

Perspective of water environment education in graduate school

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we discuss on the issues on career paths for young PhD holders in the field of water sciences and technology in Japan, especially focusing on degree program in the PhD course, potential career paths in this field, matching of the human capacity between needs of the business world and seeds of the academic world, etc.

Keywords: human resource education, water environment, graduate level, environmental leadership

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Issues on career paths of doctor holders

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Issues on job hunting of doctor holders will be discussed from the various kinds of view points.

Keywords: doctor holder, career path, job hunting

Doctor course education and carrier pass on the water field

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Water is essential for human being, so that research works relevant to water have been continued for a long time. Therefore fundamentals of water research are in a mature state. Nowadays disaster prevention and aquatic environment which are parts of the fields of water research are focused as a government policy. This policy is supposed to continue at least five years as a program, but nothing is clear after that. This procedure does not give psychological stability to young researchers.

In Japan, Japanese candidates for admission to the doctor course in graduate schools have been decreasing. Since due to this movement, most of colleges in Japan have not reached the quota, they have already started to reduce the quota to fulfill the regulation by MEXT. This action seems to solve the vacancy problem in the graduate schools, but it does never solve the essential problem on this subject in Japan. There are many spectral elements relevant to this subject; the government, MEXT, colleges, enterprises, candidates, and the society. Problems in each relevant sector are considered;

Japanese science policy: Japanese Government is to hold a management plan on the intellectual property regarding not only cutting edge ones but traditional ones based on many experiences like biological taxonomy which do not develop new scientific horizons. When national universities were privatized, the Government had to hold a policy on how to keep intellectual properties like this one. The national universities cannot keep these properties as they used to be.

Research program by Japanese Government:

Japanese Government has a basic plan for systematically and comprehensively promoting Japanese science and technology policies. Now the 4th Basic Plan is positioned as a national strategy under MEXT. This plan consists of five year projects in significant regions of science and technology. The major targets are as follows:

1)A nation that realizes a safe, secure and high-quality society and lifestyles for its people; 2)A nation that achieves sustained growth and development while maintaining global superiority; 3)A nation that will take the lead in resolving global issues in cooperation with other countries, etc. In 1) and 3), research topics relevant to water are included. The topic 1) (ii) is that a nation realizing a safe, full and high-quality life for citizens, and (iii) a nation leading in the resolution of global problems such as large-scale natural disasters. Other ministries such as the Ministry of Environment and Ministry of LIT have their own research projects for their own purposes on administration. These projects target for obtaining useful research results on administration, not for accumulating intellectual assets. This means they would not necessary work for capacity building of young researchers regarding a finite term and slight light on basic science.

Research policy in graduate school: MEXT has a variety of funding programs for research in graduate schools, which have a function on making graduate schools face into the same direction. Each university has a difficulty to have its own policy without enough finance. The government would like to get fruits on research through its program. On the other hand, universities have to spread seeds, water and manure. The actions universities have to take could work for capacity building of young researchers.

Education in graduate school:

Education in doctor course in Japan is not attractive and does not give any incentive to study hard to most of the candidates. They also do not have motivation to establish their own research foundation. Systematic learning on their target field should be available.

Countermeasures for carrier ladder: In order to make postdoctoral fellows work stably the program leader always pays attention to capacity building as researchers. Taking a balance between driving the research project and fulfilling strong desire for basic study and research is of importance.

Keywords: Japanese science policy, MEXT policy, college management policy, education concept, employment

Organization of monitoring on forest hydrology

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Forest hydrology has a monitoring history near one hundred years, and about 10 years have passed since the system establishment of flux monitoring. 'Future earth' in ICSU considers the resilience and threshold of ecosystem in response to environmental changes as key subjects, but we have a very pessimistic future for the continuous monitoring in Japan. We have to create an organized system for the monitorings beyond the unsatable maintenance by short-term study funds. The presentation will consider the observation and data-processing work with a high technology as one of the career paths for PhD hodlers.

Keywords: forest hydrology, site monitoring, organization

Current program and its related perspectives on Environmental Groundwater Leader Program at Kumamoto University.

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Waters for urban lives, agriculture, and industry are all supplied by groundwater in Kumamoto City with population over 700,000. Owing to the extensive existence of porous lava flows (Togawa Lava) and pyroclastic flow deposits from Mt. Aso, water is excellent in quality. Because of the richness in amount and quality, Kumamoto City is well known as the top groundwater city in Japan. For the sustainable management of local

groundwater resources, Kumamoto City has already started to implement advanced management of groundwater resource in consideration of the total groundwater system from the recharge to discharge areas. Such background is very preferable to establish a groundwater environmental program at Kumamoto University and Groundwater Environmental Leader Program (GelK) was born in 2010. We would explain its current situation and future prospects.

