



University of Natural Resources
and Life Sciences, Vienna
Department of Water, Atmosphere
and Environment

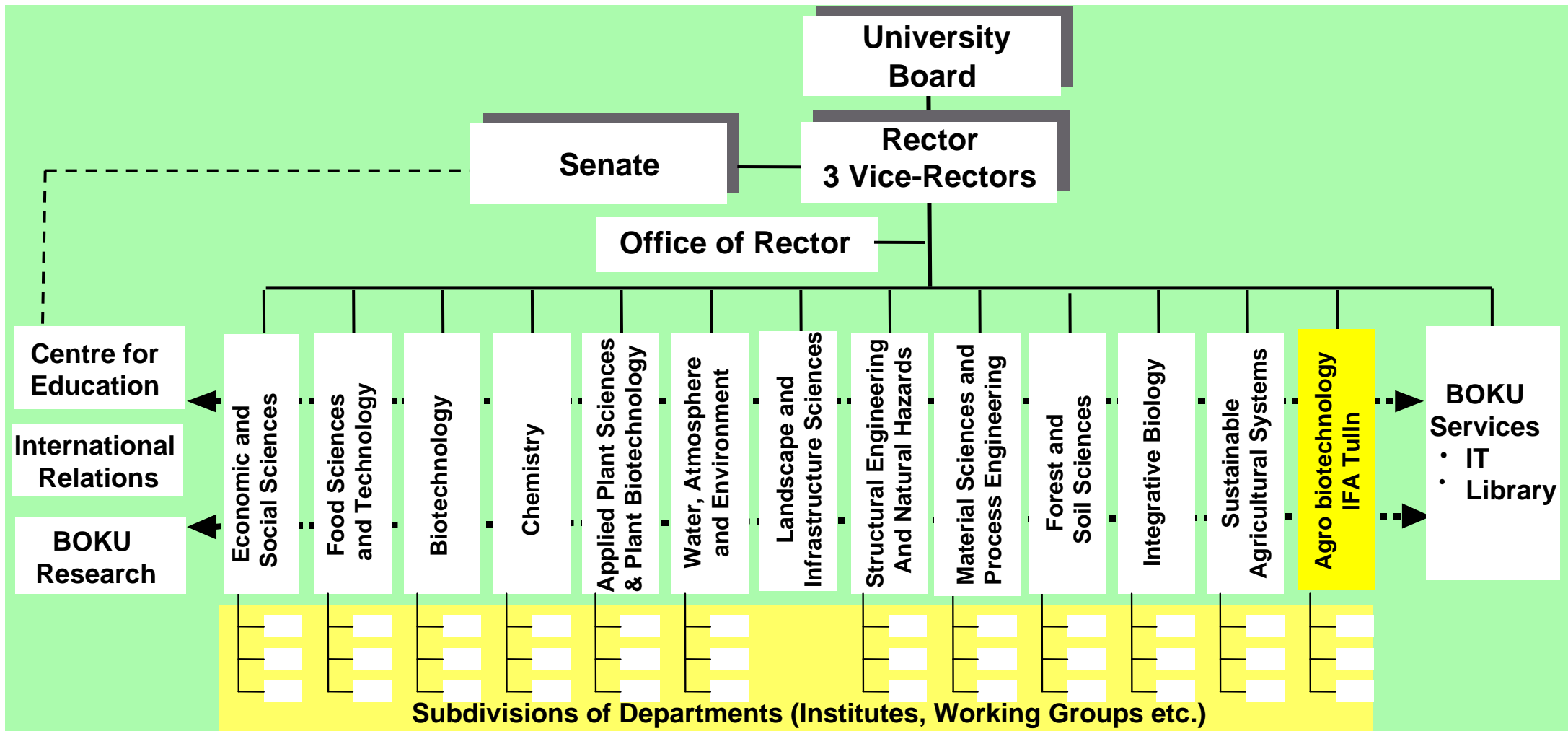
Department of Water, Atmosphere and Environment

