

The impact of El Nino on sustainable management of school-based projects: A case of five selected schools in Harare North District, Zimbabwe

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Abstract

The purpose of the study is to assess the impact of El Nino on sustainable management of school-based projects in five selected Schools in Harare North District, Zimbabwe. It demonstrates the significant impact of El Nino on sustainable management of school-based projects. Challenges hindering secure, stable and consistent management of service provision of the projects in the respective education institutions are exposed. School-based projects managed include curriculum implementation- related activities in the school as system. Empirical research was essential in ensuring that young people in education realise positive and productive project outcomes while the school as a system benefits from successful curriculum implementation- related activities. This study is guided by the Theory of Project Management and the interpretivist paradigm that uses the descriptive survey research design. A qualitative methodology was adopted because of the nature of the research question. It used semi-structured questionnaires and interview guides, observation and checklists as data gathering instruments. The sample comprised five selected secondary education institutions in Zimbabwe (stratified systematic sampling), 20 staff members (purposive sampling) 5 Heads (purposive sampling), 10 SDCs (purposively sampled) and 50 students randomly selected but representing different levels. Findings from this study are presented in three sections relating to three sub questions. Overall, they indicate lack of support at multiple levels of learning, The study concluded that, school management of curriculum projects, parental financial support to learners and students' welfare have all been affected by drought conditions in Zimbabwe. Learning environments are no longer viable due to the impact of El Nino on the schools' projects. The conditions which hinder effective project implementation and flow of resources include shortage of resources, lack of adequate water supplies, inflation and poor funding. As part of best practices, it was recommended that more funding and mitigatory measures be availed. On the problem of electricity and water shortages, there is need for more boreholes and solar -powered energy. Key policy makers in education need emergency measures on these stated challenges.

Key words: El Nino, sustainable management strategies and school-based projects.

Background to the study

In sub-Saharan Africa, El Niño-related weather conditions including extremely low rainfall have resulted in countries declaring state of national food disaster. Lesotho became the latest country to do so following similar declarations by Botswana, Malawi, Namibia, Zambia, and Zimbabwe (UNICEF, 2024). El Niño events have recurred irregularly??, appearing every two to six years (Akasha and Ghaffarpasand, 2023). Historically, El Niño events in Zimbabwe have

been linked to disruptions of climatic patterns, including rainfall, resulting in both localized and widespread impacts on livelihoods and ecosystems (Marle, and Vidal, Ludovic-Alexandar, 2016 and Mesly, 2017). El Niño is a climatic phenomenon characterised by the warming of sea surface temperatures in the central and eastern equatorial Pacific Ocean. The severe drought that has impacted large parts of Southern Africa is threatening the lives of hundreds of thousands of children in the six worst-affected countries. This includes more than 270,000 children who are expected to suffer from life-threatening acute malnutrition (SAM)? in 2024 (UNICEF, 2024 Ayoko, 2022). Those who experience the drought may suffer from decreases in income and food access (Grundy, Johnson, & Scholes, 2022 and Faguet, 2018). This can affect household resource allocation and schooling decisions while exposing individuals to stress and uncertainty (Ardyn Nordstrom and Christopher Cotton, 2023). In Zimbabwe, schools implement the curriculum from primary to secondary levels. School manpower includes heads, teachers, students and School Development Committees (SDCs) (Kambutu, Akpovo., Nganga, Thapa & Mwangi, 2020). According to Hansen and Svejvig (2023), schools manage curriculum-related projects such as building, poultry, market gardening and animal keeping (cattle breeding), feeding schemes and many more (Guevara, 2024). Under normal conditions, projects initiated in schools become sustainable through adequate supplies of resources like electricity, water, feeds and financial injection. Quality end products are realized and management strategies of these projects are usually achievable (Ewuru, 2024). With normal rainfall, adequate sunshine and plenty of grazing land, schools enjoy successful projects output (Chitambara, 2019 and Chugunov, 2021). The community also provides learners to schools without struggling with payment of levies and fees. Schools do not experience high learner drop-out ratios under normal circumstances (Commonwealth Local Government Forum (CLGF, 2021 and Gaviria, 2017). To situate this problem clearly, what is worrisome in Harare North District is the severe drought that has impacted even large parts of Southern Africa. From 2023 to 2025, El Niño has been threatening the lives of surrounding communities in Harare North District. Schools are now worst affected as there are signs of change and strain in income budgets, capital inflows from parents and donors are dwindling. Curriculum implementation is now a burden to all management units in education. The targeted goals are now difficult to achieve hence the study sought to assess the impact of El Nino on sustainable management of school-based projects. A case of 5 selected Schools in Harare North District, Zimbabwe.