Keywords: groundwater management, Kumamoto area, Environmental leader

Educational Program of Water Science in Graduate School of Advanced Integrated Study in Human Survivability

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In Kyoto University, a new Graduate Program entitled as "Graduate School of Advanced Integrated Study in Human Survivability" is being launched since April 2013 seeking for educating talented global leader capable in comprehending current critical status of our planet and in making appropriate decision in every stage in integrated worldwide society.

The target profile for a program graduate is an individual who is willing to assume responsibility as a global leader with a high sense of mission and ethical perspective, is capable of enduring various kinds of pressure and integrating existing disciplines and areas of concern through flexible thinking that stems from a broad spectrum of knowledge and profound expertise, and has acquired the appropriate discernment and ability to act "in the field" through abundant practical training both in Japan and abroad.

In this graduate school, we lead water science based on hydrological basin connected to the ocean as basic unit in comprehending "Positive" and "Negative" perspective of human activity. In the "Mutual Linkage between Human Activity and Nature", we introduce the "Positive" perspective of the hydrological basin through learning mutual linkage among upstream forest, village, river and estuaries connecting with ocean. In the "Global Environmental Risk Management", we introduce the "Negative" perspective of the hydrological basin through learning public pollution events including "Minamata and Itai-Itai" diseases induced by organic mercury and cadmium into the basin and radionuclide transport in the basin. We also introduce the importance of the presence of water in the geophysical history of the earth through "Earth, the Water Planet".

Above education should be accompanied with the field observation activity, on the other hands, there are essential issue which can be learned only through field observation, at the same time, there are always existing "Risks" in educational field. We would like to propose the need in sharing such experiences in field science study.

Keywords: Study on Human Survivability, Water related educational program, Watershed, Material circulation, Pollutants

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Trials of ICRE-UY

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Trials of UCRE-UY

Future Earth; Integrated Program of Global Environmental Change Studies

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During the last decade, each discipline oriented researches for global environmental change have achieved excellent progress, however, the real global environmental problems have not been solved yet. Disagreements between developed and developing countries, and science and society are the most urgent issue for all stakeholders. In order to take a step forward, ICSU/ISSC/UNU/IGFA/Belmont Forum/UNEP/UNESCO have launched a new 10 years program Future Earth which focus on co-design/co-production, transdisciplinarity, vertical (multi scale: global-regional-local) and horizontal (multi issue with different sectors/stakeholders) integrations, and the involvement of young scientists. These are very important and urgent for solving global environmental problems. In addition to these, the regional perspective to the Future Earth is also important. More than 50 percent of the worlds population lives in Asia, and huge cultural/economical/ environmental/political diversities exists in Asia. Drastic changes (both increase and decrease) of population, material consumptions, environmental deteriorations, natural and social disasters, occurs in Asia, i.e. Asia is the most hot spot area in terms of human and nature drives. Discipline oriented research has a tendency with quick impacts but quick phase out. On the other hand, interdisciplinary and transdisciplinary research has a tendency of slow and long impact to the society. Both possibility and problems for young scientists exists in term of interdisciplinary and transdisciplinarity research. As fresh water security has been launched as one of the future earth project, hydrology requires integration of the problems such as water-energy-food nexus. For co-design/co-production of the future earth program, scientists should consider whom and when the stakeholders to be involved in.

Keywords: Future Earth, co-design/co-production, fresh water security, young researchers

An approach to establishment of a research and educational system by cooperation of graduate schools

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This presentation illustrates typical examples that are fostering interdisciplinary education at the graduate school level in Kyoto University. Two programs are introduced: Global COE Program "Sustainability/Survivability Science for a Resilient Society Adaptable to Extreme Weather Conditions" and Leading Graduate Schools Program "Inter-Graduate School Program for Sustainable Development and Survivable Societies" under the cooperation of graduate schools. The former consists of 5 Graduate schools and 2 research Institutes, while the latter 9 graduate schools and 3 research institutes. They respectively have formed a curriculum for interdisciplinary education, providing various opportunities of lectures, interdisciplinary seminars, international schools, internship, and field training. Thus these programs are nurturing young promising students to be global leaders in various international situations.

Keywords: innovation of graduate schools, interdisciplinary education, field exercise, global leaders, nurturing promising students