Curriculum Development - Water Sector

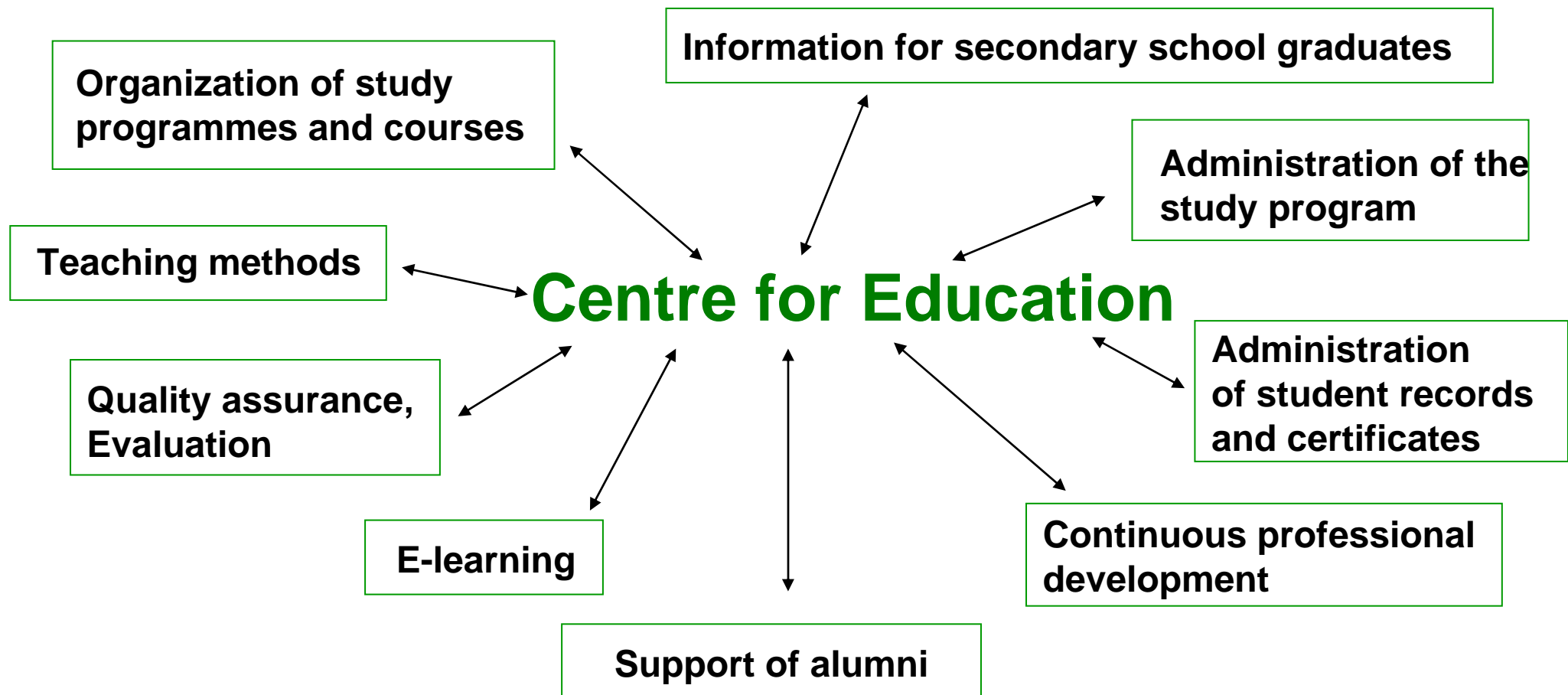
Loiskandl Willibald

Institute of Hydraulics and Rural Water Management

Structure of University Organisation - BOKU



Structure of University Organisation - BOKU



Structure of University Organisation - BOKU

- International office
 - ➔ platform for international activities
 - ➔ transmit information among different partner institutions, but also internally
- Establishment of quality assurance groups
- Strategy for the Internationalisation of BOKU

From the BOKU Mission Statement :

The BOKU professes to being an international performer in research and teaching, cooperating across national and international borders, and initiating open-mindedness towards new developments



Challenges for education



Knowledge triangle

Research – Education – Innovation

Because there are forces that are focussing more on **training** than **education** it can not be overemphasised that university education is per definition linked to research.



