The impact of El Nino in primary schools: A case of five selected primary schools in Mudzi District

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Abstract

The study focused on an assessment of the impact of El Nino in primary schools in Mudzi District of Mashonaland East Province, with particular reference to five selected schools therein. The article draws on the qualitative inquiry using a sample of 5 heads and 5 deputy heads were sampled purposively by virtue of their positions in these schools. 10 SDC members, 20 teachers and 25 learners. The main objectives were to examine the capacity of primary schools in reducing the impact of El nino, to establish the effects of El Nino on schools and to suggest possible solutions to reducing its impact. The main findings are that awareness campaigns are being done in schools, and that these schools have sources of water although they inadequate, and that nutrition gardens exist. It can be concluded that poor performance in class, learner absenteeism, reduced crop yields, shortage of food and water are effects of El Nino in primary schools. Water is paramount, hence, boreholes and water harvesting are vital. Prioritisation of projects, feeding programmes are a must; so are assistance with fees payment and grants for learners as possible solutions that can reduce the impact of El Nino in primary schools.

Keywords: El Nino, Impact teacher, primary schools

Background of the Study

The challenge of El Nino- induced conditions is not only peculiar to the Zimbabwean context but is a dilemma that affects the globe. From a global perspective, the problem is also prevalent in developed nations. According to a study conducted by De Silva, Babel, Abatan and Shanmugasundaram (2023). El Nino has brought increased rainfall and the risk of floods punctuated by landslides in Latin America, Brazil and Asia. Wang *et al* (2023) cited in Roney, Wahiduzzamen, Rahman and Bala (2024) argues that continents like Australia and Asia have experienced climatic condition disruptions induced by Elnino. From a regional perspective, studies conducted in SADC (2024) revealed that Southern and Central Africa received below average rainfall and experienced hot and dry conditions for a period of over fifty days during the rainy season. Hence, El Nino- induced conditions on nations are a threat to humans, wildlife and vegetation. Alfani, Arslan, McCarthy, Cavatassi and Sitko (2019) argue that in Zambia, the effects of El Nino were severe and included floods and drought. From a Zimbabwean perspective, ACAPS (2024) posits that due to El Nino more than four fifths of the country's population received below normal rains and an estimated 2, 7 million people are at risk of food security. Thus, the impact of El Nino in primary schools is a problem worth investigating as the learners, facilitators, parents and wildlife are all affected by El Nino- induced conditions.

From a theoretical perspective, all stakeholders are motivated by the availability of basic needs which they cannot do without. Motivation is paramount if the teachers and learners are to perform their duties as expected. According to Maslow's Hierarchy of Needs Theory, there are some basic needs that have to be met for one to be satisfied. Maslow classified the needs as physiological needs, safety needs, social need, esteem needs and self-actualisation (Kaur 2013 in Okafor and Abraham 2021). Okafor and Abraham (2021) posit that the basic needs like water, food, salary, shelter, health and security need to be met first for one to be motivated. However, when the lower needs are met, they will activate the desire to satisfy higher order needs.

Statement of the problem

The government is pumping money into the education system through school development grants to schools, purchase of text books and paying salaries for its workers. Donors are also building more schools and providing teaching and learning materials like furniture. The parents are also paying school fees for their children expecting quality education. Thus, all stake holders expect learners to excel and display good morals and high pass rates. The problems that crop up include absenteeism of both teachers and learners due to hunger, shortage of water, eruption of malnutrition diseases and abandoning of some the projects mid- way. This study carried out an assessment of the impact of El Nino in five selected primary schools in Mudzi District. It also aims to suggest possible solutions to reduce the impact and effects of El Nino in primary schools.

RESEARCH QUESTIONS

1. What is the capacity of primary schools in reducing the impact of El nino?

2. What are the effects of El Nino on schools?

3. What are the possible solutions to reduce the impact of El Nino in primary schools?

RESEARCH OBJECTIVES

The study sought to:
1. establish the capacity of primary schools to reduce the impact of El nino.

2. establish the effects of El Nino on schools.

3. suggest possible solutions to reduce the impact of El Nino in primary schools.