Statement of the problem

The Ministry of Primary and Secondary Education has a mandate to budget and allocate financial and material resources towards the education of pupils in Zimbabwe. In addition, parents, the community and other stakeholders in the country support the education system in different ways (Machingambi and Musingafi, 2020, Johnson, 2023 and Jones, 2022). During the process of curriculum implementation and management, schools manage curriculum-related projects such as building, poultry, market gardening and animal keeping (cattle breeding), feeding scheme and many more. However, schools bemoan challenges due to El Niño impact on their projects and sustainable goal achievement. These increase food insecurity and malnutrition, access to safe water and sanitation, as well as risks to disease outbreaks such as cholera (Chiu, 2020). This crisis should not go unheeded by the parents, teachers, donors

and the ministry of education, hence, this study sought to assess the impact of El Nino on sustainable management of school-based projects.

Main Research Question

What is the impact of El Nino on sustainable management of school-based projects in 5 selected Schools in Harare North District, Zimbabwe?

Sub-research questions

1. What are the sustainable school-based projects that are managed by Schools in Harare North District?
2. What is the impact of El Nino on sustainable management of school-based projects in Harare North District?
3. What are the possible solutions on the impact of El Nino on sustainable management of school-based projects in Harare North District?

Main Research Objective

The study sought to assess the impact of El Nino on sustainable management of school-based projects. A case of 5 selected schools in Harare North District, Zimbabwe.

Sub-Research Objectives

The study sought to:

1. Establish the sustainable school-based projects that are managed by schools in Harare North District.
2. Assess the impact of El Nino on sustainable management of school-based projects in 5 selected Schools in Harare North District, Zimbabwe.
3. To suggest possible solutions to the impact of El Nino on sustainable management of school-based projects in Harare North District.

Literature Review

Literature was sought on: What are the sustainable school-based projects that are managed by schools? Curriculum implementation and management is important in the school education system. This practice ensures that the curriculum remains responsive to the ever-changing environment. Factors such as knowledge expansion, societal interactions and changes and technological advancements need to be understood as schools resolve emerging challenges and issues. Curriculum implementation has been defined by Nevenglosky (2018:17) as "... how teachers deliver instruction and assessment through the use of specified resources provided in a curriculum." The aspect of resources is prominent in this definition, thus, indicating its importance in the process of curriculum implementation and management. The implementation process enables educational planners to reflect on the effectiveness of the teaching and learning methods to achieve the goals of the curriculum. Effective projects implementation can be a

challenge if proper planning on how the implementation process is to take place is not done (Karakuş, 2020). During the process of curriculum implementation and management, schools manage curriculum -related projects such as building, poultry, market gardening and animal keeping (cattle breeding), feeding schemes and many more (Mesly, 2017). The critical point to note here is that some schools have projects which depend on natural weather conditions while some require supplementary water sources. However, there are factors that militate against the successful implementation and sustainable management of the curriculum projects in schools. This is necessitated by the fact that very little or no rainfall was received in southern Africa, including Zimbabwe (UNICEF 2024).

Literature was also sought on: What is the impact of El Nino on sustainable management of school-based projects? El Niño is a natural phenomenon experienced in the equatorial Pacific which causes temporary alterations in the world climate (World Health Organisation, 2023). It is normally characterised by complex and abnormally warm ocean temperatures in the ocean in the area near the equator which results in global weather events and sea-surface temperature changes (UNICEF 2024). Related literature has revealed that El Nino has severe impacts on social, economic and environmental arenas;in particular sustainable projects.