Introduction BOKU – Study Programmes

Bachelor studies (time-line: 6 semesters)

1st Degree: “Bachelor of technical sciences”

Master studies (time-line: 4 semesters)

a continuing program after the bachelor study 2nd Degree:
“Master of engineering”

PhD studies (time-line: 6 semesters)

Program which is offered for master program graduates.

Degree: “Doctor of Agricultural Sciences” (Dr. nat. techn.)

NEW: Doctorate of Social and Economic Sciences at BOKU
(Dr.rer.soc.oec)

Further information: www.boku4you.at



Introduction BOKU – Study Programmes

Corner stones for education → Bologna declaration

- Comparable and transparent curriculum structure
- European Credit Transfer System (ECTS)
- Political decisions
- New partnerships and co-operations
 - national
 - international
 - global

EU - Programmes

e.g. TEMPUS support capacity building at higher education institutions

Curriculum development at BOKU

From “Diplom-Ingenieur” to Bachelor / MSc

Frame for Bachelor – Master – System

Total Duration (old curr.)..... 210 Wh / 6 Sem. (before \approx 255 Wh / Sem.)

Bachelor min. 70% \cong 147 Wh / 6 Sem.

Master max. 63 Wh / 4 Sem.

Elective subjects min. 10% \cong 15 Wh / 6 Sem.

Wh = teaching hours per week

Total hours Wh * 14, e.g. $147 * 14 = 2058$ hours

In ECTS $180 * 25$ or $30 = 4500 - 5400$ hours workload

Environmental Engineering

- was introduced in 1883 as a 3 years course for academic instruction on land improvement and reclamation (drainage, irrigation).

The field of activity was the rural (agricultural) area.

- is an applied technical orientated course with strong background on natural sciences and ecological empathy. This allows graduates to work at an interdisciplinary level in planning, implementing, supervising, maintaining and administrating engineering projects related to land and water management as well as waste disposal.

The field of activity is still the rural area but in close interrelation with the demands and special features of the urban area.

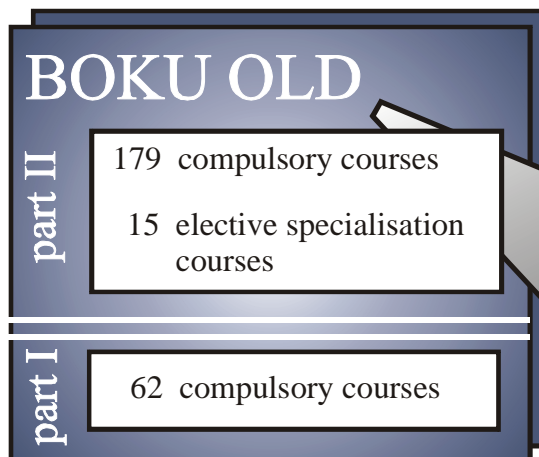
Environmental Engineering



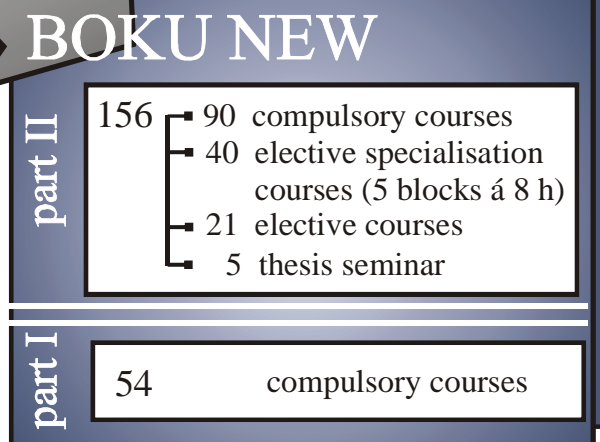
Before

1996

After



Σ 256 weekly hours equivalents
(5 years = 10 terms)
equals 25,6 hours per term
and per week



