Ten questions for Associate Professor Dr. Pham Quy Nhan

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1. How did you get into the field of water resources? What interested you about this field? Why is this field important in Vietnam?

My hometown is a poor village in Thanh Hoa province, right next to the gentle Ma River, where I used to see the daily water intake and bathing during my childhood. While I grew up I witnessed American and Vietnamese air forces in the sky during the Vietnam War. Ever since I was a teenager, I asked myself questions like where does the river origi nate from? Why is river water better to brew tea than well water? (Lately I learned that TDS in dug wells' water of my hometown was close to the threshold 1g/L, leading to lower quality drinking water). The Ma River flowing through my hometown left me with all kinds of serenity, it was poetic in the early spring, and in the rainy season of August it fiercely swept away all the trees. Perhaps those were the reasons that made me choose this research field.

In our day, mathematics and allied fields created a special attraction. When I entered university and majored in hydrogeology, geological knowledge opened up for me to understand the formation of the earth and the path of water molecules, and once again I was blown away. The knowledge of earth science combined with problems about the movement of underground water fascinated me at that time.

Vietnam is one of most heavily affected countries by climate change and sea-level rise. Average annual surface water resources which are generated from outside the territory of Vietnam are greater than 64%, indicating that water resources depend a lot on water resources outside the country. If we take the international standards on the limit of water scarcity of 4000 m3/person/year, many regions of Vietnam are already experiencing water scarcity at different times. Many regions are even extremely scarce, meaning the annual water per capita < 1700m3/person/year. Besides, the hazards caused by water such as floods, droughts, saltwater intrusion, flash floods, etc. are increasing, causing great damage to the community.

Furthermore, the increasing demand for economic development requires the amount of water supplied for different purposes to increase, requiring IWRM solutions since resources in Vietnam are very limited. Therefore, the research and development of water resources in Vietnam have never been as important as now.

2. Can you give a short summary of your early career and how you got to being an associate professor at HUNRE?

When I was a kid, I just wanted to be an engineer, a teacher was never considered an option because my parents and brothers were teachers, and it wouldn't be fun to have another teacher in the family. However, fate is inevitable. When doing my graduate project at the University of Mining and Geology, I was guided by the head of the Department, a very famous professor in Vietnam on hydrogeology. Right after graduating, the Professor instructed me to stay and do research and later become a lecturer in this Department.

During the time I studied and taught at the University of Mining and Geology (1983-2009), there were many political events for Vietnamese society such as the Sino-Vietnamese War (border skirmishes with China), the dissolution of the Soviet Union and communism East European countries. Such circumstances required a great deal of effort from our research and teaching staff. Due to economic sanctions, resources for teaching and research were very scarce. Regarding foreign reference books, I studied French at high school, then Russian in the university, and self-studied English after graduating. By doing that, I could understand the materials of my profession. At that time, studying abroad was also frozen due to the Fall of Nations while Western countries did not accept us yet.

To do my doctoral thesis, I had to read old Russian documents and a scanty number of Western documents. I remember, in the 90s, the theory of groundwater movement according to Soviet books was a pseudo-3D (Quasi-3D), while I did research from the instruction manual of the MODFLOW model, it was set for real 3D flow. I presented the results of my research on groundwater numerical simulation based on that model but did not get the consent of the supervisor. He used to study for nearly 10 years in Russia and did not have access to Western documents yet.

Fortunately, as soon as the embargo was lifted, many companies entered Vietnam and I had the opportunity to consult a Dutch company, IWACO which later merged into HASKONING to explore and exploit groundwater source for setting up Ha Tay brewery, specializing in producing Heineken and Tiger beer in Vietnam in the years of 1995-1996. Thereafter, my involvement in collaborative projects with researchers from SGI, Chalmers Univ. (Sweden), DTU, GEUS (Denmark), TU Delft (Netherland) on Nitrogen pollution, Arsenic,

salt intrusion in groundwater and some other issues made me mature a lot. Perhaps, the self-study through the teaching and research process helped me to improve my capacity and I was also honoured to be appointed as an associate professor in the 2000s. It is also important to remember that at that time the position of the associate professor was recognized at all the graduate and postgraduate institutions in our system.

