

Effects of Dam-Induced Displacement on Teaching and Learning: A Case Study of Tokwe-Mukosi Disaster in Chivi, Zimbabwe

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Abstract

Teaching and learning in ChiviSouth District of Zimbabwe had been on a rosy path up until the construction of Tokwe-Mukosi Dam in 2014 which triggered educational challenges. Using interviews and observations, data were generated from six purposively sampled participants made up of four teachers and two school heads. The study, informed by the chaos theory, adopted the case study within the qualitative paradigm to solicit information from those who experienced the disaster. It came to light that upstream flooding at Tokwe-Mukosi Dam caused by unpredictable heavy rains displaced people within the vicinity, and subsequently disrupted teaching and learning activities. School children experienced a break in education, a delay in the accomplishment of the study programme and a miss of some vital concepts necessary for continuity. The study recommends detailed pre-project baseline surveys to be conducted in order to draft a resettlement plan first before commencement of dam construction. It also recommends the introduction of holiday lessons, Performance Lag Address Programme, Accelerated Learning Programme, extra lessons and injection of educational resources among others in order to put back on track the teaching and learning processes.

Keywords: *Upstream flooding; learning activities; educational resources; performance lag address programme; accelerated learning programme.*

Introduction and background

The Government of Zimbabwe and her Ministry of Education had registered notable success in issues to do with Education for All as reflected by the literacy rate of the country which, by 2010, was at pole position in Sub-Saharan Africa as reported by UNESCO (2010), cited in Mhishi, Pedzisai and Mandonga (2013). That position was attributed to visionary leadership which sourced support from the international community for help in areas that had do to with quality education, for example, the engagement of UNICEF through Global Partnership for Education (GPE) whose grant was meant to support the improvement of the quality of teaching

and learning in Zimbabwe by supporting teacher education (Ministry of Primary & Secondary Education (MoPSE), 2014). On one hand, School Improvement Grant (SIG) played its role by constructing and improving infrastructure in schools for better learning space while, on the other hand, the GPE grant enabled the country to achieve its pursuit for improved learning outcomes for children throughout Zimbabwe, in primary and secondary schools. All children benefited, either directly through Early Reading Initiative, Performance Lag Address Programme or through greater efficiencies in the system namely the Teacher Development Information System, Teacher Professional Standards and the Education Sector Strategic Plan (MoPSE, 2014).

Amidst these developments, the government of Zimbabwe embarked on the construction of Tokwe-Mukosi Dam. Little was known on its effects on learning and teaching, as the people blindly had high hopes of improving their lives as dam water meant a source of living to them. In the past few years, many studies have been carried out on the impact of dam construction in an attempt to investigate and understand the ramifications of dam construction. These include national reports, for example by Senzanje and Chimbari (2002); Bond and Manyanya (2002); Mudzengi (2012); Chikodzi, Mutowo and Makaudze (2013). However, previous research in this field has focused on impact of downstream flooding, overlooking challenges that could be triggered by upstream flooding. Earlier studies established that downstream flooding destroyed the livelihoods of people within the vicinity of the dams. Thus, there is still a dearth of up to date information on impacts of upstream flooding in general and on learning in particular. Little has been done to assess the impact of upstream flooding on learning hence it was a grey area that needed attention. It was against this backdrop that this researcher ventured into this area, especially after the occurrence of a Tokwe-Mukosi disaster that displaced more than 2230 families (Payne, 2014). Studies related to flooding by the dam's back-flow and contingency plans in the Zimbabwean context are few. It is important to note that Tokwe-Mukosi was not the last dam project in Zimbabwe and beyond, but some of the Zimbabwean dam projects were far from complete. These included Gwayi-Shangani Dam, Bubi-Lupane, Marovanyati Dam and Kunzvi Dam to cite a few (Mugabe, 2014; ZimAsset, 2014). This study adds to literature on the effects of upstream flooding on learning and teaching, using the Tokwe-Mukosi dam disaster as a reference point.

