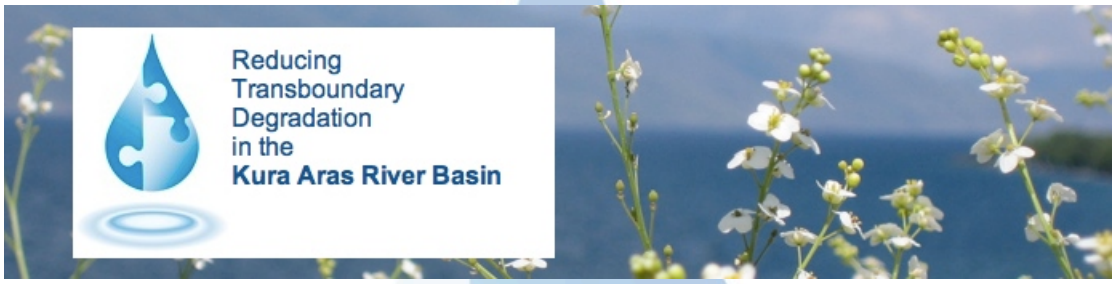


Concept Note for an IWRM Masters Degree Program

Armenia, Azerbaijan and Georgia

2012

1. Summary of Action

The UNDP-GEF Kura Project has undertaken several stakeholder involvement and capacity building initiatives in its work to reduce transboundary degradation in the Kura River Basin. One of these initiatives has been to develop plans for effective Integrated Water Resources Management (IWRM) in each country, in accordance with EU Association Agreements and the EU Water Framework Directive, working with the governments of Armenia, Azerbaijan, and Georgia, and other donor driven initiatives. The Project is working to develop National IWRM Plans that will benefit each country individually and the region as a whole in the area of water management.

One challenge being faced in each country, however, will be effectively and efficiently implementing the IWRM Plans developed by the Project. The concept of IWRM is to have a holistic approach to water management and requires decision makers to consider several aspects of water science and public policy simultaneously such as: hydrology, ecology, water quantity, irrigation, water quality, public health, economics, agriculture, energy, climate change, waste management, transboundary issues, and gender. The education system in this region has traditionally compelled students to focus on only *one* of the mentioned subjects, which leaves decision makers very knowledgeable in that specific area, but largely unfamiliar with the other concepts and often unable to apply them in decision-making.

Such a discipline-specific approach limits the full implementation of national IWRM Plans and River Basin Management Plans in line with the EU Water Framework Directive. To remedy this situation, the UNDP-GEF Kura River Project is working with Baku State University, Tbilisi State University and Yerevan State University of Architecture and Construction to develop linked graduate curriculums in IWRM in order to begin offering Graduate Degrees in IWRM as early as 2013. By educating a new generation of students and future decision-makers in an interdisciplinary and *integrated* approach to water management, the countries will be able to more effectively and jointly manage their water resources at the national and regional levels. Building local capacity for effective water management will also decrease dependence on internationally funded and implemented programs.

The Project has also recently hosted a conference with faculty and administrative representatives from the partner institutions to discuss the need, possibility, and process of offering Graduate Degrees in IWRM. Though political realities and heavy state involvement in higher education prevents the universities from offering a joint-degree program amongst the partners, the individual programs

will be developed together with the expertise of the Project, and will be linked on an through regional conferences held in Tbilisi. At these conferences, students and lecturers will be able to share their work, learn from their regional colleagues, and get to know each other on a personal level.

The project sees the full implementation of Graduate Programs in IWRM as a sustainable and effective means of addressing water management issues all of the South Caucuses and the region as a whole.

2. Relevance

2.1 Proposal's relevance to local needs and constraints

- The proposal is extremely relevant to the water management needs and current capacity constraints of the target countries and region. By building up a base of decision-makers familiar with an integrated approach to water management and the role of the EU WFD in water management, the countries will become less dependent on internationally funded/administered programs and will be able to more effectively manage water resources using local and regional capacity.
- As part of the initiative the Project has conducted a needs assessment with prospective employers of graduates from an IWRM MSc Program. There is a very high level of anticipated local need for IWRM Professionals across the basin in the coming 5 and 10 years. The summary of these findings is in the appendix to this concept note.
- By acknowledging, and working within, certain political constraints in the region, the agreement to "link" the three separate programs on an unofficial basis will effectively address the transboundary aspect of the Project and benefit the region as a whole.

