

Water Education in Timor Leste

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Abstract— This paper presents water education issues and challenges in Timor-Leste and the way forward to introduce water education into school curricula. Subjects related to water education are not properly integrated into the curricula of all education levels, from primary schools to universities. The water subjects do not form one independent discipline of the school learning process, but are only taught as part of other disciplines, like biology, environment, geographic and natural sciences including geology. The final part of this article discusses the water subject at university levels such as in biology, civil engineering, agriculture and geology.

Water education in Timor-Leste is still a crucial subject, one that needs high attention by the all parties, like the government, communities and other stakeholders. Nowadays, after independence, Timor-Leste still has various problems related to water, such as not having an integrated water management, protection, conservation and water supply for domestic and agriculture use in both urban and rural areas. Therefore, Timor-Leste introduced a water resource conservation education program for the students and communities, conducted by the Ministry of Public Works, Permaculture NGOs and the Timor Geoscience Development society. This program delivered seminars for teaching communities on how to protect and conserve Timor-Leste's water resources and environment. The WASH Learning Network also organized a workshop for decision makers, students and community leaders which consisted of seminars, discussions and videos on water pollution, water management and sanitation. Sponsored by UNESCO, the conference gathered international experts who shared, taught and rose awareness of the communities on the need to dialogue in order to improve water education in Timor.

Improving education service delivery forms part of one of the pillars of the country's strategic plan. Therefore, Timor-Leste needs to integrate water education into schools' curricula as a core discipline with the main purpose of teaching and educating students and the communities, including the young generation, on how to manage, protect, conserve and use water in a sustainable way. There are many challenges to face regarding the management of the communities, schools and decision makers. This raises the need for community conservation programs and the implementation of integrated water education in Timor-Leste as crucial ways to reduce the water issues, in order to secure water resources and ensure sustainable water use for all communities.

Keywords: *Water, Education, integrating water subjects.*



1 INTRODUCTION

Water education is a very important issue that needs close attention and careful consideration by the fragile states in the world, including Timor-Leste. We need water education to promote the transformation of our mentalities and communities' behaviours on water management, protection, conservation, water supply and use. The introduction of water education curricula in schools as outlined below is a fundamental key to change and increase the knowledge and abilities of the communities. This can lead communities to understand and manage water resources and, at the same time, change their lives as well. Water education and the study of water are fundamental because water is a vital resource essential for the survival of human beings and all other living beings in our planet (Ferreira and Aoki, 2014).

Water education in Timor-Leste is not recognized as a discipline, but as a chapter included in different disciplines, such as natural science and geography, biology, geology and also environmental science. In this way, it is still scattered in various subjects of the primary school and secondary and university level studies. Water subjects that are included in higher education are taught in biology and chemistry departments as a part of environmental studies. There is not one discipline which is focused only on water subjects. This is one of the challenges for Timor-Leste as a young country. Indeed, the present ecological and environmental disasters, water security and water pollution threats are potential issues with significant implications for the development process in all sectors. Timor-Leste considers that water education is a very important goal that must be carried out in three education levels: El-

ementary School, University and the communities. This has the purpose to provide an integrated vision for both students and communities regarding water issues, its supply and use.

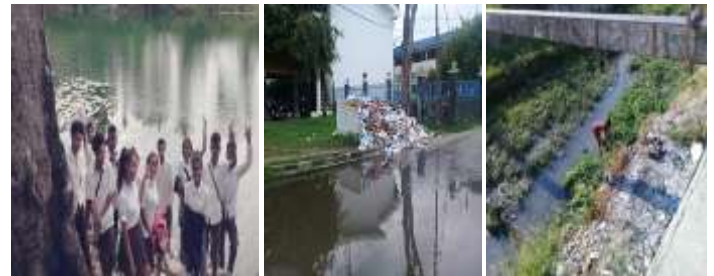


Fig.1 *Lake conservation activities from students, wastewater in open sewage, waste deposit and flooding in the City.*

Why is it necessary to integrate water subjects as independent disciplines of the education curriculum? Because water is the most precious gift and the fundamental element for the maintenance of life and the environment. The survival of the human species, conservation and balance of biodiversity, including dependency relationships among living beings and natural environments, all depend on water. Therefore, the management, protection and conservation of water resources are fundamental to our life. Timor-Leste must take serious actions to manage, protect and conserve its water resources. Indeed, water crisis occur periodically and we must be prepared for their implications in the wellbeing and economic development. Water education is a key ingredient for providing solutions to water problems and the recognition of the water's value to our life and planet (Stone, 2005).

In Timor-Leste there are programs for communities and students on water resources' conservation and education, which were orga-

nized by the Ministry of Public Works under the National Directorate of Water Resource Management in cooperation with some local NGOs, such as the Permaculture and Timor Geoscience and Development Society (TGDS) and the WASH Learning Network. These actions included seminars and workshops for the local authorities, students and communities regarding water management, protection and conservation and also additional information about water pollution and environment.



Fig. 2. Workshop on water quality and water pollution in Timor-Leste.