Statement of the problem

As the water levels of Tokwe-Mukosi dam rose due to heavy rains during its construction in 2014, crops nearing maturity were submerged, houses destroyed, animals drowned and some people were airlifted to safety. School children stopped going to schools, teachers were suddenly relocated, and the adults stopped their daily routines and placed emphasis on the survival of their dependants. It was against this background that this study undertook to investigate the adverse effects of disruptions on learning and teaching caused by the dam-induced displacement.

Theoretical framework

The theoretical framework that informs this study is based on the Chaos Theory popularised by Edward Lorenz's butterfly effect, which claims that the future is unpredictable and non-linear dynamics are sensitive to initial conditions (Ghys, 2012; Rickles, Hawe & Shiel, 2007; Fractal Foundation, 2013). Implied in the theory is that very small incidents have the potential to trigger the occurrence of unpredictable events which can be either helpful or detrimental to the lives of people. In the context of this study, heavy and incessant rains that flooded the dam whilst it was still under construction were unexpected but, in the long run, amplified challenges in educational institutions by disturbing lessons in Chivi District. The planners of the relocation programme which was meant to ensure learners' and teachers' needs were met could not predict the weather conditions that raised the water level to 677 metres above sea level, seventeen metres more than anticipated (Bote, 2014; Payne, 2014). The heavy rains set new and more challenging demands on the teaching and learning process which was in conflict with what was expected in the schools.

The heavy rains that flooded the then uncompleted dam disturbed the teaching and learning processes in Chivi District of Zimbabwe, becoming a small hitch that altered the teaching programme, sending learners and teachers away from their established schools. Indeed, that was a flap of a butterfly's wings at Tokwe-Mukosi dam that set off a tornado in Zimbabwe and beyond. Initial changes in rain pattern brought amplified and drastic changes, full of surprises and unpredictability on the future of the learners and the teachers and the quality of education in Zimbabwe.

Research questions

How did the Tokwe-Mukosi dam-induced displacement affect teaching and learning activities in the immediate community of Chivi District?

The study sought to address the following questions:

- What were the effects of the Tokwe-Mukosi dam-induced displacements on teaching and learning?
- How can the adverse effects on teaching and learning triggered by dam-induced displacement be addressed?

Objectives

Against the background of Tokwe-Mukosi dam induced displacement, the study sought to:

- Establish the effects of Tokwe-Mukosi dam induced displacement on teaching and learning.
- Suggest ways to address the adverse effects on teaching and learning caused by dam-induced displacement.

Methodology

This study adopted a case study approach from the qualitative paradigm design to unpack the issues under discussion. In order to capture information in the context in which the phenomenon occurred on the impacts of upstream flooding, data collection was done using interviews and observations. The use of these lenses in the case study was to ensure worthiness of the information generated. A case study is an approach that is used to generate an in-depth, multifaceted understanding of a complex issue in its real context (Crowe, Creswell, Robertson, Avery & Sheik, 2011). This approach was employed so as to obtain an in-depth appreciation of the effects of dam induced-displacement on learning and teaching as posed by the upstream flooding at Tokwe-Mukosi dam.

Using non-participant observations and in-depth interviews, the study generated data from four teachers and two school heads purposively sampled from the schools which were very close to the dam and whose structures were abandoned. This was premised on the fact that teachers had first-hand information on the disturbances experienced hence could provide rich data. Observation was made during and after the flooding period at the dam site, at the schools and at Chingwizi Holding Camp where temporary schools were established. Using observation

guide sheet, the researcher made notes, took pictures and drew graphs of statistical data observed in some documents such as school registers and admission registers as part of the historical data. To capture the teachers' experiences of the dam-induced displacement, in-depth interviews were conducted that lasted about 45 minutes per individual. Data collected were then recorded and re-read several times to come up with recurring themes. Data were then thematically analysed in tandem with the focus of the study and research questions. Ethical considerations were followed religiously. Permission was sought first from the Ministry of Education; thereafter the participating educators read and signed consent forms in line with De Vos, Strydom, Fouché and Delpont's (2014) advice.