CONCEPTUAL FRAMEWORK

THE CONCEPT OF EL NINO

Camp (2001), cited in Adom, Hussein and Joe (2018), argues that a conceptual framework is a structure that can best elaborate on a natural progression of a phenomenon to be studied. The concept to be unpacked is the impact of El Nino in primary schools. According to Rony *et al* (2024), El Nino is a climatic phenomenon that alters the precipitation cycle and causes warm, dry and hot conditions to affect the weather patterns. Weng *et al* (2023), cited in Tony et al

(2024), posits that El Nino brings drought to other regions and also vast rains or increased devastating precipitation to yet others. Hence, El Nino is a natural phenomenon which has adverse effects on the ecosystem and affects all the school stakeholders and school projects.

THEORETICAL FRAMEWORK

Adom *et al* (2018: 438) define theoretical framework as "a framework based on an existing theory in a field of enquiry that is related and or reflects the hypothesis on a study." Hence, it is a theory or a school of thought in which a research study is hinged upon. This research study was guided by Maslow's Hierarchy of Needs Theory. Maslow's hierarchy of needs is hinged upon two assumptions: The first is that human beings have different needs ranging from biological needs at the lower level to psychological needs at the upper level. The second assumption is that the basic needs have to be satisfied before higher level needs. Tsav (2018) posits that Maslow came up with five needs levels which are of paramount importance, these are physiological needs, safety/security needs, self-belonging needs, self-esteem needs and self-actualization needs. Thus, basic needs are for actual survival and these include food, shelter, water, sex and air. Both teachers and learners need food, water and stable economy for them to be effective in their duties. El Nino militates against the attainment of these basic needs.

REVIEW OF RELATED LITERATURE

In this section literature from other researchers is going to be reviewed against the sub themes formulated.

The capacity of primary schools to reduce the impact of El nino

SADC May (2024) avers that some primary schools are conducting supplementary feeding for malnourished learners. Schools are conducting disaster awareness campaigns through disaster risk reduction teams (World Health Organization 2023). Rony et al (2024) posits that, various stakeholders are conducting elevated workshops on community empowerment on equipping schools and other partners on how to survive in drought- prone areas. UNICEF, cited in Filho, Balasubramanian, Zuniga and Siera (2023), argues that child- led awareness in schools should be vibrant, punctuated by crafting of simple ways of educating learners which are child-centered and expose them to climate change awareness. Schools are conducting capacity building which promote entrepreneurship and adaptability and focusing on the Sustainable Development Goals (SDGs) (Filho *et al* 2023). Musanhi (2019) argues that since schools have land and sources of water, they should make use of sustainable agriculture hinged upon water conservation and high yields.

Effects of El Nino on schools

Climate- induced migration caused when both parents migrate in search of food transfers the burden to search for food to the children and learners may also migrate in search of work so as to be able to put food on the table (Musanhi 2019). Mugiyo, Magadzire, Choruma, Chimonyo, Manzou, Jiri and Mabhaudhi (2023) argue that crop yields are drastically reduced and food security is compromised under extreme weather conditions. Water becomes scarce and this affects irrigation and cultivation activities (Musanhi 2019). Rural households are most

vulnerable to drought and food shortage due to extreme weather events as crop yields are negatively affected due to extremely low precipitation (Alfani, Arslan, McCarthy, Cavatassi and Sitko 2019). Filho *et al* (2023) posits that in developing nations, El Nino presents a challenge because most children fail to complete their education because of lack of money.

Possible solutions to reduce the impact of El Nino in primary schools

SADC (2024) asserts that interventions like feeding programs in schools by the donor community should be made so as to allow a process of uninterrupted learning in schools. FAO (2023) highlights that essential agricultural inputs should be provided and access to water by both people and livestock should be prioritized. OCHA (2023) is of the view that water management schemes should be introduced to incorporate borehole drilling, construction of dams and rainwater harvesting for small scale irrigation. This notion is also supported by SADC (2024) who avers that borehole drilling should be done to promote irrigation and water harvesting in collaboration with other sectors to mitigate El Nino effects. Government should activate vibrant education, communication and awareness campaigns in schools and communities on drought mitigation. FAO (2023) advocates protection of community water points as well as distribution of food.

Research Methodology

Qualitative research methodology

Creswell (2014), cited in Asenahabi (2019), postulates that qualitative research focuses on exploring and comprehending the meaning which a group or an individual ascribes to a social or human problem. Adopting the qualitative research paradigm in this study was paramount to the researchers because it was effective to gather rich information through in-depth data collection methods like interviews, open-ended questionnaires and discussions. The qualitative design was also used in this study because it did not detach the researchers from the participants. Rather, qualitative research brought the researchers closer to the participants and paved the way for an opportunity to interact with them at a human level. The researchers were able to obtain an intimate familiarity with the research participants in natural settings of their school compounds, which helped to explain phenomenon as it occurred.