El Niño's impact on public health and the need for preparedness measures cannot be underestimated (Akasha, Ghaffarpasand and Pope, 2023). El Niño can exacerbate existing health vulnerabilities and create new challenges for communities worldwide. El Niño contributes to the spread of waterborne diseases due to contamination of water sources and inadequate sanitation during flooding (Ahmed and Basnayake 2022). Additionally, prolonged droughts can lead to food and water shortages, malnutrition, and increased risk of vector-borne diseases. El Niño-induced heatwaves can result in heat-related illnesses and fatalities, especially in urban areas with vulnerable populations (Ahmed and Basnayake 2022). Literature was also sought on the question: **What are the possible solutions on the impact of El Nino on sustainable management of school-based projects?** According to this principle, whenever an issue or a problem occurs in the project, there should be a permanent solution to that problem so that it may not recur in future (Brint, 2023). But, according to global reports like UNICEF (2024), strengthening national social protection systems is one of UNICEF's key tools in supporting families build resilience against future shocks and recover from the effects of emergencies. A group of scholars who have researched on this topic include Johnson (2023), Akasha, Ghaffarpasand and Pope (2023). Their stance is that successful project implementation requires a diverse set of knowledge and skills that go beyond just technical expertise. Project implementers must be adept at navigating the complex web of stakeholders, budgets, timelines, and unforeseen challenges that can make or break a project's success (Ahmed and Basnayake 2022). The researcher noted that there are gaps that the current study has to fill because all these studies were focusing on urban-schools projects. There was no attention on peri- urban and rural schools with different infrastructure. The impact of El Niño is experienced differently by schools in different geographical and social contexts.

Research Methodology

Conceptual Framework

The impact of El Nino

El Niño is a natural phenomenon experienced in the equatorial Pacific... which causes temporary alterations in the world climate (World Health Organisation, 2023). It is normally characterised by complex and abnormally warm ocean temperatures in the areas near the equator which results in global weather events and sea-surface temperature changes (UNICEF 2024). From a practical sense, the ocean surface around the equator region warms up in significant degrees and brings along very heavy thunderstorms. The small rise in temperatures is influenced by change in the normal wind direction (World Health Organisation, 2023). Scientist also posit that the temperature increases may be intensified by the effects of greenhouse gases and result in global warming (Baudoin *et. al*, 2022, UNICEF Zimbabwe. 2017). The difference in temperature increase has a substantial impact on the world's climate (Ahmed and Basnayake, 2022).

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Theoretical Framework

This study is guided by the Theory of Project Management (Brint, 2023).

Objective- oriented

According to the theory, the sole motto of every organisation is to get profit. To earn profit from work, there has to be quality, and there is a need for good marketing. So, for this an objective is required first which contains some short-term goals. It helps the organisation to save time, resources and results in good profit. This is why it is considered as a critical principle of project management (Brint, 2023).

The study was guided by the interpretivist paradigm, and it also used the descriptive survey research design. A qualitative methodology was adopted because of the nature of the research question. It used semi-structured questionnaires and interview guides, observations and checklists as data gathering instruments. The sample comprised 5 selected secondary education institutions in Zimbabwe (stratified systematic sampling), 10 staff members (purposive sampling) 5 Heads (purposive sampling), 10 SDCs, (purposively sampled) and 50 students randomly selected but representing different levels.

Standards of engagements

According to the theory of project management, this principle basically talks about the workforce or employees who work for the project (Brint, 2023). To access this, there should be a pre-defined list and hierarchy of positions that handle which responsibilities and the specific duties of a particular position. The idea behind this separation of duties is to make every employee accountable for their work. Also, a sense of responsibility is very important in every project so that everyone stays connected to their duties.

Intervention and execution strategy

During the execution of the project and at any stage of the project, it is quite often that some problems may occur. So, this is the challenge for the whole team: how to tackle that problem

so that it may not influence the result. Thus, the next principle which emerges is known as the ‘intervention and execution strategy’. According to this principle, whenever an issue or a problem occurs in the project, there should be a permanent solution to that problem so that it may not recur in future. Also, every project staff’s duty is to contribute ideas to resolve a particular problem if it occurs.