Findings

Challenges and their mitigation strategies

From the interviews and observations made, the population within the vicinity of Tokwe-Mukosi Dam lost their livelihoods assets, rendering them vulnerable and poor, thus leading to deleterious effects on the learning and teaching of their children. Poverty emanating from the impact of upstream flooding incapacitated the household heads' abilities to provide continuity in the education of their children during and immediately after the flooding.

From the study, it emerged that 1718 students were affected by the floods and experienced a break in their education due to their sudden relocation to a new home, 260km away from the original home as revealed by the school teachers. As corroborated by Teacher 2 and 1 that:

Two of the schools in the vicinity were used as shelter during the flooding time. The students faced residential instability and had no school to go to for about two months and when make-up shift schools were established they were fraught with shortage of teachers, educational materials, learning space and classrooms to continue to learn smoothly.

That was confirmed by Teacher 4 who said, "The students learned and lived in crowded tents which were unsuitable for the learning process." Observation confirmed these sentiments as learners at the make-up schools were seen learning in tents which were not large enough to accommodate more than twenty learners. Books and other instructional materials were placed on the dusty floors. One teacher was with more than seventy learners of mixed age groups, which was indeed a burden for the teacher to manage them.

Responses from the six participants revealed that upstream flooding adversely affected the teaching and learning process; it disrupted learning activities, provoked a delay in accomplishment of study materials (syllabi), induced performance lag in students, affected their potential in educational achievement and drained parents' resources. Head 1 had this to say:

By virtue that the newly established schools for the victims were in pathetic conditions and appeared disheartening to educators the schools are severely understaffed. There are very few teachers who are ready to teach under such conditions. As such, most of our classes are too large to be manned by one teacher. We are now behind time to cover for the lost time because of the disruptions triggered by the floods. This impacts heavily on the performance of our learners of which some are far behind while others are ahead.

To mitigate challenges of delays in the completion of the study material posed by downstream flooding, all school heads suggested the introduction of the holiday and extra lessons of which Head 2 summarises that:

To compensate for the loss of time which was spent on resettlement modalities, schools are implored to start holiday or extra lessons so that concepts which were not covered during the disturbances could be taught. As for learners who are now behind in terms of performance, a Performance Lag address Programme can be initiated while those who are ahead can be grouped and subjected to an Accelerated Learning Programme that takes into account the cognitive level of the learners.

It emerged from the interviews that both teachers and school heads were aware of the shortage of human and material resources that inhibited the teaching and learning process. In this matter, the educators suggested that the international community and the corporate community could offer assistance by donating educational materials as well as paying extra salaries to attract qualified teachers. In the words of Teacher 3:

We call upon well wishers to give a hand to our schools which are facing challenges in sourcing both human and material resources. If the government and the international community can come together to source both instructional materials and human resources that would avert the challenges we are currently encountering in these make

shift schools. If we are given hardship allowances, then that could lure us into coming into such schools.

Discussion of findings

It was evident that a small hitch, precipitated by the heavy rains, caused severe damage on the education of learners, causing a butterfly effect as envisioned through the Chaos Theory. The 1718 students from several schools, namely; Neruvanga Secondary, Kushinga Secondary, Zunga Primary, Gororo Primary and Zifunzi Primary Schools which were affected by the floods, experienced a break in their education. That scenario was also experienced by the students in Mozambique due to downstream flooding of Kariba Dam (Scudder, 2005). The break in education from the beginning of February 2014 to March 2014 had the greatest negative effects on the performance of students. This was especially so on students who were below average and those who needed special attention (Chang, Khatoun, & Shah, 2013). Mostly, the weaker students were to repeat a grade severally without improving, which resulted in dropping out of school system (ADPC, 2008). In that case, an educational programme that caters for differences in the cognitive level of students could go a long way to redress the performance lag brought about by lack of continuity in education and absenteeism. Absenteeism negated quality performance in education (Arulampalan et al., 2012; Gupta & Lata, 2014; Teixeira, 2013). The introduction of Performance Lag Address Programme, a remedial package that caters for those who miss out important concepts could be a milestone in allowing students to work on their weaknesses in order to catch up with those at the same age. In such cases, Nkoma, Zirima, Chimunhu, and Nyanga (2013) suggested and hinted that the Ministry of Primary and Secondary Education should put in place a policy on performance lag address, where classroom instruction should begin at the child's last point of success to ensure continuity.