2.2 Problems to be resolved and the needs to be met

- The Project is offering its expertise to the universities to develop an IWRM Graduate curriculum that meets international standards and familiarizes future water managers with the EU WFD to meet the commitments of the EU Association Agreements.
- In order to build up the states' ownership and interest in the programs, the Project is seeking international donors to cover the initial costs of the program for the first two years and then staged decrease their contributions on a regular basis after that, compelling the states to then support the successful programs, making them sustainable and increasing national ownership of the programs.

2.3 Actors involved

- Baku State University, Tbilisi State University, and Yerevan State University of Architecture and Construction, and their concerned governmental entities
- Ministry of Nature Protection, Armenia
- Ministry of Ecology and Natural Resources, Azerbaijan
- Ministry of Environment Protection, Georgia
- The UNDP-GEF Kura River Project
- International Donors

2.4 Objectives and expected results

- Objective: To educating future decision-makers in an integrated approach to water resources management using a common regional curriculum that meets wider international standards
- Expected Result: An increase in local capacity within each country to effectively manage water resources on a national and regional level without long term dependence on internationally funded/administered programs and international experts

2.5 Added value of the action

- The value added to the countries and region is a sustainable network of highly educated decision makers knowledgeable in several aspects of water management and able to take better long-term decisions for shared and limited natural resources.

3. Methodology and Sustainability

3.1 Main project activities

- The project is aimed at developing and implementing Graduate level courses in IWRM at all three partner universities by Autumn 2013
- The Kura River Project is currently working with all three institutions on developing a common curriculum, but other activities must also be undertaken such as:
  - Joint professional development and IWRM training for faculty from all three partner universities to be held in Tbilisi
  - Securing international donors to provide initial start up costs
  - Securing international funding to provide decreasing medium term funding to enable State budgets to absorb costs over longer term

3.2 Main implementing partners

- The main foreseeable and permanent actors in the project are the three partner universities and their associated governmental entities
- The UNDP-GEF Kura River Project, which is acting only to coordinate the Graduate programs project between the universities and will only be involved in the current project as long as the Project has a mandate
- Additional university partners are currently being sought internationally to provide guidance in the development of the curriculum and support to the effort through academic expertise and guidance in the initial years with specific sensitivities to the challenges in the region.
- International Donors, who will provide the up-front costs of the project for the first two years, but then reduce their financial commitment each year until the Graduate programs are self-sustaining

3.3 How the project will achieve sustainability

- By implementing this project through well-established national universities, the Graduate programs are not constrained by the UNDP-GEF Kura Project's, or any other international project's, timeline
- By demonstrating the need for and efficacy of the program to the national governments within the early years of operation, the Project intends for the governments to build up their financial commitment to the programs as international donors withdraw

- By only asking international donors to finance the start up costs of the program, and then contribute to decreasing amounts in the midterm, the universities and governments themselves will be required to make the programs sustainable.

3.4 Multiplier effects

- Builds local capacity for water resources management, decreasing dependence on internationally funded/administered projects
- Provides means to gainful employment for interested students and improved capacity for future employers to implement IWRM and River Basin Management Plans.
- Will allow countries to more effectively and efficiently come in line with their obligations under EU Association Agreements and the EU Water Framework Directive
- Increases common understanding of water management among government sectors within and between countries in the South Caucasus region for future generations of water managers
- Could be replicated at other universities in the region or throughout the world

4. Operational capacity and expertise

4.1 Experience of organization in project management

- Currently developing National IWRM Plans in all three countries by coordinating over 60 National and International experts in water resources management
- Currently working with agencies in all three national governments on Demonstration Projects to develop a common regional metric on determining river system health in line with partner EU Projects, including the EU Kura Project Phase III
- Has already developed and administered The UNDP-GEF EU Kura River IWRM Academy to 62 rising decision makers in the Basin which involved 72 hours of training in all three countries designed to educate current and future decision makers in the basics of IWRM in order to more effectively implement the National IWRM Plans
- Has already hosted a regional conference in Tbilisi between partner universities to discuss the development and implementation of the IWRM Graduate programs, and has already begun working with the universities on a common curriculum

4.2 Experience of organization and partners with issue being addressed

- The UNDP-GEF Kura River Project already has a network of over 60 National and International experts in IWRM and is developing three different National IWRM Plans for the three countries
- The universities already offer many of the courses needed for an IWRM curriculum and are experienced in merging various courses into one degree curriculum
- The international experts for the UNDP-GEF Kura River Project have adapted national curriculum and courses to meet needs for IWRM MSc. This includes core and elective courses offered. (see appendix C) The Project Staff is in current discussion with universities regarding creating courses, and options for further development.