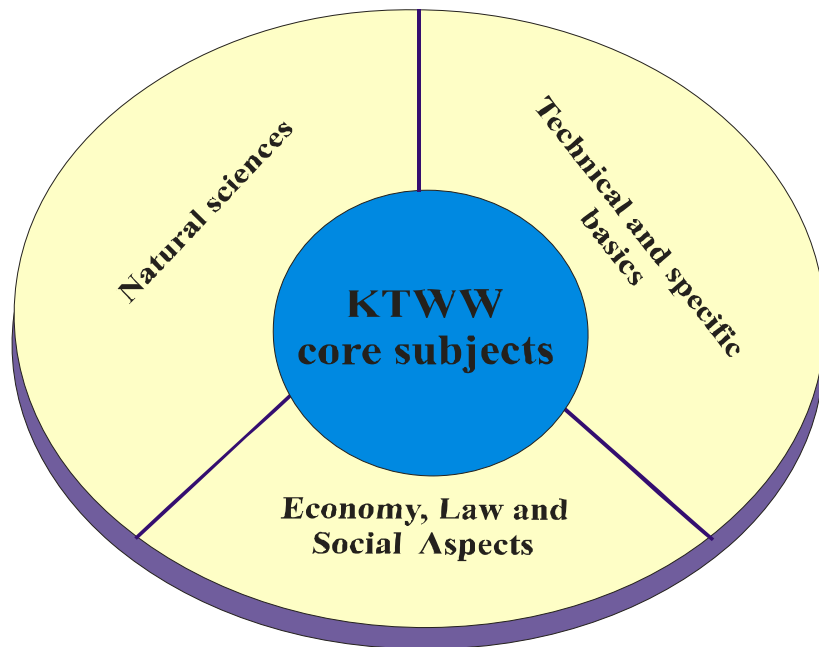
Σ 210 weekly hours equivalents
equals 21 hours per term
and per week

Reduction of workload

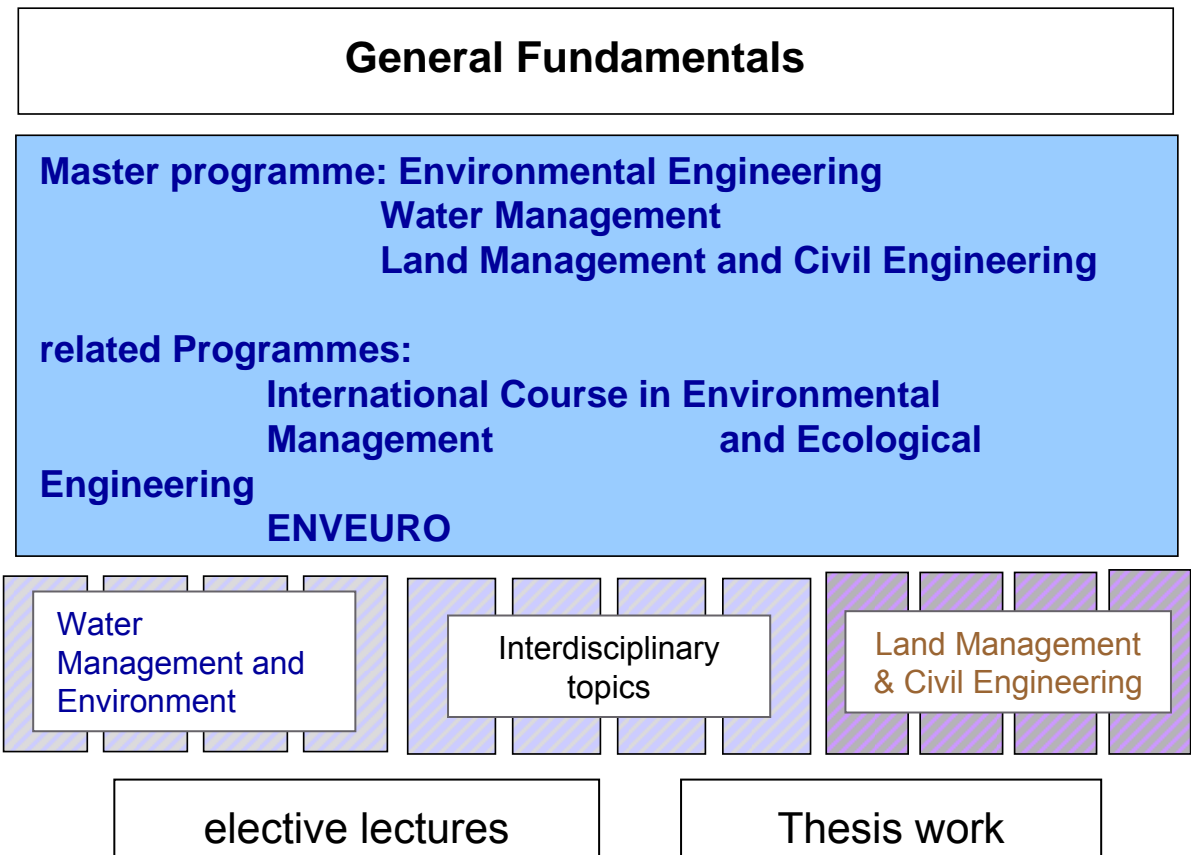
210 weekly hours equivalent \rightarrow 300ECTS