On the other hand, the affected students were from different schools that had diverse school cultures. This had a bearing on what they learnt and at what pace and how they learnt, despite having the same study materials. Some schools were possibly far ahead than others, in terms of accomplishment of study materials while others lagged behind. But, at the end of it all, the students found themselves in the same classes giving teachers a challenge to cope with the

diversity presented by these students from different schools. Then, in that case, establishment of Accelerated Learning Programme, a package for those far ahead in terms of educational achievement, could help to assist the fast learners.

The break in educational activities meant that completion of the study programmes set by the ministry was affected as was witnessed in South East Asia (ADPC, 2008) where floods provoked the delay of study programme. According to ADPC (2008)'s research findings, flood was one of the factors that disrupted study programme accomplishment and thus affected the quality of current education. Lost time, therefore, had to be recovered in one way or the other. Lost time could be recovered through introduction of holiday lessons and extra lessons which the government could fund.

The 1718 students who were displaced to the camps had inadequate teachers attending to them hence the students suffered lack of effective learning. In their research Chang et al. (2013) argue that, after disasters, the qualified teachers found it difficult to take up teaching jobs in the affected areas thus causing shortage of qualified staff. Ultimately the shortage of qualified teachers had the potential to affect enrolment, quality of education and the overall performance of students and schools. In that regard, teacher recruitment and retention were important and that could be done through provision of hardship allowances.

The findings indicated that the enrolment of students was on an upward trend at the new schools. That affected teacher establishment, with some schools forcing teachers to relocate while others were incapacitated as they became understaffed. To that end, service delivery in education was short-changed. Teaching members who went to Chingwizi Holding Camp did so because they had no options. According to Chang et al. (2013) most schools in the affected areas were in pathetic situation and were disheartening to educationists, henceforth, the teachers at these schools had no education of children at heart.

It came to light in the study that infrastructure at some schools in the affected areas were used as emergency shelter like what happened in South East Asia (ADPC, 2008). The classrooms were used as warehouses for storage of commodities which the affected had managed to rescue

from the disaster. That implied that the students at those schools had to learn under trees and in the open while their facilities were in use by evacuees. In addition, the noisy and crowded environment could not permit a suitable environment for better learning hence the quality of learning was also affected.

The study also revealed that, on arrival at the Chingwizi Holding Camp, the affected children had to be accommodated in tents, with no space to do their school homework. Due to upstream flooding, the children thus experienced residential instability, lived in crowded tents and parents could not concentrate on the education of their children as they directed their efforts towards survival strategies. In that same vein, Sindh et al. (2013) argue that for the poorest, human vulnerability deepened because resources were targeted towards the survival of people, ignoring the call to enrol children in schools due to high opportunity costs of education. Brennan (2011) argues that children living in crowded homes could experience reduced educational achievement for several reasons. Overcrowding could reduce parental responsiveness by creating social overload and withdrawal. The author further notes that crowded homes increased noise and chaos that in turn interfered with children's studies and cognitive development. In addition, the problem could be simple lack of space to sit down and do homework.

Indeed, the shortage of learning space, materials and important educational resources created more learning problems. The affected students had to squeeze in small tents designed for not more than forty students without chairs, desks and books. Yet, adequate level of input such as personnel, learning materials and physical materials had to accompany the teaching-learning process for its efficiency and effectiveness (Chang et al., 2013). Indeed, in the school system, the greater the quality and quantity of inputs the better quality of outputs that could be achieved which would in turn satisfy the expectations of the society. That confirms the assertion by Khoma et al. (2013) that concurrent absence of human and capital resource could definitely have a negative effect on learning. Viewed that way, inadequate learning materials and acute shortages of teachers hampered the affected students' learning potential and hence their motivation was low. The quality of education was compromised to say the least. To inspire the children to be on their feet, some surgery that could allow them to be committed to their work

was expected. School children needed friendly schools that could allow them to continue with their education from where they had left, regardless of their age.