A meeting of the key faculty and administrators will be held 5-7 February 2013 in Tbilisi, Georgia.

The meeting agenda will include:

- Discussion of harmonization of curriculum;
- Areas of need for additional expertise;
- Logistics for start up;
- Funding options at the national and regional level;
- International donor support;
- Plans for the IWRM Academy for Academics July 2013; and,
- Developing partnership with other universities outside of the region.

All interested parties are welcome to attend.

For more information contact Dr. Mary Matthews at mary.matthews@kura-aras.org
and
visit http://www.kura-aras.org

Appendix A - Supplemental — Tentative Budget

Estimated costs for Regional IWRM Master's Programs — Year 1

Cost	Georgia	Armenia	Azerbaijan	KAP
Faculty Capacity Building				31 500€
Salary Supplemental Fund*	35 000€	35 000€	35 000€	
Scholarship Funding (50% of Tuition)	2 000€	2 000€	2 000€	
National Guest Lecturer ($150/Day)	TBD As needed	TBD As needed	TBD As needed	
Regional Guest Lecturer ($200/Day)	TBD As needed	TBD As needed	TBD As needed	
International Guest Lecture ($400/Day+travel+DSA+etc)	TBD As needed	TBD As needed	TBD As needed	
Equipment for E-Leaning	11 850€	11 850€	11 850€	
Text and Learning Material	2 500€	2 500€	2 500€	
PR/Marketing	4 800€	4 800€	4 800€	
Regional Conference	10 500€			
Internship Support	4 000€	4 000€	4 000€	
Addition Buffer, 10% of total				22 245€
				244 695€€

* Based on a supplemental salary of 500€ per month for 10 months, for 7 professors

Estimated Costs for Regional IWRM Master's Programs – Year 2

Cost	Georgia	Armenia	Azerbaijan	KAP
Faculty Capacity Building				31 500€
Salary Supplemental Fund*	35 000€	35 000€	35 000€	
Scholarship Funding (50% of Tuition)	2000€	2000€	2000€	
National Guest Lecturer ($150/Day)	TBD As needed	TBD As needed	TBD As needed	
Regional Guest Lecturer ($200/Day)	TBD As needed	TBD As needed	TBD As needed	
International Guest Lecture ($400/Day+travel+DSA+etc)	TBD As needed	TBD As needed	TBD As needed	
Text and Learning Material	2 500€	2 500€	2 500€	
Regional Conference	10 500€			
Internship Support	4 000€	4 000€	4 000€	
Addition Buffer, 10% of total				17 250€
				189 750€

* Based on a supplemental salary of 500€ per month for 10 months, for 7 professors

Appendix B 1

Regional Needs Assessment Survey Summary for
IWRM Masters Degree Program
Armenia, Azerbaijan and Georgia
2012

5. Summary of Action

As outlined in the Concept Paper for the IWRM Masters Degree Program for Armenia, Azerbaijan and Georgia, 2012, there is a perceived need to train current and future generations of water managers in the fields of IWRM in order to improve prospects for sustainable integrated management of water resources at the local, national and regional level. As part of the supportive initiative for this, the UNDP-GEF Kura Project conducted a survey of stakeholder organizations likely to need staff with IWRM expertise. This summary provides the overview of regional findings from this survey.