New curriculum: Environmental Engineering (2003)

**KTWW- Bachelor (6 Semester)
Environmental Engineering**



Master-Programme (4 Semester)



Environmental Engineering



Environmental Engineering

Water Management and Environment

Unit 1: Water Management and Environment

Subject Sanitary Engineering, Industrial Water Management and Water Provision

Subject Rural Water Management and soil water management

Subject Hydrology and water management strategies

Subject Hydraulic Structures and river catchment management

Surface water ecology

Land Management and Civil Engineering

Unit 2: Interdisciplinary topics

Subject Data management for land information systems

Subject Sustainability, natural hazards and environmental protection

Subject Construction Economics and Construction Management

Subject Geotechnics, Applied Geology and Soil Sciences

Unit 3: Land Management and Civil Engineering

Subject Land Management and Land Development

Subject Civil Engineering

Subject traffic planning and road design

Subject Waste Management and Waste Treatment

BOKU experiences with curriculum development



Diploma Curriculum

Pros

- Well known, accepted
- Balanced curriculum
- Distinct to curricula of competitors
- Broad range of professional topics
- Problem oriented approach

Contras

- Limited compatibility with international programmes
- Lack of international recognition
- No graduation for drop-outs
- Long study duration

Bachelor - Master

Pros

- Internat. Acceptance
- Comparable formal standards
- Stimulation of mobility
- Competitive to polytechnics
- Bachelor graduation

Contras

- Difficult a priori evaluation
- Unknown employers acceptance of Bachelor degree
- Non-homogeneous Master programs
- Broad professional expertise only with B+M

BOKU experiences with curriculum development

- University / National
 - ➔ From Dipl.-Ing. to Bachelor/Master
- Europe

➔ Etnet EnvironmentWater

Evaluation of Teaching Resources in an European Context

➔ ELLS

Summer schools and master programmes

- International

➔ ICA ERASMUS MUNDUS PROJECT and Thematic Network

“Redefining the curricula for the multifunctional rural environment – agriculture, forestry and the rural society” (MRENet)