Population

Shukla (2020) defines population as a set of all members on which the findings of the research study are applied to. Thacker (2020) posits that a population is a complete set of all the people with specified features. The population of the study was as follows: 40 primary schools, 40 school heads,40 deputy heads,12 000 learners, 800 teachers and 200 SDC members.

Sample

Thacker (2020) defines a sample as a subset of the given population. From the population given, The sample comprised 5 schools, 5 heads and 5 deputy heads by virtue of their positions in the schools were purposively sampled. 10 SDC members (2 from each school), 20 teachers (4 teachers from each school), 25 learners with 5 learners selected from each school.

Sampling Procedure

According to Ames, Glenton and Lewin (2019), the use of a systematic sample provides a convenient way to draw a sample from a large identified population when a printed list of that population is readily available. Through the use of systematic sampling, every 8*th* name on the list of schools was selected. Hence, out of 40 schools 5 were selected. For Heads, Deputy Heads and SDC, purposive sampling was made use of because of the nature of their roles as they are the rightful leaders of the selected schools. On SDC, the aspect of gender was considered so as to have a male and female participant. For teachers and learners, random sampling was used, taking into consideration the gender of participants. Keppel (1991), cited in Creswell (2018), posits that with random sampling, every person has an equal opportunity of being selected, thus, the population will be representative of the entire population being studied.

Table 1 Research Population

Category	**Population**	**Sample**	**Sampling**
Schools	40	5	Random
Heads	40	5	Purposive
Deputy Heads	40	5	Purposive
Teachers	720	20	Random
SDC	200	10	Purposive
Learners	9 000	25	Random

1.10.1 Gender Distribution of Participants Table 2

School		**A**	**B**	**C**	**D**	**E**	**Total**
Sex	M	5	4	3	7	6	25
	F	8	9	10	6	7	40
Total		13	13	13	13	13	65

Table 2 consists of gender distribution of the participants. Sex is indicated as male or female and the schools are numbered from A to E.

1.10.2 Educational Qualifications of participants Table 3

Level of Education attained:	**Participants in school:**				
	A	**B**	**C**	**D**	**E**
Primary	5	5	5	5	5
O' Level	2	2	2	2	2
Certificate in Education	0	0	0	0	0
Diploma in Education	3	4	4	4	3
Bachelor of Education	3	2	2	2	2
Master's in Education	0	0	0	0	1
Total	**13**	**13**	**13**	**13**	**13**

Table 3 presents participants according to their level of education starting from primary up to O' level; professional qualifications which include certificates, diplomas in education, degrees and masters' qualifications. Learners are at the primary level. SDC members had O' levels; the rest consisted of teachers, with one teacher holding a Bachelors' Degree. All school heads were holders of Bachelors' degrees, with one school head being a holder of a Masters' Degree.

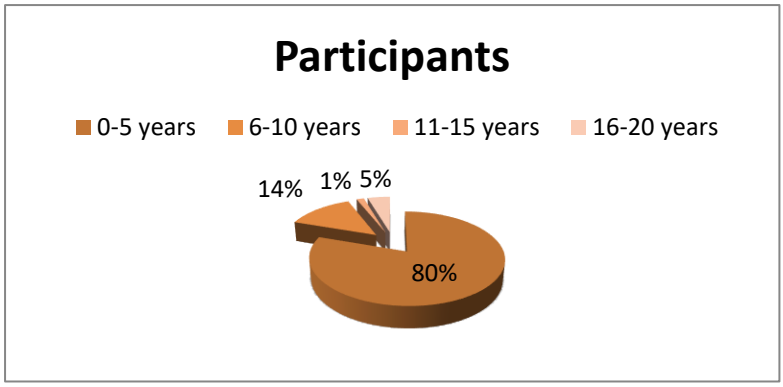

Fig 1 Pie chart

Experience in the current school is grouped into four segments as represented in the above pie chart **Fig 1**. The 16 to 20 years' experience range has the most seasoned participants although they are only two participants in total. Most of the participants are in the 1 to 5 years' experience range, this is the group with the least experience in the school.