Organisational alignment

This principle is like the bedrock for the whole project management strategy because the principle talks about the proper alignment of the organisation, which means that there should be a proper channel of communication, whether it is flowing from top to bottom or from bottom to top. This is important because communication plays an important role in the project. If there are some changes in the policy of the project and there is no proper communication, it may hit the performance at last. So there should be organisational alignment in every firm.

Measurement and accountability

Finally, when the project is completed, there should be a proper measurement of all the parameters so that every doubt can be cleared before delivery. Also, measurement leads to accountability because if there is some fault in some part of the project, the employee who works on that part is solely accountable for that. So, the principle of measurement and accountability acts as a check and balance for the whole project, and it is not an exaggeration to say that this is the best way of managing projects successfully. In summary, this theory was preferred by the researcher because it is a guide that informs management on project management.

Empirical research was essential for ensuring that young people in education harvest positive and productive project outcomes while the school, as a system, benefits from successful curriculum implementation related activities. This study is guided by the Theory of Project Management and the interpretivist paradigm that uses the descriptive survey research design. The sample comprised 5 selected secondary education institutions in Zimbabwe (stratified systematic sampling), 20 staff members (purposive sampling) 5 Heads (purposive sampling), 10 SDCs, (purposively sampled) and 50 students randomly selected but representing different levels. Findings from this study are presented in three sections relating to three sub questions.

Discussion, conclusions and recommendations

Findings from this study are presented in three sections relating to three sub questions.

Biographic information of participants.

Table 1 Biographic information of participants.

| variable | Sample size | Sampling method |
|-----------------|--------------------|--------------------------------|
| schools | 5 | stratified systematic sampling |
| School heads | 5 | purposive sampling |

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|---------------|----|--------------------|
| Staff members | 20 | purposive sampling |
| SDCs | 10 | purposive sampling |
| learners | 50 | Random sampling |

The sample comprised 5 selected secondary education institutions in Harare North District, Zimbabwe (stratified systematic sampling), 20 staff members (purposive sampling) 5 Heads (purposive sampling), 10 SDCs, (purposively sampled) and 50 students randomly selected but representing different levels

1. What are the sustainable school-based projects that are managed by schools in Harare North District?

According to literature reviewed, curriculum implementation and management is important in the school education system. This practice ensures that the curriculum remains responsive to the ever-changing environment. The implementation process enables educational planners to reflect on the effectiveness of the teaching and learning methods to achieve the goals of the curriculum. Effective projects implementation can be a challenge if proper planning on how the implementation process is to take place is not done (Karakuş, 2020).

In this study, school heads, teachers and learners concurred that schools manage curriculum-related projects such as building, poultry, market gardening and animal keeping (cattle breeding), feeding schemes and many more. Such responses from interview guide and observations tally with literature reviewed by (Mesly, 2017).

A male SDC participant from school E said:

‘Feeding programmes are no longer available at the schools because of poverty.’

Through further probing, the study established that, in policy terms, feeding schemes exist in schools. However, although most of the schools held meetings with the SDC, they did not support the feeding programme. According to the data collected, no school had a feeding programme where learners were given food. The school Head explained why the feeding programme did not exist:” *Parents in this area depend much on donations. When donated food is finished the feeding programme also stops. Parents have a dependence syndrome.*”

This indicates why and how some programmes fail; it is because people do not want to pay feeding scheme money to ensure the continuity of sustainable programmes that would have been started by others or donor organisations. Two schools indicated that parents came for consultation with teachers to check on the progress of the feeding project and offered support. The heads of those schools cited illiteracy on the part of parents as one of the causes for such support towards the feeding programme.

The schools' practical subjects' teachers said:

"We have projects running like poultry keeping and piggery as part of the agriculture subject practical requirements. However, our projects have been affected by EL-Nino. We had to cut on numbers because of feeds and other inputs that were required. Our projects are not sustainable these days."