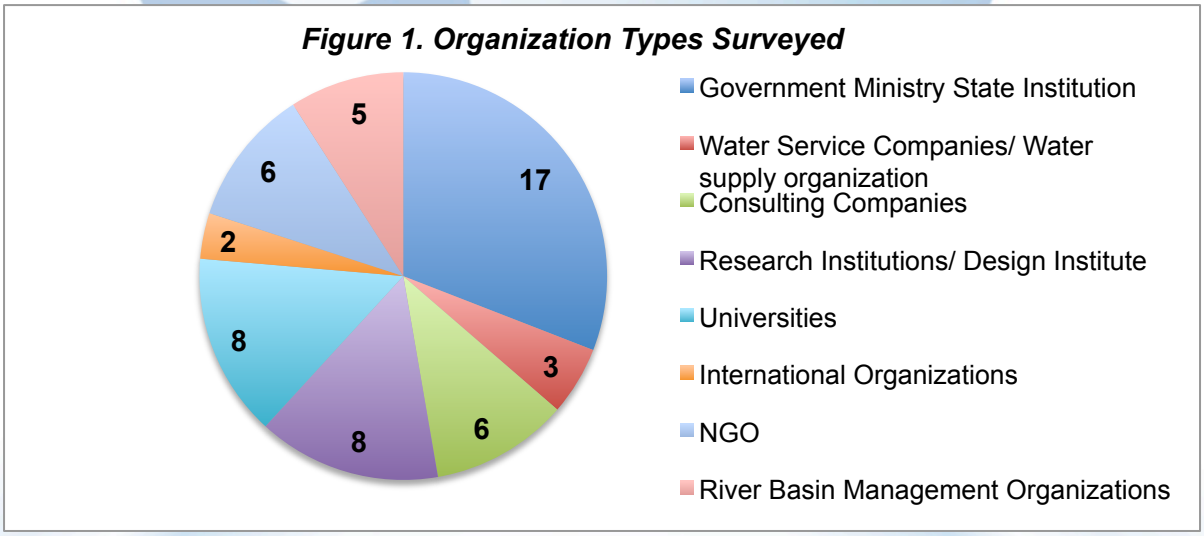
6. Survey methodology

The survey was conducted in September 2012 in Armenia, Azerbaijan and Georgia. The survey was designed in line with international best practices for stakeholder surveys. Surveys were translated into national languages and administered by project staff either through telephone or in person interviews. A total of 48 surveys were collected, drawing from 8 types of organizations, and interview subjects were allowed to self-select from the options provided. The full survey it attached to this report. Aggregate data was compiled pertaining to the survey and summarized in the report below. Full data and more extensive analysis is available upon request.

7. Survey Findings

The findings of the survey show that there is a strong awareness of the need for additional support and expertise in IWRM in each country. Of the organizations surveyed, interview subjects were allowed to self-identify up to three organizations. Figure 1 shows organization types surveyed. The chart shows the numbers of respondents self identifying with each organization type.

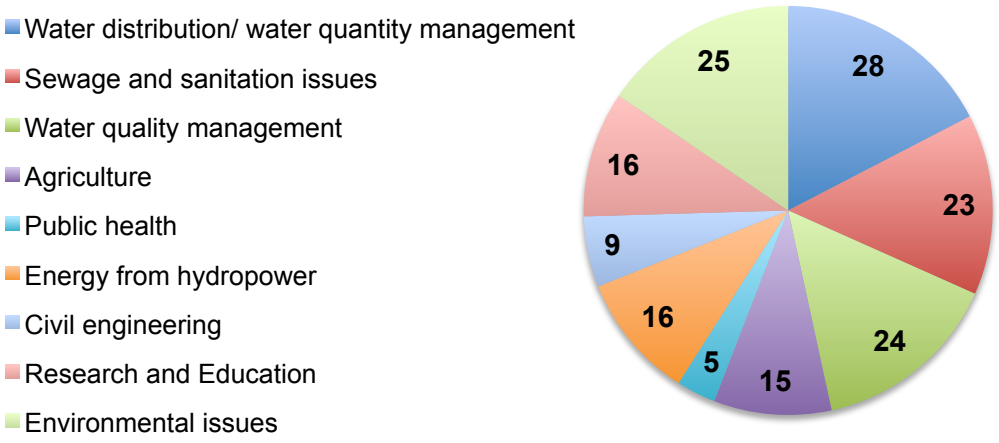
Figure 1. Organization Types Surveyed



The organizations ranged from a wide array of government entities, including Ministries addressing issues of environment, natural resources, energy, agriculture, public health and others. The water service and water supply organizations are those that are joint stock companies. The consulting companies are individual private organizations. The research institutions/design institutes are those who are part of ministries, joint stock companies, universities or private organizations. The universities focused on faculty who deal with water resource management. All were drawn from all three South Caucasus countries except the river basin management organizations, which were solely represented in Armenia.

The focus of the organizations surveyed drew from 9 self-selected categories. Survey participants were asked to name which areas their organization focused on and were not limited in the number selected. Figure 2 provides a review of those selected by participants.