Presentation and description of data from interviews

The capacity of primary schools to reduce the impact of El Nino

When asked about the capacity of primary schools to reduce the impact of El Nino, this is what the Head of school A had to say:

> *"From an administrative point of view, we have Disaster Risk Reduction Committees (DRRC) in schools which help in disaster preparedness and educate learners, teachers and parents on disasters. Boreholes are available but we do not have one which caters for the school alone, although this year there is not much water to cater for nutritional gardens. We were also promised grain by the government for feeding schemes but we have not received an allocation yet".*

When asked about the capacity of primary schools to reduce the impact of El Nino, this is what the SDC of school B had to say:

> *"We have boreholes although this year there isn't much water as they are deep wells converted to borehole systems. Currently, we are doing some piggery projects, but water is a major challenge. This year, school fees are not forth coming and, hence, we have managed to feed the infant classes at least once in two weeks."*

When asked about the capacity of primary schools to reduce the impact of El Nino, this is what the Deputy Head of school C had to say:

The government gave us different varieties of seeds to plant. However, this year our yield was disturbed and we are now doing poultry projects of road runner and broiler chickens. But, the proceeds from the sales are inadequate to feed the learners as we have to cater for other school needs such as purchasing stationery."

When asked about the capacity of primary schools to reduce the impact of El Nino, this is what a teacher of school D had to say:

"We sometimes apply for authority from District Schools Inspector to conduct a civics day to fundraise for money to buy items for the feeding program. We normally feed learners once in every two weeks. We have a deep well and this year, due to shortage of water, we could not operate our nutritional garden."

When asked about the capacity of primary schools to reduce the impact of El Nino, this is what the learner of school E had to say:

"We never had a feeding program this year at our school; our crops were affected by the hot weather. Yes, we have a borehole but it is failing to provide adequate drinking water for us, the learners and our teachers. We keep goats but they are only slaughtered when we go for sports. These goats are just few and if we are to slaughter them all, they might give us maybe only three meals as they are less than fifteen."

The effects of El Nino on schools

When asked about the effects of El Nino on schools, this is what a head of school E had to say:

"This is a different year altogether. We're experiencing learner absenteeism at a large scale. Parents are coming in for payment plans whilst others have not paid even a single cent. We do not have adequate water so we are now shelving our piggery project and the nutritional garden."

When asked about the effects of El Nino on schools, this is what a deputy of school D had to say:

"Water is scarce and we are asking learners to bring their own drinking water from home. The borehole we have caters for the primary and secondary schools and the community, so, for this year it runs dry early in the morning. Our teachers have to queue for water until midnight, which now affects their performance in classes."

When asked about the effects of El Nino on schools, this is what a teacher of school C had to say:

"This is one of the worst years. We did not harvest anything from our small plots as teachers, and the school got nothing also. Some learners are collapsing during lessons; they come to school without having eaten breakfast or anything. We are forced to teach only theory lessons in Agriculture as we are short of water to have a viable school garden."

When asked about the effects of El Nino on schools, this is what an SDC member of school B had to say:

> *"We are now forced to abandon the school garden due to scarcity of water. In the village we did not get enough yields and some families are sleeping on empty stomachs, it's a sad story out there. Most families here depend on agriculture and can only get money after selling their produce, so this year it's a different story. We are expecting our dependable donor friends to chip in as they sometimes do."*

When asked about the effects of El Nino on schools, this is what a learner of school A had to say:

> *"Water is a challenge, as you know that Mudzi is a very hot place and we have to drink lots of water on a daily basis. We carry at least a litre of water from home. We have a challenge when it comes to toilet cleaning as we compete for water with the community and sometimes they chase us away from the borehole as it is a shared one. I usually have a meal in the morning, which porridge, and soda in the evening. During break and lunch times I go for masawu or Mawoyo with my friends."*

Possible solutions to reduce the impact of El Nino in primary schools

When asked about possible solutions to reduce the impact of El Nino in primary schools, this is what the Head of school D had to say:

> *"From an administrative point of view, we as school need to forgo projects which require a lot of water like piggery and venture into small income -generating projects like bee keeping and road runner chicken farming."*

When asked about possible solutions to reduce the impact of El Nino in primary schools, this is what the Deputy Head of school E had to say:

> *"The way forward is to drill at least two solar- powered boreholes for the schools and also to practise sustainable agriculture."*

When asked about possible solutions to reduce the impact of El Nino in primary schools, this is what an SDC member of school B had to say:

> *"We need dams and tanks so as to harvest water during the rainy season. As parents, we need to support the school nutritional gardens, what we lack is awareness of climate change as we have been relying much on donors. We also need irrigation equipment so as to practise water conservation."*

When asked about possible solutions to reduce the impact of El Nino in primary schools, this is what a teacher of school A had to say:

> *"Temperatures are too high here in Mudzi and the best solution would be to have more boreholes drilled. We need funding as we cannot drill boreholes with the meagre fees which parents pay. With water we can sustain our nutritional gardens. We need education on climate change and how we can survive under such adverse conditions.*

As a school, we can also have a tuck-shop projects to help sustain our learner feeding program; we can also plant drought -resistant crops."