➔ NARMEE

Joint Master Programme



Euroleague
FOR LIFE SCIENCES



BOKU experiences with curriculum development



Master Programmes in English



Mountain Forestry



Mountain Risk Engineering

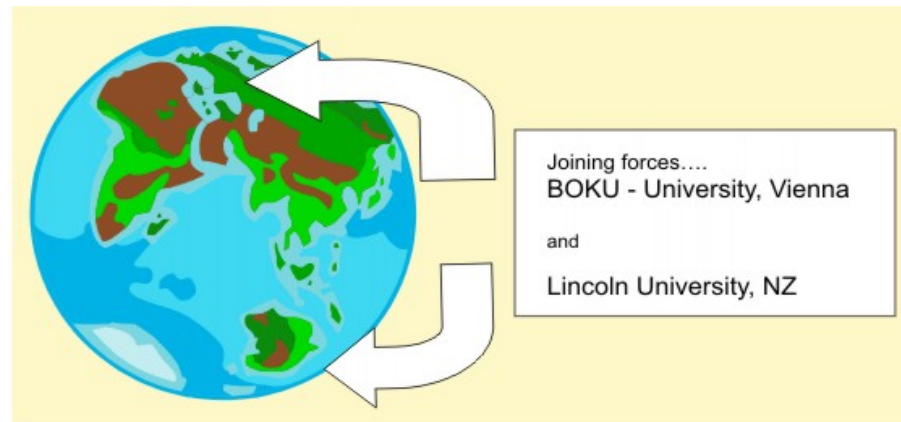


Horticultural Sciences



***International Master of Natural Resources
Management and Ecological Engineering***

International



Global Partnership

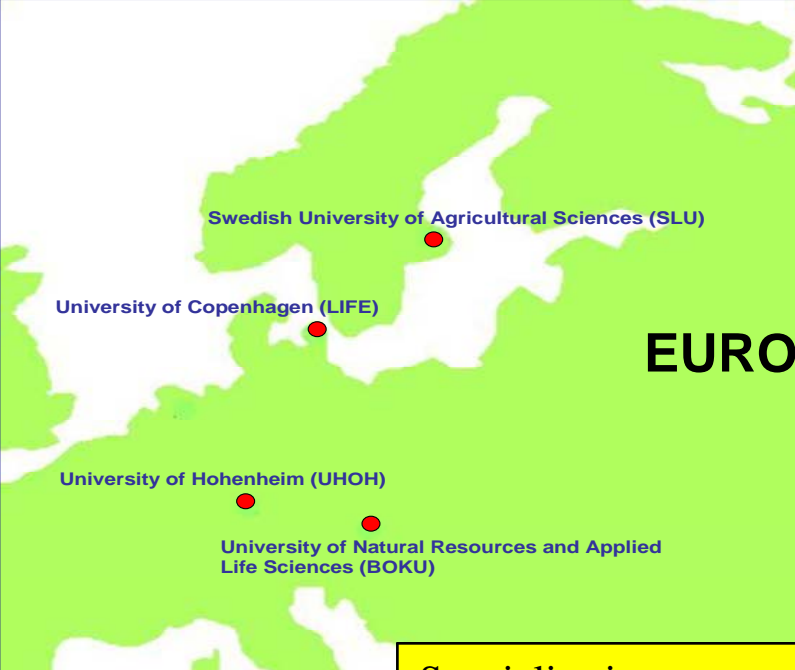
Two universities — one in the northern and one in the southern hemisphere — have joined forces to produce an innovative Masters degree.

Why this degree?

In a world of increasing internationalisation, individual nations are increasingly extending and inter-penetrating their environmental impacts and 'ecological footprints

What is it?

The 'Master of Natural Resources Management and Ecological Engineering' (NARMEE) is a two-year Masters combining both examination and thesis. Students are required to study at both places, and will finish with a jointly-awarded degree.



EUROLEAGUE FOR LIFE SCIENCES

Specialisations

Specialisations	BOKU	UHOH	KVL	SLU
Water Resources	X			X
Environmental Impacts		X	X	
Soil Resources and Land use	X	X	X	X
Ecosystems and Biodiversity	X			X
Environmental Management		X	X	
Climate Change	X	X	X	X

Each university has three fields of specialisation, requiring that the university offer ASPs within each of these.

Present Doctoral Curricula

Summary: Doctoral programme of BOKU 2006

- Admission: issued by rector (vice rector of education)
- **6 Semester**
- Minimum of 180 ECTS, including at least 20 ECTS doctoral courses and at least 160 ECTS for the dissertation
- Registration requirements:
 - Doctoral thesis topic
 - Name of advisor
 - A work schedule approved by the advisor including:
 - ➔ **Advisory team**
 - ➔ **Time schedule** and **resource plan**
 - Proposal for doctoral courses (**approved by Dean**)

- 20 ECTS examination record;
- **Thesis: 2 Reviewers ≠ Advisor**

~~Defence of Thesis (examination board: chair + examiners)~~

Present Doctoral Curricula

Doctorate in Social and Economics Sciences at the University of Renewable Natural Resources and Applied Life Sciences Vienna

Structure analogue to Doctoral programme of BOKU 2006

<http://www.boku.ac.at/8176.html?&L=1>



Doctoral School Sustainable Development

PhD Programme, Started summer term 2007

Project coordination

Head: ao. Univ.Prof. Dipl.Ing. Dr. Andreas Muhar (Institute of Landscape Development, Recreation and Conservation Planning)

Deputy head: Univ.Prof. Dr. Markus Fiebig (Institute of Applied Geology)