Figure 2. Focus of Organizations Surveyed



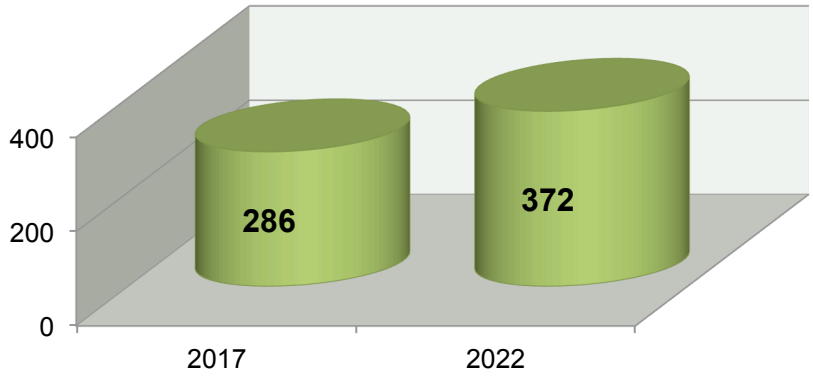
The focus of the organizations selected provides an overview of the organizations working with IWRM related issues, and focusing on water resources management. The inter related nature of many of these, for example water distribution/water quantity management is closely tied to many of the others, specifically sewage and sanitation issues, water quality management, agriculture, public health energy, civil engineering and environmental issues. The expansion of these linkages and exploration into the challenges that this presents to regional and national water management are explored in the *Transboundary Diagnostic Analysis Update* produced by the UNP-GEF Kura Project, due for release in early 2013. Understanding an appreciation for these linkages will be critical in the development of sustainable IWRM for the region and it will be necessary to emphasize these for curriculum development for the national and regional levels.

As this is a summary of findings, the most important findings for consideration are the important level of anticipated need for IWRM experts across the region. The presence of the EU WFD, the pending EU Association Agreements, the awareness of increasing water scarcity as a result of climate change, and the improved

understanding of the need to integrate water resource management to improve economic conditions and human health across the Kura basin.

Survey participants were asked what the anticipated need for additional anticipated IWRM Experts is for the coming 5 years and coming 10 years within their specific organizations. Figure 3 shows the totals of anticipated needs in these periods.

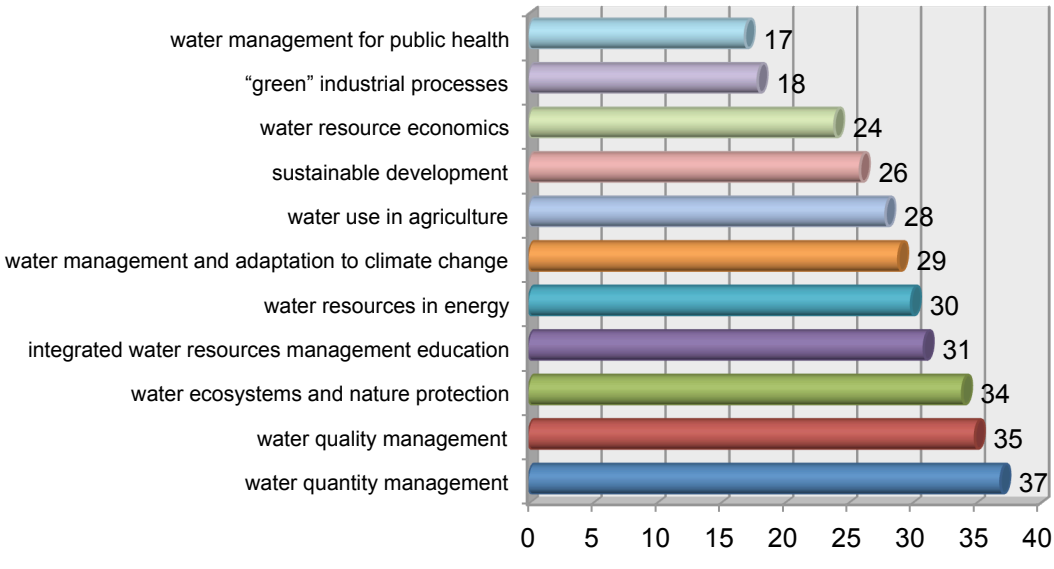
Figure 3. Total number of additional anticipated Water Management Experts needed in South Caucasus region



The distribution of these ranged from 0-40 anticipated for each organization with an average of 7 additional per organization in 2017 and 9 additional per organization in 2022.

