Co-funded by the Erasmus+ Programme of the European Union

Experiences and good practices from Bulgaria

Assoc. Prof. Petar Filkov
University of Architecture, Civil Engineering and Geodesy - Sofia

Workshop on the sustainability of the SWARM results
Aristotle University of Thessaloniki, Department of Civil Engineering,
20 – 21 December 2021

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Co-funded by the Erasmus+ Programme of the European Union

1. Sustainability

- SWARM project aims "*Strengthening of master curricula in water resources management for the Western Balkans HEIs and stakeholders*"
- Thus, "*sustainability of SWARM results*" should mean sustainability of master curricula
- It is better to speak about *sustainability of master programmes*, related to *water resources management (WRM)*, not about their curricula
  - Curricula are changed over time to take into account the changes in science, practice, etc.
  - Names of study programmes usually are not changed

2. Master Programmes in WRM at UACEG

- The following Master Programmes related to WRM exist in UACEG

1. **Integrated Master Programmes – 5 years**
   - Water Supply and Sewerage – since 1947
   - *Hydro Engineering* – since 2018

     Should be read / translated *Hydraulic Engineering*, but it joins two previously existing study programmes
     - ✓ Irrigation and Drainage Engineering – since 1947
     - ✓ Hydraulic Engineering – since 1947

     Thus, for now, to escape any confusion, it is translated in English as *Hydro Engineering*

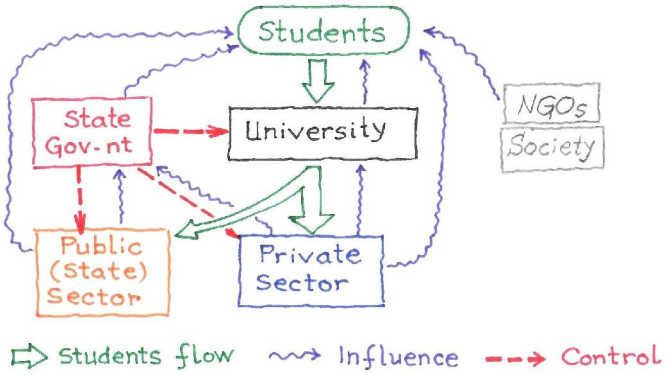
2. Master Programmes in WRM at UACEG

- The following Master Programmes related to WRM exist in UACEG

2. **Master Programmes – 2 years (after BSc)**
   - Water Supply and Sewerage Systems and Facilities
   - Water and Wastewater Treatment
   - Hydraulic Engineering
     - ✓ specialization in Hydraulic Structures
     - ✓ specialization in Hydro-Power Plants and Facilities
   - Irrigation and Drainage Engineering
     - ✓ specialization in Irrigation Systems
     - ✓ specialization in Drainage Systems and River Trainings
   - Water Resources Management (1,5 years) – ***paid***

3. Sustainability Factors and Examples

- The stakeholders – the university is not a single player
  - Students
  - State
  - Employers
  - University
  - NGOs
  - Society



swarm
Co-funded by the Erasmus+ Programme of the European Union

3. Sustainability Factors and Examples

- Stakeholders and study programmes
  - Students
    - ✓ Recognizability of study programmes
    - ✓ Qualification
    - ✓ Public image (realization)
  - State
    - ✓ State policy
    - ✓ Qualification requirements
  - Employers
    - ✓ Qualification requirements (knowledge, skills, competence)
    - ✓ Adequate curricula (to meet the employers' demands)
  - University – a focal point
    - ✓ It is either dependent, or can influence on others

3. Sustainability Factors and Examples

- The factors affecting sustainability
  - Recognizability of the study programme
  - Qualification / Rights of graduates
  - State policy
  - Public image
  - Update of curricula

3. Sustainability Factors and Examples

- Recognizability
  - **The study programme name has to be well known**
    - ✓ Do not change the programme name just to be modern
    - ✓ Traditional employers get confused
  - ***(Bad) Example from Bulgaria***
    - ✓ In the period 1996-2005 the two traditional specialties "Hydraulic Engineering" and "Irrigation and Drainage Engineering" were joined under new name – "*Hydro Engineering*" (free translation)
    - ✓ The "market" was stunned
      - What these graduates can do? Is this Hydraulic Engineering or else?
      - What is their qualification?
      - What are their design rights?
    - ✓ Enrollment of new students - suffered