The study also revealed that some affected students were in examination classes and the loss of time meant that passing could not be guaranteed. The loss of learning time meant loss of some concepts necessary for their future mastery of other concepts. They could fail the examinations and be forced to repeat a form or grade. This had deep implications on the livelihoods of parents. That meant the parents had to fund the education of their children twice, impacting negatively on their economic status and hence draining their already strained resources by the impact of the upstream flooding. Instead of them reaping from their efforts of sending their siblings to school in the near future, they had to restart the process again of sending the children to school. The education break that the children experienced, infringed on their human right to education and the benefits attached to it. To that end, there was need for a subsidiary fee structure in the affected areas to cushion the parents against the financial hardships and to allow the children to enjoy their right to education.

Conclusion

From the discussion above, it can be concluded that the effects of upstream flooding at Tokwe-Mukosi were just like a flap of a butterfly's wings in the catchment of Tokwe River that seriously affected learning set in Chivi District, Zimbabwe and beyond. The upstream flooding which subsequently displaced and affected the livelihoods of 1151 households impacted negatively on the 1718 students' learning and the entire education system. The ramifications of upstream flooding were widespread disruptions on learning. The study has revealed that 1718 school pupils experienced a break in education. Educational challenges noted because of the floods included difficulty in accessing schools, delays in the accomplishment of study programmes, lack of psycho-social support and finance, inadequate teaching manpower and learning materials which in turn had the potential to derail the educational performance at individual, institutional and national levels.

In order to curtail the effects of the disrupted learning activities, a Performance Lag Address Programme (PLAP) was necessary, introduction of extra lessons to recover the lost time and to invalidate delays in completion of the syllabi and a subsidiary school levies structure to

cushion the financial burden faced by parents which also could overturn the chances of school drop outs, instituting a bridging programme for those who missed out and recruitment of qualified personnel in order to enhance the quality of learning.

Recommendations

It is, therefore, appropriate in this section to highlight some policy considerations which, if implemented, could play an important role in addressing the effects of upstream flooding on learning in future. The study makes the following recommendations:

- synchronising construction of dams and resettlement schedules in order to avoid disasters that may result from upstream flooding;
- introducing holiday lessons as well as extra lessons to recover the lost time that derailed the accomplishment of study materials (syllabi);
- implementing the Accelerated Learning Programme (ALP) for those students who excelled and were far ahead in completing the syllabi and putting in place a Progress Lag Address Programme (PLAP) to students who missed some important concepts necessary for their future learning. These programmes take into account the different cognitive levels of students and address their learning needs and gaps on a one-to-one basis;
- channelling available educational resources to the new schools which include human materials and physical materials as well as books and other necessary learning gadgets; and
- offering teachers working in the new schools' allowances and incentives in order to lure the best qualified personnel to avert the challenges presented by the break in education.

References

- ADPC. (2008). *Impacts of disasters on the education sector in Cambodia*. Cambodia: Economic Institute of Cambodia.
- Arulampalan, W., R. A. Naylor and J. Smith. (2012.). AmI missing something: The effects of absence from class on student performance. *Economics of Education Review*, 3 (1), 363-375.
- Baxter, P. & Jack, S. (2008). *Qualitative Case Study Methodology: Study Design*