The survey participants were asked what areas of specialization within IWRM would be most beneficial to their organization. There was not a limit on the number of options selected. Figure 4 demonstrates the range of expertise needed within the region according to the organizations surveyed.

Figure 4. Needed Areas of Expertise for Water Management



The 48 respondents show that most feel that water quantity management, water quality management, and water ecosystem and nature protection are critical. More than half felt that IWRM education, water resources and energy, adaptation to climate change, water use in agriculture and sustainable development specializations will be beneficial, and over one third believed the having experts in water resource economics, green industrial processes and water management for public health will be beneficial to their organizations.

Of the organizations surveyed 7 actively provide training in IWRM, and 38 of 48 allow employees to pursue graduate degrees while working. Only 2 of the 38 currently will provide financial support for graduate studies.

8. Conclusion

To date there are no academic programs in the Kura Aras Basin countries that teach IWRM at a graduate level. Universities currently offer components that could partially fulfill the needs, but a specific degree that integrates these components, is very much needed to meet the increasing demand for IWRM professionals with experience at the national and regional level. There is strong political will among all three countries to increase the national capacity for IWRM implementation that will enable organizations and state institutions to function more optimally through hiring staff that have an applied understanding of the concepts and principles of IWRM.

To meet the needs outlined here, it will be critical that national level training is provided at the graduate level and within the region to avoid exporting expertise and expenses of training professionals abroad. The development of an IWRM Masters Degree Curriculum in Armenia, Azerbaijan and Georgia is supported by the needs assessment, which shows a high level of anticipated demand in a wide array of topics. To meet this demand, support will be needed from national, regional and international organizations that will play an essential part in building the support and understanding of the water challenges facing the Kura basin in the coming years. Sustainable capacity building at the national and regional levels will benefit the countries and member states of the region, as integration of water resource management becomes implemented in line with national priorities, regional needs and international natural resource management best practices.

For more information contact Dr. Mary Matthews at mary.matthews@kura-aras.org
and
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Appendix B2

IWRM Master's Degree Survey

The purpose of this survey is to learn about current and future needs of your organization, regarding water management. This is done with (National University) and the UNDP-GEF Kura Project to help know how to develop graduate programs for water management experts.

These surveys will be kept completely confidential. No individual or specific organization will be named in any report. This survey is based on your opinions only and in no way implies any formal agreement or commitment from your or your organization. We are grateful for your help with this effort.

Aggregated results will be made available to you on the project web page.

1. Country/survey number:
2. Name:
3. Approximate Age:
4. Gender:
5. Position within organization:
6. Organization name:
7. Organization type:
    a. Government Ministry State Institution
    b. Regional/municipal governments
    c. Water Service Companies/ Water supply organization
    d. Consulting Companies
    e. Research Institutions/ Design Institute
    f. Universities
    g. International Organizations
    h. Private sector
    i. NGO
    j. River Basin Management Organizations (?)
    k. Other type of organization (Specify)
8. Organization funding source: (private, state funds, mix, international, etc.)
9. Size of organization (number of employees, in country for I.O.s):
10. Estimated average age of employees:
11. Estimated average age of management staff:
12. Estimated average number years of higher education of all staff:
13. Estimated average number of years of higher education among management:
14. Estimated percentage of female employees:
15. Estimated percentage of female managers:
16. Estimated percent of people employed in jobs relating specifically to managing water resources:
17. Estimated number of people employed in jobs relating to managing the environment:
18. Does your organization focus mainly on: (check all that apply)
    a. Water distribution/ water quantity management
    b. Sewage and sanitation issues
    c. Water quality management

d. Agriculture
e. Public health
f. Energy from hydropower
g. Civil engineering
h. Research and Education
i. Environmental issues
j. other