The main objective of this paper is to outline water education issues and challenges in Timor-Leste since its independence until the present time and the approaches for introducing water education into school curricula.

2. Water Education Issues and Challenges

As referred previously, one of the potential issues related to water education in Timor-Leste is that water subjects are still included in other disciplines, such as natural science and geography, biology and also geology and environmental science. Natural science and geography are taught in primary schools and biology and geology in secondary high schools and universities. Therefore, water subjects are only outlined in an intro-

ductory chapter about general concepts of water resources, such as its definition and use. More detailed descriptions about water questions, such as the distinction between upstream and downstream, are not covered. Therefore, students lack knowledge and understanding about almost all questions related to water resources in Timor-Leste. Another challenge is the lack of communities' assessment (knowledge?) or access to water education. This is due to capacity building limitations in water issues among the communities.

National and international NGOs and also the relevant government department have provided non-formal education on water supply maintenance, service and conservation through training campaigns and dialogue with the communities in Timor-Leste. However, such campaigns are not held regularly and are very limited. Moreover, they do not cover all the national territory of Timor-Leste. Therefore, it's very difficult for the communities to increase their knowledge and abilities regarding water. The government of Timor-Leste, through the Ministry of Education and the Ministry of Health, have launched a program and a campaign about water resources conservation in Timor-Leste and hand washing.

We recall that water studies are not the subject of a specific discipline in the school learning process. Although the government of Timor-Leste has set up the priority actions for rural and urban water supply, these priorities are concerned with water services for communities and not with the definition of the water curriculum to teach in schools (Service Delivery Assessment, 2015).



Fig.3. Discuss and information sharing related to water, hygiene and sanitation issues in Timor-Leste which involved UNTL, Water Aid, TGDS and Permaculture.

3. Approaches to Introduce Water Education into School Curriculum Water Education Issues and Challenges

The first step to introduce water subjects into the school curriculum is to identify and understand well what potential resources exist. In our case these are the primary, secondary and senior high schools, including universities. It is important to involve the schools in Timor-Leste to introduce water subjects as a specific discipline in the education sector in order to teach and educate students about water resources and water management. Moreover, we came to the conclusion that the role of the teacher is very significant. He/she may contribute to the formation of students with educational practices that help to understand the local and global realities and to foster promotion of habits and attitudes regarding water utilization (Ananias Freitas and Gomes Marin, 2015). It is expected that teachers will have access to adequate training so that they can encourage their students to acquire knowledge, skills and atti-

tudes towards water and environmental resources.

Another approach is needed to formulate well the water curriculum of the different school levels, assigning different water subjects to primary schools and to universities. We need to start and introduce the general concept of water resources and its environment in primary schools and senior high schools and to continue with more specific water subjects, such as management, protection and conservation. These should include case studies related to water resources, ecohydrology and environment of Timor-Leste. Regarding water education, the government of Timor-Leste through the Ministry of Education has introduced water subjects as a chapter in the natural science and environmental disciplines in primary schools and in the geography, biology and geology subjects in senior high schools and also universities (Annual Report, 2016).



Fig. 4. Awareness rising on water conservation, working with community leaders and water should be part of existing hygiene promotion campaigns.

Partnership in decision making and planning design for water curriculum as an integrated approach for water education in Timor-Leste is necessary. It is also important to make an effort in raising community awareness for improvement

of water management, protection and conservation. The implementation of public education programs for communities, school programs and youth education curricula for water conservation are very important to promote. They facilitate awareness, appreciation, knowledge and stewardship of communities and youth in performing good water resources management and conservation. These programs also provide resources to help communities, educators and students at all levels to become involved in taking care of the water environment (Swistock *et al*, 2010).

4. Conclusion

Water education is the key to promote water management, protection and conservation including water security. Therefore, we need an adequate investment in water education for all levels, for formal and non-formal education and also education for the decision makers. Because water education is still a big issue and has many challenges in Timor-Leste, it is necessary to build good partnerships with all parties at national and international levels in order to design well water curricula for schools. The most important resources are human resources, such as teachers and trainers. Through their roles and quality contributions it will be possible to drive water education in schools.

We should be aware of the lack of communities' access to water education due to the present resource limitations. There is a need of water trainings, dialogue and workshops that take into consideration the lack of water management, protection and conservation. These are big challenges for Timor-Leste.

Fundamental to water education development in Timor-Leste is a better understanding and formulation of the water curriculum through good partnerships with the relevant stakeholders. Timor-Leste should adopt the initiative of IHE on water education: we need water education to manage water resources, perform a good management of the fresh water of both surface and sub-surface within the national territory.

The introduction of water subjects as a proper discipline is the key to teach and educate students about water resources and water management. For this reason, the role of teachers and trainers represents a significant contribution to the education of students and communities in water education.

Timor-Leste needs to learn more from the experiences from other countries, in particular on how to make integration of water curriculum into schools and how to ensure its sustainable functionality. Finally, we expect that collaboration with Southeast Asian countries will result in fruitful partnerships for water education development.

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