- and implementation for novice researchers. *The Qualitative Report* 13 (4), 544-559.
- Bond, P. & Manyanya, M. (2002). *Zimbabwe's plunge: exhausted nationalism and the search for social justice*. Harare: Weaver Press.
- Bote, T. (2014). *ActionAid responds to Tokwe-Mukosi floods*. <http://www.actionaidusa.org/zim>.
- Brennan, M. (2011). *The impact of affordable housing on education: A research summary*. Centre for Housing Policy. Washington, DC: World Bank.
- Chang, M. S., Khatoon, S. Z. & S. G. Shah, S. G. (2013). Flood disasters and impacts on child education in Sindh: A case study of 2010 floods. *International Journal of Advanced Research*, 1 (3), 329-344.
- Chikodzi, D., Mutowo, G. & Makaudze, B. (2013). Impacts of dam construction on tree species diversity in semi-arid regions: A case of Ruti Dam in Zimbabwe. *Green Journal of Environment Management and Public Safety*, 2 (1): 016-021.
- Crowe, S., K., Cresswell, K., Robertson, A., Avery, A. & Sheik, A. (2011). *The case study approach*. Nottingham: Medical Research Methodology.
- De Vos, A. Strydom, S., Fouché, C. B. & Delpont, C. S. L. (2014). *Research at grassroots for social sciences and human service (7th Ed.)*, Pretoria, SA: JL Van Schaik Publishers.
- Gupta, M. and Lata, P. (2014). Absenteeism in schools: A chronic problem in the present time. *Education Confab*, 3 (1), 11-16.
- Khandhela, M. & May, J. (2006). *A study on poverty, vulnerability and the impact of flooding in the Limpopo Province*. School of Development Studies, South Africa: University of Kwazulu Natal.
- Mhishi, M., Pedzisai, E. & Mandonga, E. (2013). Geography literacy and world knowledge amongst open distance learning students in Zimbabwe. *Greener Journal of Educational Research*, 3(7), 301-309.
- Mudzengi, B. K. (2012). An assessment of the socio-economic impact of the construction of Siya Dam in the Mazungunye area, Bikita District of Zimbabwe. *Journal of Sustainable Development in Africa*, 14 (4), 1520-1559.
- Mugabe, M. (2014). Corruption in Tokwe-Mukosi Dam disaster. <http://www.changezimbabwe.com>.

- Mwape, Y.P. (2009). *An impact of floods on the socio-economic livelihoods of people: A case study of Sikaunzwe community in Kazungula district of Zambia*. Free State, South Africa: University of the Free State.
- Nkoma, E., H., Zirima, I., Chimunhu, & Nyanga, T. (2013). Tracking learner achievement gap: An analysis of mathematics achievements in Manicaland, Zimbabwe. *International Journal of Economy, Management and Social Sciences*, 2 (5), 124-132.
- Nwobodo, O. (2014). Emergency plan of action: Zimbabwe floods. *International Federation of Red Cross and Red Crescent Societies*. <http://www.ifrc.org>.
- Payne, A. (2014). Update Tokwe-Mukosi dam in Zimbabwe. *Digital Journal*, <http://www.digitaljournal.com/new>.
- Sandstrom, H. & Huerta, S. (2013). *The negative effects of instability on child development: A research synthesis*. Low Income Working Families, Discussion Paper 3: Urban Institute.
- Schmulian, A. & Coetzee, S. (2011). Class absenteeism: Reasons for non-attendance and the effect on academic performance. *Accounting Research Journal* 24 (2), 178-194.
- Scudder, T. (2005). *The future of large dams: Dealing with social environmental, institutional and political costs*. London: Earthscan.
- Senzanje, A. & Chimbari, M. 2002. *Inventory of small dams in Zimbabwe*. Colombo, Sri Lanka: IWMI.
- Tapfumaneyi, R. (2014). *Tokwe-Mukosi: The untold positive*. <http://www.newzimbabwe.com>.
- Tarisayi, K. S. (2014). Ramifications of flooding on livelihoods: A case of two communal areas in Chivi District in Zimbabwe. *The International Journal of Humanities and Social Studies*, 2 (2), 165-167.
- Teixeira, A. A. C. (2013). *The impact of class absenteeism on undergraduates' academic performance: evidence from elite economic school in Portugal*. Porto: FEP. ZimAsset.
- (2014). *Zimbabwe's economic blueprint for sustainable development*. Harare: Government of Zimbabwe.
- ZRCS. (2014). Emergency plan of action. International Federation of Red Cross and the Red Crescent Societies. <http://www.ifrc.org>.