19. In your own words in what aspects of water management is your organization involved?
20. Are you familiar with the term “Integrated Water Resources Management”? (If yes go to question 21, 22,23, If no, skip to question 24)
21. How does IWRM relate to the work your organization does?
22. Are you able to find suitably trained staff and managers with expertise in IWRM?
23. Does your organization provide training for staff and managers on IWRM?
24. Does your organization allow employees to pursue graduate degrees while working with you? Is educational cost support provided by your organization for this?
25. In the future do you anticipate needing people in your organization with expertise in national issues related to water resources management?
26. Can you estimate how many people with water management expertise you will need in your organization in the next 5 years? 10 years?
27. Do you anticipate that your organization would benefit from employees with expertise in the following areas:
    a. water quantity management
    b. water quality management
    c. water ecosystems and nature protection
    d. water resource economics
    e. water use in agriculture
    f. water resources in energy
    g. sustainable development
    h. “green” industrial processes
    i. water management and adaptation to climate change
    j. water management for public health
    k. integrated water resources management education
    l. other: (please specify)
28. What does your organization need most in terms of future employees capacity and expertise to be even more successful?
29. From which university do most of your managers graduate?
30. Is there anything you would like us to know or consider about your future employment needs?

THANK YOU SO MUCH FOR YOUR TIME!

Appendix C

M.Sc. Degree Programme in Integrated Water Resources Management (IWRM)

Considerations for Curriculum for Discussion November 2012

IWRM: Principles and Concepts	Core Course
Water Governance	Core Course
Water Resources Planning and Management I	Core Course
Basic Analytical Methods	Core Course
Water Resources Economics and Finances I	Core Course
Stakeholders, Awareness and Participation	Core Course
River Basin Planning and Management	Core Course
Climate Change and IWRM	Core Course
Ecology in IWRM	Core Course
Water Quality Management	Core Course
Infrastructure in Water Resources Management	Elective Course
Municipal Water Supply and Sanitation	Elective Course
Water and Agricultural Development	Elective Course
Ecosystems Management and Restoration	Elective Course
Water Resources Planning and Management II	Elective Course
Legislation and Regulation in IWRM	Elective Course
Water Resources Economics and Finances II	Elective Course
Hydrology I	Elective Course
Environmental Impact Assessment for IWRM	Elective Course
Renewable Energies	Elective Course
Transboundary waters, water conflicts management	Elective Course
Directed study	

Core Courses

1. IWRM Principles and Concepts

Many of the students may be unfamiliar with all of the concepts and principles of IWRM. It will cover the history of the concept, explain its six main principles in detail, the elements of integration and what is needed to make it work (enabling environment, institutional structure, management instruments). It will also outline the main disciplines that are involved in IWRM so that students from the various disciplines will develop a basic understanding of the other disciplines and how they integrate with each other for successful IWRM.

2. Water Governance

This course will cover all aspects of governance in IWRM and include aspects of law, policy, funding IWRM and, further, will include elements of

water resources management, including participation, public awareness, gender issues, transparency and accountability.

3. Water Resources Planning and Management I

The course will start with the hydrological cycle, introducing each of its components, then move to managing water as a resource. It will cover all aspects of the resource – surface water and groundwater, and will include "non-conventional" water resources. It will cover the basics of: resource assessment, including very basic hydrology and hydrogeology, demand assessment, water allocation, floods, droughts, integration of environment and ecological requirements. Water quality and the impacts of various activities on water quality and on ecosystem health will also be included. It will also cover water demand management and other aspects of conservation. It will introduce planning and the types of analysis and information that are needed for it, and the importance of stakeholder participation in the planning process.

4. Basic Analytical Methods

We suggest adding this course to introduce basic analytical tools and methods in statistics and mathematics that are needed for analysis of many IWRM components. Most students will have some background in statistics and mathematics and this course strengthens that background and introduces some specific methods used in all aspects of IWRM, including social assessments.

5. Water Resources Economics and Finances I

We suggest adding 'finances' to this course because of its importance to water resources development. The course will start by explaining the difference between economics and finance. The course will cover economic theory, basics of economic analysis, specific application to water resources management, analyzing options in water resources development (infrastructure, etc.), analyzing the impact of improved management of water resources, and others. It will also cover economic instruments used to change public behavior. It introduces financing in water resources, explores sources of financing and financial instruments (tariffs, cost recovery etc.).

6. Stakeholders, Awareness and Participation

We suggest adding this course that will treat the principles of stakeholders and the importance of their participation in the IWRM process. It will cover stakeholder identification, go into methods in stakeholder analysis, how to get stakeholders involved, awareness methods for informed participation and the functional link with public health and domestic water.