3. Sustainability Factors and Examples

- Recognizability
  - **The study programme name has to be well known**
  - ***(Bad) Example from Bulgaria - continues***
    - ✓ In the period 2006-2018 the two traditional specialties "Hydraulic Engineering" and "Irrigation and Drainage Engineering" were restored
    - ✓ Enrollment of new students – difficulties (again)
      - Only 4 students enrolled in each of years 2016 and 2017
    - ✓ Eventually UACEG was forced to join these two study programmes again, under the name "Hydraulic Engineering"
      - Trade-off – protected by the state programme – no fees for students
  - Thus, ***don't change the lineup when the team wins***

3. Sustainability Factors and Examples

- Recognizability
  - **The study programme name has to be well known**
  - ***(Good) Example from Bulgaria***
    - ✓ The study programme "Water Supply and Sewerage" is the only mass recognizable in the field of water engineering in Bulgaria
    - ✓ Almost everyone can say what the graduates can do
    - ✓ Sometimes people are wrong, but the good public image exists
    - ✓ Even some private universities started their own study programmes
      - Paradoxically, without having even one teacher, graduated in this study programme
  - **The study programme name has to speak for itself**
    - ✓ Everyone should understand what is the future role/job of the graduates

3. Sustainability Factors and Examples

- Qualification
  - **In Bulgaria a few study programmes are regulated**
  - There are National requirements on the curricula content
    - ✓ There are groups of courses and minimum number of academic hours for each group
    - ✓ The requirements are both for Bachelor and Master Degree Programmes
    - ✓ The study programmes which have to fulfill the requirements:
      - Water Supply and Sewerage
      - Hydraulic Engineering and
      - Irrigation and Drainage Engineering
    - ✓ Paradoxically, there are requirements for BSc of the specialty Water Supply and Sewerage

3. Sustainability Factors and Examples

- Qualification
  - The National requirements on the curricula content are related with the designers' rights only
  - It is difficult to include new study programme in the list of regulated study programmes
  - The Master Programme "Water Resources Management" does not give graduates any designer's rights
    - ✓ It is targeted to people who will operate or manage already existing water management systems
    - ✓ In the Public (State) sector, such specialty is not well recognized yet

3. Sustainability Factors and Examples

- State policy
  - **The water resources management is a state business**
    - ✓ This is valid for governance, operation and maintenance, not in the field of design and construction of water management systems
  - The state is the biggest employer
    - ✓ The municipalities are also included
  - The state sets the qualification requirements
  - The state determines the requirements for each job/position in:
    - ✓ Ministries
    - ✓ State institutions and departments
    - ✓ State-owned companies
  - The state sets the rules for approvement of design projects, etc.

3. Sustainability Factors and Examples

- State policy
  - Wrong state policy can ruin every good deed
  - ***(Bad) Example from Bulgaria***
    - ✓ Ministry of Agriculture and Food (MoAF) has no policy for irrigation, drainage and flood protection
    - ✓ The state-owned company (through the MoAF) is systemically underfunded (last 20 years, at least)
    - ✓ As a result:
      - Infrastructure deteriorates, it is poorly operated and maintained
      - The company ahs bad public image
      - Small number of Irrigation and Drainage Engineers left in the company; No new I&D Engineers candidates / employees
      - **The study programme Irrigation and Drainage Engineering had (almost) no students enrolled**

3. Sustainability Factors and Examples

- State policy
  - ***(Bad) Example from Bulgaria - continued***
    - ✓ Ministry of Agriculture and Food (MoAF) has no direct control on quality, adequacy, compliance with standards of the design projects funded through Rural Development Programme of EU
    - ✓ As a result:
      - Each merchant of irrigation equipment can make design project
      - Some absolutely insane projects are funded
        - » The irrigation water will be delivered by… tank trucks!?
      - No one checks if the standards for design are met
      - No one checks the compliance with other state legislation
      - **The Irrigation and Drainage Engineers could not take part in the design process, in the project assessment, etc.**
      - **NO WORK for the graduates in Irrigation and Drainage Engineering**