All schools cited challenges to do with drought and economic hardships. Still on projects schools had, it was established that agricultural projects running included market gardening in green mealies and vegetables, some schools have projects which depend on natural weather conditions while some require supplementary water sources. However, there are factors that militate against the successful implementation and sustainable management of the curriculum projects in schools. This was necessitated by the fact that very little or no rainfall was received in southern Africa, including Zimbabwe (UNICEF 2024).

2. What is the impact of El Nino on sustainable management of school-based projects in Harare North District?

The study generated data from key participants to gain insight on: What is the impact of El Nino on sustainable management of school-based projects in Harare North District? It emerged from the SDCs participants that El Nino is a reality in our community which has affected so many areas of our normal living pattern. Our farming has been affected in many ways.

A female SDC participant, who is also an Agritex officer, said:

"Communities have lost crops and livestock due to lack of pasture and water. Zimbabwe is one of the countries in the region's vulnerable agricultural belt and has frequently experienced the detrimental effects of El Niño in the past from 1982 to the present."

Similar observations were made by Ewuru (2024). From the interview guide, students and teachers revealed that in Harare North District, El Niño events associated with prolonged dry spells, reduced rainfall, and increased temperatures have had a negative impact on the teaching and learning activities. Management of school curriculum events and projects is a cause for concern because these conditions lead to water shortages, and crop failures. Parental, community and donor support has shrunk in terms of school support, posing significant challenges to health, agriculture, and food security in the district.

A male student from school E said:" *Parents are struggling to raise money especially for practical subjects like Agriculture, Building, Metal work, Clothing and Textiles."*

They used to rely on their sales even from market gardening. Another notable impact is that *El Niño* increased the likelihood of poor hygiene practices and the risk of infectious and waterborne disease outbreaks in schools; this is worrisome because the country is already battling with a cholera outbreak linked to unsafe water, poor hygiene, and sanitation.

School Head from station B said;" *Other challenges resulting from El Niño in our curriculum project management include staggering school attendance rates during economic hardship and reported cases of child labour."*

A male Head from school D said;” *El Niño contributed to the spread of waterborne diseases due to contamination of water sources and inadequate sanitation in the schools.*”

From such experiences, smooth running of school projects is affected because low attendance means low income for project inputs and pass rate is compromised by child-labour practices. This study was guided by the Theory of Project Management (Brint, 2023) and, according to the theory, the sole motto of every organization is to get profit. To earn profit from work, there should be quality good marketing (Chitambara, 2019 and Chugunov, 2021).

This study’s findings are not in line with this assertion. The study findings reveal that there is need for capacity- building in the area of implementing school-based projects and sustainable management in El Nino- induced conditions. Currently this is non-existent.

3. What are the possible solutions on the impact of El Nino on sustainable management of school-based projects in Harare North District?

With reference to possible solutions on the impact of El Niño on sustainable management of school-based projects in Harare North District, the following responses unfolded.

A female participant from school A said that *Schools can improve quality and availability of education in emergencies through provision of conditional cash transfer or in-kind support.*

A senior management male participant from school A also suggested that;

“All schools have a management mandate to quickly identify their projects priorities so as to close some that are totally affected by extreme harsh weather conditions.”

Furthermore, descriptive data generated from the interview guide and the observation check list reveals the following situation on three schools with poor infrastructure.

Table 2 Impact of El Nino on three schools with poor to satisfactory infrastructure.

| Schools | Participant category | Responses on projects management | Suggestions |
|---------|--------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ato C | Males and Females teachers and heads | Management of curriculum activities a challenge, budget allocation affected, long term plans affected by El Nino | Alter the teaching and learning Time table for practical subjects, management to focus on short term budget plans on projects, Source for external funding |

N (15)

What emerges from the data findings is that, management of school projects during curriculum implementation has become unsustainable. Issues range from changing of school calendar events that include the main timetable. Schools have resorted to short term budgeting due to

economic constraints. These participants are hard hit by drought conditions as they lack water and electricity to implement quality and sustainable projects.