7. River Basin Planning and Management

It introduces a wide range of management areas and issues as a core course. The course will cover both land and water as part of the overall

river basin, address land use and its relationship to water resources and their planning and management. There will be an emphasis on the planning process as this tends to be an area that is often neglected.

8. Climate Change in IWRM

The course will explore the land and ecosystem aspect of climate change. The course will introduce the basics of global climate change, its causes and impacts and the current initiatives to both mitigate it and adapt to it. The focus will then change to the more specific impacts on IWRM issues, including water resources as well as land resources and ecological systems. Both the impacts on these areas and how they can be managed to mitigate climate change will both be covered. Social, economic, environmental and other impacts will be covered. We suggest this become a core course rather than an elective because of its cross cutting importance.

9. Water Quality Management

We suggest no change in this course. It is expected to introduce water quality monitoring, both in the field and in the laboratory, analytical methods to produce information for managers. It will cover the main polluters, point and non-point sources of pollution, changes in water quality with variation in river flow, temperature, turbulence, etc. approaches to reducing pollution, regulation and enforcement of pollution legislation, etc.

Elective Courses

10. Hydrology I

The course will introduce both hydrology and climatology and how these systems work. Starting with climatology, it will move into the hydrological cycle, which should be covered in some detail, explaining rainfall and its various characteristics, surface overflow, soil moisture and its relationship with plants, recharge of aquifers and groundwater movement, the characteristics of river flow, how wetlands work both hydrologically and ecologically, etc. Everyone needs to know these basics.

11. Infrastructure in Water Resources Management

The course introduces the types of infrastructure used to manage water and how they work, typical impacts on the resource and on the environment. It will cover: dams and reservoirs, various forms of irrigation infrastructure, water supply and sanitation, inter-basin diversions, wells, pumps, well fields, among others, and the basics of how they work and their environmental and social impacts. It will also cover the *integrated* aspects of infrastructure, in terms of multi-objective works, how one development may impact another and how planning can be done to optimize benefits, etc.

12. **Municipal Water Supply and Sanitation**

This course will examine issues of municipal water supply and sanitation including basic processes and infrastructure, links with public health, the relationship between supply and sanitation as well as wastewater treatment. Alternative approaches to supply and sanitation will also be explored. Financial and economic mechanisms for supporting sustainable water supply and sanitation development will be addressed.

13. **Legislation and Regulation in IWRM**

The content will cover aspects of water legislation plus other laws and codes that impact on or are impacted by water resources management at the national level and international agreements that also must be considered for IWRM. Implementation and enforcement of legislation will be examined as critical for sustainable development.

14. **Ecosystems Management and Restoration**

This course will cover how ecosystems are managed and why wider ecosystem management is important to water resources management. The course will also cover strategies for ecosystem restoration and wetlands restoration using ecological processes to support sustainable management.

15. **Water Planning and Resources Management II**

This will introduce models appropriate to management and decision making, including planning. This will cover agro-economic models, hydraulic modeling, rainfall-runoff models, etc. The objective is not to produce professional modelers, but rather to introduce modeling and other analytical methods in water resources management sufficient for the students to understand the modeling process and to understand what is behind the results of the analyses when they are faced with them.

16. **Water Resources Economics and Finances II**

This course will introduce optimization methods in water resources planning which includes multi-objective analysis, stochastic analysis etc.

17. **Water and Agricultural Development**

This course will cover how agriculture uses water, what needs to be considered for irrigation planning and management, how such systems are operated and managed and the financial and economic aspects of it.

18. **Environmental Impact Assessment for IWRM**

This course will include a background to EIA itself, and how it works. It will then go more deeply into how an EIA is done, with emphasis on the European EIA Directive. Then, further, to focus on water related EIA issues and considerations. Additional attention will also be given to Strategic Environmental Assessments

19. Renewable energies (with emphasis on Hydropower)

This course will open with material on all forms of energy with some history of the development of energy. It will then continue into renewable energies and why the modern emphasis on renewables exists. The decision making process on selecting energy development will become the focus, then moving into hydropower, its good and bad points, impacts on river regimes, water resources, social and environmental impacts, transmission needs, etc.

20. Transboundary waters, water conflicts management

This course will cover the issues of transboundary water resources and their management, including technical, legal, international cooperation and other aspects. It will also include understanding conflict and conflict resolution approaches.