3. Sustainability Factors and Examples

- State policy
  - ***(Bad) Example from Bulgaria - continued***
    - ✓ Ministry of Agriculture and Food (MoAF) has no direct control on quality, adequacy, compliance with standards of the design projects funded through Rural Development Programme of EU
    - ✓ As a result:
      - Each merchant of irrigation equipment can make design project
      - Some absolutely insane projects are funded
        - » The irrigation water will be delivered by… tank trucks!?
      - No one checks if the standards for design are met
      - No one checks the compliance with other state legislation
      - **The Irrigation and Drainage Engineers could not take part in the design process, in the project assessment, etc.**
      - **NO WORK for the graduates in Irrigation and Drainage Engineering**

3. Sustainability Factors and Examples

- State policy
  - ***(Good) Example from Bulgaria***
    - ✓ The state realized:
      - its bad (or lack of) policy for maintenance and operation of small dams
      - small number of Hydraulic engineers left in the country
    - ✓ The new (joined) study programme "Hydraulic Engineering" was proclaimed *protected*
      - Students pay no fees
      - Students can be awarded with additional scholarship
      - Students can sign agreements with employers in advance
    - ✓ As a result:
      - The number of students increased: in 2020 – 17; in 2021 – 53
      - The bad news is that the number of enrolled students in Water Supply and Sewerage

3. Sustainability Factors and Examples

- Public image
  - It attracts or repels the candidates
  - It shows how prestigious is the study programme
  - It is created in different ways
    - ✓ State (and state policy)
    - ✓ Employers
    - ✓ other stakeholders
  - ***(Bad) Example from Bulgaria***
    - ✓ In last years "green" NGOs (not only in Bulgaria) shout out loud:
      - Hydro-Power Plants are bad!
      - Dams are terrible and dangerous!
      - Hydraulic structures kill the rivers
    - ✓ Comment: *How we can realize the "green deal" of EU*?

3. Sustainability Factors and Examples

- Updates of curricula
  - It is a "must do" activity
  - The scientific progress is taken into account
  - The employers' interest is taken into account
  - Changes on legislation and state policy are also tracked
  - ***Example from Bulgaria***
    - ✓ Some private companies want changes in curricula
    - ✓ UACEG listens to all suggestions, but most of them are not accepted:
      - Some owners/management of the private companies have no idea what is the meaning/purpose of higher education.
      - Masters are not Bachelors, Bachelors are not Technicians!

3. Sustainability Factors and Examples

- Updates of curricula
  - ***Example from Bulgaria***
  - Study programme "Water Supply and Sewerage"
    - ✓ The curriculum is subject to regular changes since 1947
    - ✓ In mid 80's two specializations were created
      - Water Supply Networks and Facilities.
      - Water and Wastewater Treatment
    - ✓ Course Projects are prepared with a help by specialized software
      - Created by teachers from UACEG
      - Professional (freeware)
      - Commercial (academic license)

3. Sustainability Factors and Examples

- Updates of curricula
  - ***Example from Bulgaria (2)***
  - Study programme "Irrigation and Drainage Engineering"
    - ✓ In mid 80's a subject "Optimization of Irrigation Systems" was introduced
      - The focus is on Irrigation Systems, but the optimization principles can be used to solve other problems of water resources management
    - ✓ In 1995 a special subject entitled "Water Economic Investigations" was introduced
      - Prior to this, some topics on water resources management were part of other subjects

    N.B. Topics related to water economic investigations are still included in a subject from curriculum of Hydraulic Engineering study programme, but not as a separate subject.

3. Sustainability Factors and Examples

- Updates of curricula
  - ***Example from Bulgaria (3)***
  - Study programme "Water Resources Management"
    - ✓ It started in 2009 with duration of 4 semesters (3 + 1 diploma thesis)
    - ✓ Target group – BSc or MSc graduates, working in the State sector
    - ✓ **Paid programme** (not subsidized by the State)
      - Small number of students
        - » Not recognizable
        - » Does not give design rights
      - The number of students decreased, due to permanent increase of tuition fees last 6 years.
    - ✓ The duration was shortened to 1,5 years (in 2019)
      - To reduce the costs
      - Some of the subjects were found not entirely relevant

3. Sustainability Factors and Examples

- Sustainability of the study programmes depends on many factors
- The University has control on few of them
  - Recognizability
  - Qualification
  - Update of curricula

- The University has do its best to control these factors as good as possible

....

Thank you for your attention!