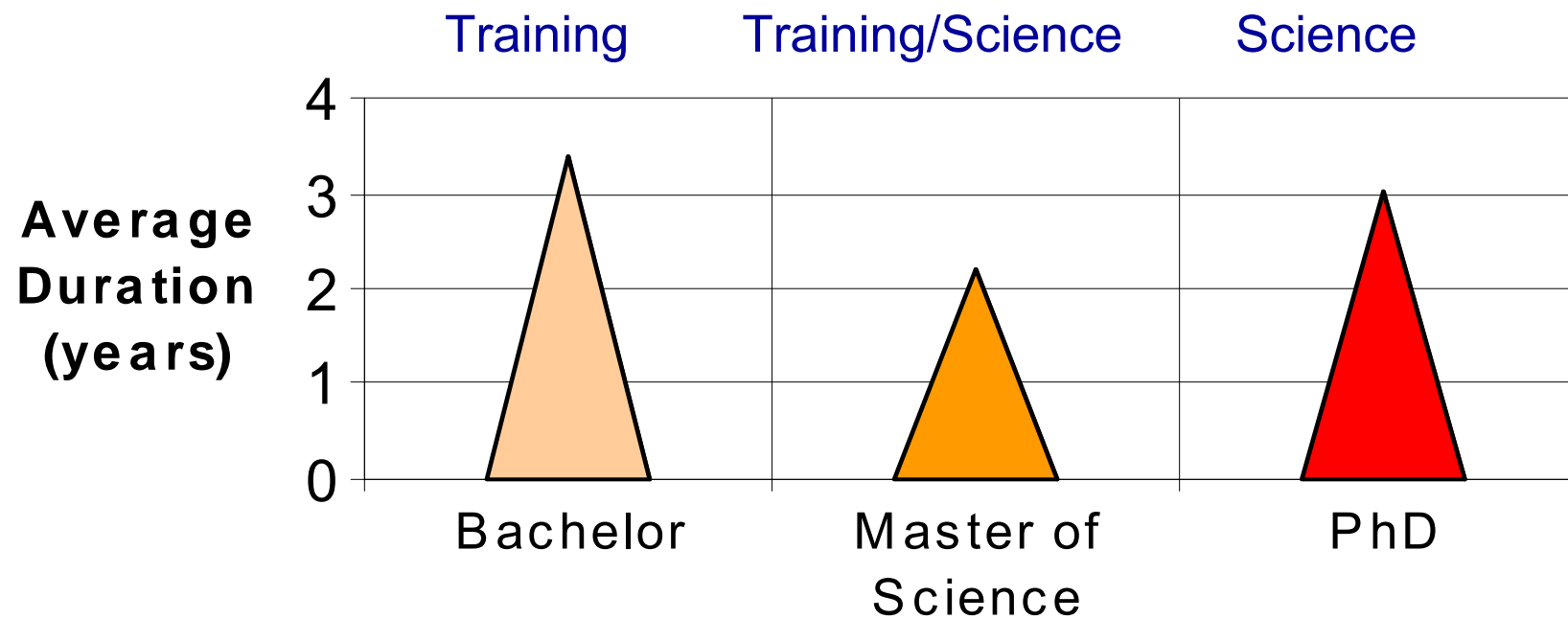
<http://www.dokne.boku.ac.at/>



Comparison of study duration

European dimension ~ 60 universities participated

Duration of several Programmes



Impact on universities?

During transition and permanently

ELLS – Conference: Internationalisation and Quality Assurance

University	Academic staff	Administration	Students
Bologna International offices Co-operation vs. Competition Market presence Increase of competence Acknowledge time for changes Extra costs? Incentives, investment in future	Language New partners Collaboration Sharing of teaching material Expertise exchange New teaching methods Changes of thinking Cultural diversity Mobility and training Extra work , incentives	Language ECTS Flexibility Mutual trust International contracts Extra work	Language Different environment Broaden mind/ Specialising Integration International jobs Make new friends Lifelong experience Continuing education
European/International	European/International	European/International	European/International

Student mobility

How to encourage students?

