change mitigation and adaptation





# Challenges

1. Identification on the niches of each institution and further strengthen its support structure such as faculty, facilities and library
2. Strengthening of institutional networks for instruction and research linkages
3. Development of a career plan for our graduates in order to increase the number of students that go into biology
4. Enhancement on the delivery of courses in the Biology curriculum and integration of more applied concepts



# CHED Initiatives

1. Implementation of CMO 24, Series of 2005: Policies for BS Biology
2. Formulation and approval of the Graduate Policies in Biology: Masters and Doctorate Level: For approval of the Commission en banc
3. Faculty Development Program II – Biology and related programs are included in the priority fields
  - ▶ Masters Program
  - ▶ Doctorate Program
  - ▶ Ph.D. Sandwich Program



# CHED Initiatives

4. Support for Paper Presentation in International Conferences
5. Support for Paper Presentation in International Conferences
6. Thesis and Dissertation support
7. Research Funding under the National Higher Education Research Agenda II (NHERA II)
8. Support for Researches on Biodiversity
9. Faculty Upgrading: Hands-on Training in Cell and Molecular Biology



**Thank you!**