3. What made you want to stay in the academic field within your career?

From the beginning, I did not like the academic environment as my whole family members are all teachers, but the universities where I teach and work have kept me from quitting up to now. Furthermore, my family's tradition has the slogan "Famers plough field, our family plough books". I believe that any field of research has interesting things as long as we are still passionate about it. The more we research, the smaller our understanding becomes and thus the more we want to know. As I got older, I realized the meaning of the idiom: "If you want to go fast, go alone, but if you want to go far, go together" and this shows that teamwork is very important to be able to go further. Working with young colleagues in the university has kept me in the fire of passion.

4. What subjects do you enjoy teaching the most?

I was in charge of teaching many subjects in my teaching life, but perhaps the subject that I love the most is "Groundwater Modelling" because it has the theoretical basis of mathematics, computer science, architectural knowledge and art, as well as the sensitivity of parameters in validating and the possible simplification. This is probably the subject where the "Art of Teaching" principle needs to be most applied in order to best convey the content of this subject.

5. What is your research philosophy?

“Explain research problems as simply as possible"

6. In your career, what has been some of your favourite research and why?

In my career, my favourite research issue is the saline intrusion in the two largest deltas in Vietnam, the Red River Delta and the Mekong Delta.

Groundwater is a very valuable resource for living and various purposes. However, understanding the different distribution of the freshwater/saltwater interface in the aquifers is still an unknown that scientists have long been interested in. Knowledge of the mechanism and origin forming the distribution of freshwater/saltwater interface ensures the effectiveness of solutions for sustainable management and exploitation of groundwater resources in the deltas. These studies not only contribute to addressing the solutions to existing problems in those deltas but also contribute to the clarification of the mentioned phenomenon in many other deltas in the world.

A combination of traditional and modern research methods has been applied such as surface geophysics and borehole logging, isotopic techniques and groundwater age determination, remote sensing, and modelling. Researching results on this issue over the past 10 years have initially yielded positive results. Some articles have been published in prestigious journals around the world, such as the article: "Groundwater arsenic concentrations in Vietnam controlled by sediment age", 2012 in Nature Geoscience. Additionally, many generations of students and graduate students have also graduated from participating in these research projects, and more importantly, the results of the topic have been put into practice in water resource management in the Red River Delta.

7. What do you enjoy most about collaborating with International researchers?

It can be said that international cooperation is the key to promoting development in teaching and scientific research and playing great significance to developing countries like Vietnam. International experience and resources have shortened the development process and this is more evident with the open policy of innovation in Vietnam in recent years. Through international cooperation, we have gained different aspects including facilities and specific research results, and the most important thing is to learn professionalism, problem approach, solving methodology, and to expand our collaborative research network. The partnership with TU Delft is the most sustainable we have ever had up to now.

8. What are some of the research projects you're working on now?

We have just finished researching a state-level project on "Assessment of salt intrusion vulnerability and proposal for mitigation measures in the context of climate change and sea-level rise in aquifers in the Central Coastal Deltas' aquifers " (2017-2020) and at the end of this year, we will be granted another state-level project entitled "Research on solutions to restore groundwater extraction works due to salinization in water-scarce areas in the Southern Delta Plain" 2020-2023. This is a very interesting research issue for scientists at home and abroad, including scientists from the Netherlands. Hopefully, this research will receive the attention and cooperation of scientists around the world.

9. What, up until now, has been the best memory of your career?

I have been lucky to collaborate, study, and work with some famous scientists in the world such as Dieke Postma or Cliff Voss. Dieke Postma is a Dutch man and together with Appelo who published a very famous and worldwide used textbook: "Geochemistry, Groundwater, and Pollution". In 2004, I met him for the first time in Hanoi and sat next to him at dinner. I discussed the book's content with him. I asked him if he knew the author named Postma because I only knew that he was Dieke from the conversation. He slowly said "I am Postma" and that confused me the whole dinner that night. He was quiet, serious, and confident in the process of researching with us during the next 15 years and we have learned a lot about his wisdom.

10. What advice would you give to young researchers and academics?

Always keep your passion and dedication; the results will come to you. However, to do this you need to be equipped with certain background knowledge. Studying in school is extremely important, but self-study and foreign languages are the keys to reaching endless human knowledge.