- Mobility grants
- Full recognition of work done abroad
- Full implementation of ECTS
- Local job market acceptance
- Work abroad
- Language skills
- Participation in courses taught in a foreign language (technical) required
- Information, Dissemination, Marketing

European dimension, Student mobility

Student exchange requires **ECTS**

- ETCS is the **E**uropean **C**redit **T**ransfer **S**ystem
- ETCS is a tool for **harmonisation** — not homogenisation
- ETCS is a programme from **SOCRATES**
- ETCS serves the **mobility** in Europe

Credits represent **workload**

Credits **not** to be confused with **grades**


International: Research and Education for Development

- Addresses key issues on the way to the Millennium Development Goals
- Is basic or applied research, or a combination of both
- Recognises the crucial role of research for and in international development
- Goes beyond research and embraces training & capacity development as well as consultancy services
- Is often multidisciplinary, demand driven and done in partnership



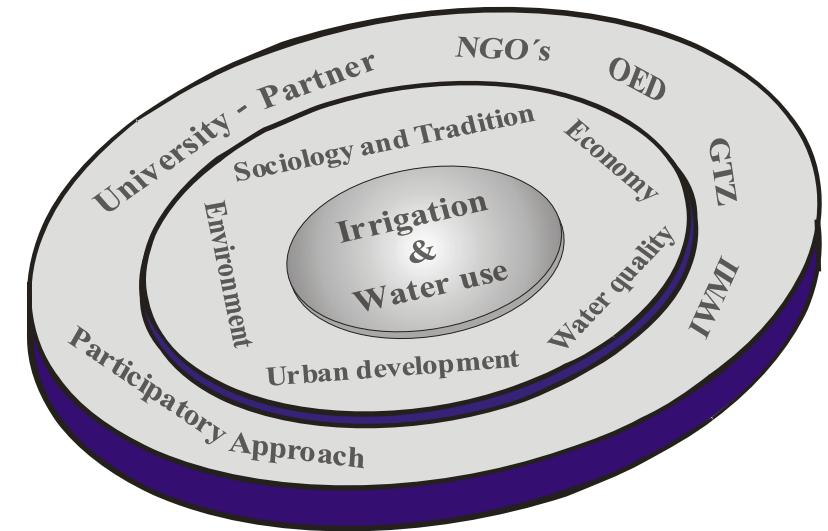
International: Research and Education for Development

- Education and human capacity building
- Education and real life projects
- Contributes to find applicable solutions
- University education is per definition linked to research
- Thesis works are one way to support research

Co-operation Partner	Action	Financial resources
Partner Universities International Organisations (FAO) NGO's International Research Institutes (IWMI)	 <div> PhD Students Master thesis Students Projects </div>	<div> ← OeAD </div> <div> ← { Boku fellowship National fellowship </div> <div> ← National Funds, EC </div>

International: Research and Education for Development

- As much as possible participation of local population
- For participatory approach strong local partners are a necessity



Water for food movement (SA)
 Food security through home food production (Rainwater harvesting)
 30 % technical
 70 % “mind mobilisation”
 99 % fun

Conclusions

- New challenges require new curricula
- Transparent and flexible curricula are needed
 - many achievements, but still there is a lot to do!
- Internationalisation is an ongoing process
- Cooperation facilitates institutional reform
- **Research must not be forgotten (WP2)**
- Joint programme development is still faced with legal restrictions
- Co-operation ensures sustainable development

Conclusion

The aim of the doctoral programmes at the University of Applied Life Sciences, Vienna, is enhancing skills in carrying out independent research and educating and supporting a new generation of academics involved innatural resources and applied life sciences.

.....or in social and economic sciences in relation to BOKU.

<http://www.boku.ac.at/707.html?&L=1&L=0>

Contact



University of Agricultural Sciences, Vienna
Department of Water, Atmosphere and Environment
Institute of Hydraulics and Rural Water Management

Universität für Bodenkultur Wien (BOKU)
Department für Wasser-Atmosphäre-Umwelt
Institut für Hydraulik und landeskulturelle Wasserwirtschaft

Willibald Loiskandl
Muthgasse 18, A-1190 Wien, AUSTRIA
Tel.: +43 1 47654 5451, Fax: +43 1 47654 5499
Willibald.Loiskandl@boku.ac.at
<http://www.wau.boku.ac.at/ihlww.html>

Thank you for your attention