From another perspective, descriptive data generated from the interview guide and the observation check list reveals the following situation on three schools with good to very good infrastructure.

Table 3 Impact of El Nino on two schools with good to very good infrastructure

| Schools | Participant category | Responses on projects management | suggestions |
|---------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D to E | Males and Females teachers and heads | Management of curriculum activities a challenge, budget allocation affected, long term plans affected by El Nino to some extent | Alter the teaching and learning Time table for practical subjects, Inputs, processes and outputs are now affected during curriculum implementation management to focus on short term budget plans on projects, |

N (10)

Also, it was observed that El Niño contributed to the spread of waterborne diseases due to contamination of water sources and inadequate sanitation in the schools. The participants suggested education awareness campaigns on hygiene.

From the data findings it emerges that although the two schools have good to very good infrastructure, management of school projects during curriculum implementation has become a challenge. Asked to elaborate, the participants hinted that:

“A school is not isolated from the community; hence it gives services to all members of surrounding community. The borehole is overstrained and we now have reduced water capacity for our practical subjects such as Agriculture.”

Issues range from changing of school calendar events. Schools have resorted to short term budgeting due to economic constraints. These participants are hard hit by drought conditions as they lack adequate water and consistent electricity supply to implement quality projects.

The study concluded that there is lack of total commitment from stakeholders including teachers and parents to fully contribute money towards school projects.

Discussion Conclusions and recommendations

El Niño events associated with prolonged dry spells, reduced rainfall, and increased temperatures have had a negative impact on the teaching and learning activities. Management of school curriculum events and projects is a cause for concern because these conditions lead to water shortages, and crop failures. The study established that schools manage curriculum related projects such as building, poultry, market gardening and animal keeping (cattle breeding), feeding schemes and many more. Teachers, students and parents are all aware of the projects in their schools. Some schools have projects which depend on natural weather conditions while some require supplementary water sources. It is concluded that all schools are aware of the required projects prescribed by the curriculum policy but are not fully supported by stakeholders of El Niño.

The study concludes that the impact of El Nino on sustainable management of school-based projects is experienced by all schools in Harare North District. Parental, community and donor support has shrunk in terms of school support, posing significant challenges to health, agriculture, and food security in the district. Despite receiving average rainfall in late December and early January, most of the country experienced a catastrophic dry spell lasting more than 30 days in February 2024. Communities lost crops and livestock due to lack of pasture and water. It has been concluded that schools are hard hit by drought conditions as they lack adequate water and consistent electricity supply to implement quality and sustainable projects. Furthermore, El Niño contributed to the spread of waterborne diseases due to contamination of water sources and inadequate sanitation in the schools.

On possible solutions, the study concluded that school projects management teams, learners, parents and the community are not fully committed to contributing to the challenges facing their immediate institutions of learning as well as in broader district contexts.

Recommendations

Some schools have projects which depend on natural weather conditions while some require supplementary water sources. It is recommended that:

All schools should have the required projects prescribed by the curriculum policy and fully supported by stakeholders to avoid non- viability because of El Niño.

There be an increase of water sources/points to supplement the existing boreholes for projects to be sustainably managed.

Next, as a management strategy, schools should resort to short term budgeting due to economic constraints.

Also, the study recommends that all schools projects management teams, learners, parents and the community should seek to contribute to the challenges facing their immediate institutions of learning as well as in broader district contexts. The Ministry of Education should develop preparedness measures that are crucial to mitigating the adverse effects of El Niño. Equipping

individuals with the tools and knowledge to take preventive actions during El Niño events is an investment in community well-being. Educational campaigns can provide step-by-step guidance on measures such as heat wave preparedness and safe water storage.

The study also recommends the acceleration and development of capacity among marginalised groups, including those schools with inadequate infrastructure. The Ministry of Education needs to develop capacity in marginalised groups, including those schools with inadequate infrastructure.

Through community engagement and education for public awareness, empowering communities, and providing education to healthcare providers, societies can weave a tapestry of resilience that helps weather the storms brought about by El Niño.

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