

Assessing the effect of integrated water resources management on the quality of water in the Pra Basin Ghana

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Valorization

This chapter discusses the importance of this dissertation to social, economic and environmental development. It also discusses how the findings can reach the target group. Partial implementation of integrated water resources management is a major setback for effective water resources management. Ineffective water management, therefore, has negative consequences on the environment and socio-economic developments. Thus, effective management of water resources is very important for today and future society. Unfortunately, little empirical evidence exists on extensive and regular assessment on how the water resources management in the basin have been effective. The findings in this dissertation provide an overview of water resources management in the Pra Basin of Ghana. It highlights the implementation gaps and its consequences on effective water resources management.

The main gaps identified in the effectiveness of water resources management centers on the implementation framework (Chapter 2). A good and practical implementation framework is very critical for effective water resources management (Hassan 2009). There are recommendations on how to implement fully IWRM to enjoy the full benefits. The empirical evidence in this dissertation shows the effort put in place in setting up the Pra Basin implementation framework. However, the state of the water resources in the Pra Basin raises a question about the effectiveness of the implementation framework: a suspicion this study has confirmed. Thus, policymakers must augment their effort to strengthen the existing inter-sectoral collaboration among water and its related sectors to improve on coordination, actual participation, and execution of roles by all stakeholders especially those who are not at the basin level. This inter-sectoral collaboration even though already exists on paper, there is the need for water resources commission (WRC) to either equip or help the related stakeholders mandated to carry out some responsibilities source for logistics, human resources, etc. to ensure the practical transfer of information and data. WRC must come together with especially the technical stakeholders who only operate at the regional and national offices to create offices at the districts.

The findings in this dissertation provide information on the gaps contributing to the continuous deterioration of the water resources due to ineffective water resources management in the Pra Basin and pointed out some specific areas of intervention for improvement. For instance, chapter 6 revealed the absence of empirical evidence as to the cause of intervention failure. This dissertation recommends the establishment of a research and innovation team to liaise between the field and policymakers. This team should be composed of people with the local, social and the psychological, etc. expertise to ensure versatility, efficiency, and effectiveness.

Chapter 2 emphasizes the lack of IWRM awareness and education and the absence of training for environmental health officers (EHO's). There is a need for regular IWRM education and awareness creation through radio, television, durbars, and schools (debates, symposium, etc.). The expectations are that policymakers will plan this

outreach program with timelines, budget and source of funding clearly indicated. This, when properly executed, will help spread the benefits as well as addressing the challenges of water resources management. The environmental health officer knowing his duties and being equipped with the knowledge and skills to carry out his duties are important determinants of his/her expected output. Currently, the University of Cape Coast is offering diploma and post-diploma programs for EHO's and other related sectors. However, most EHO's are not patronizing because of financial difficulties, inability to secure study leave and the inability to upgrade after training. WRC and the environmental health directorate can collaborate and work out the modalities to help train the EHO's and also draft a policy to outline the modalities concerning how and when trained officers will benefit from such training mentally, socially, environmentally and economically through upgrading after training. They, WRC can also collaborate with the University, to run short courses for the EHO's who are already on the field.

In chapter 2, this study recommended that an effort is made to incorporate IWRM into the training of EHO's in the long-term plan. It also proposes the establishment of a desk in all the districts assemblies as a long-term project. It must be emphasized that even though EHO's have general training in water in their syllabus; it is woefully below the level of IWRM delivery. By introducing substantial component into the training syllabus, all EHO's will have the exposure and will be equipped with the knowledge for the work ahead. Furthermore, the workload for EHO's is also a big challenge if they are to combine it with IWRM roles. They are already over-burdened by the major role they play in sanitation monitoring and rural water supply. Additional responsibilities may render them ineffective and unproductive. Creation of a separate desk with trained water and sanitation graduate or an EHO solely to manage water-related issues at the district level is important in strengthening the water resources management framework and delivery.

Concerning the beliefs and attitude of miners towards saving the deteriorating water quality and the environment, the perceived behavioral control (PBC) which was made the main focus of the intervention by the government was found not to be true in this study: a wrong selection of PBC was due to lack of empirical evidence. Gathering of empirical evidence and full or practical involvement of all stakeholders at all levels from the planning to implementation is very critical for introducing interventions successfully. Although PBC was not a significant predictor of illegal miner's behavioral intention (BI), the attitude was found to be the dominant significant antecedent of the behavioral intention. This empirical evidence can serve as a guide to interventions in basins of similar characteristics as well as being used by the Water Resources Commission (WRC) to strategize and reintroduce the intervention to save the water resources. WRC could achieve that by strategically directing all their expertise and resources in the sensitization and education of illegal miners' by focusing on the behavioral belief variables which

were found to be reliable in addressing the beliefs in this study: improving raw water quality, protecting the ecosystem, helping regeneration of fishes and reducing water pollution. The link between subjective norm and attitude could be relied upon by WRC to first establish ties with the communities' using focus group discussion by using the traditional/ opinion and religious leaders as facilitators. As time elapses, this could be expanded gradually into a form of a durbar with the focus on short sketches, demonstrations which will highlight the behavioral beliefs. This can further be augmented by education in primary, junior and senior high schools, and on radio and, television. These processes have a lot of benefits. First, the illegal miners' will be well sensitization and educated for any possible change over. Second, the miners and the entire communities will have confidence and trust in the proposals that will be brought before them and be ready to own it. Third, community members or the youth who wished to join will now be educated, informed and unmotivated to engage in such activities.

The consequences of the polluted river on socioeconomic development and ecosystem stability cannot be underestimated. The continuous deterioration of the rivers as discussed in chapters 3, 4, and 5 are very big challenges which if not salvaged could seriously slow down economic growth and development. The effectiveness of the interventions to address pollution is strongly linked to recommendations made by the study. Introducing interventions without a proper empirical assessment of the situation will yield no fruitful results. There is, therefore, the need to use an approach that will unearth the facts concerning the pending situation before arriving at any intervention. In the last quarter of 2016, the Pra Basin officers together with the people of Abono and its surrounding villages piloted one of the recommendations of this dissertation: using intervention mapping in providing an alternative job. The approach has been very effective. For example, this intervention mapping approach can be piloted in the mining communities and monitored to improve on any weakness or gaps identified before it could be scaled up to address the illegal mining menace.