When asked about possible solutions to reduce the impact of El Nino in primary schools, this is what a learner of school C had to say:

"We need food support in our communities because some of us live with our grandparents and depend upon relatives in Harare to send us groceries. We need assistance in paying school fees; we have BEAM, but it only pays for a few learners, leaving many children out."

Discussion on findings

Question 1

The majority of school heads were of the opinion that schools have disaster risk reduction committees which do awareness campaigns on disaster preparedness to learners, teachers and the parents. The teachers, deputy heads, SDC and learners agreed with the views of school heads. This is similar to the findings of the World Health Organization (2023) and Rony *et al* (2024) in their findings as shown in 1.8.1. Eighty percent of school heads, deputy heads, teachers, SDC and learners weighed in highlighting that boreholes are available in schools either as shared or for the schools alone. It was evident that schools are conducting some income- generating projects, with some requiring a lot of water. They have nutritional gardens in schools although these are not fully functional. These are similar to the findings of Musanhi (2019) who highlighted that water should be meaningfully made use of through nutritional gardens and entrepreneurship; a view similar to the findings by Filho *et al* (2023). From what has been discussed, it can be concluded that awareness campaigns are being done in schools; schools have sources of water although they are inadequate and nutritional gardens also help somehow.

The effects of El Nino on schools

School heads raised the issue of learner absenteeism, failure to pay school fees by parents, shortage of water, poor learner performance in classes, poor harvests and food scarcity as the effects of El Nino. These were also supported by the SDCs, teachers, deputy heads and learners who weighed in with the same observations. The findings are almost similar to those obtained by Musanhi (2019) in 1.8.2 who pointed out that learners absent themselves or migrate in search of food. Alfani *et al* (2019) found out that rural households are prone to drought and food shortage. Filho *et al* (2023) had the same findings that parents are failing to pay fees for their learners. Mugiyo *et al* (2023) in 1.8.2 findings, bemoans compromised food security and drastically reduced crop yields as the effects of El Nino. From the discussion, it can be concluded that poor performance in class, learner absenteeism, reduced crop yields, shortage of food and water are effects of El Nino in primary schools.

Possible solutions to reduce the impact of El Nino in primary schools

The majority of school heads and deputy heads cite prioritisation of projects that require less water usage, drilling of boreholes, doing small income generation projects, harvesting water during the rainy season, provision of irrigation equipment, government and donor- funded fees

payment as safety nets for learners. Teachers, learners and SDCs agreed with views of heads and deputy heads. These views are like the findings of SADC (2023) which stressed the activation of feeding programmes in schools. Similar findings were made by OCHA (2023) who argued for the need for drilling of boreholes, rainwater harvesting and irrigation. FAO (2023) had similar findings which emphasized maximization of food production, access to water and inputs. From the discussion, it can be concluded that water is paramount, hence boreholes and water harvesting are vital; there should be prioritization of projects. The feeding program is a must; so is assistance with fees payment grants for learners as possible solutions to reduce the impact of El Nino in primary schools.

Conclusions

Conclusion to research question 1

It can be concluded that awareness campaigns are being done in schools, schools have sources of water although they are inadequate and nutritional gardens are also present.

Conclusion to research question 2

It can be concluded that poor performance in class, learner absenteeism, reduced crop yields, shortage of food and water are effects of El Nino in primary schools.

Conclusion to research question 3

It can be concluded that water is paramount, hence boreholes and water harvesting are necessary, prioritization of projects, the feeding program are a must; and so is assistance with fees payment grants for learners as possible solutions to reduce the impact of El Nino in primary schools.

Recommendations

Recommendation to research question number 1

Investment should be done in disaster preparedness and parents should be involved in maintenance of school nutritional gardens. Schools should have vibrant water committees.

Recommendation to research question number 2

More safety nets for learners need to be activated so as to reduce learner dropouts. Drainage facilities to capture and store water need to be installed.

Recommendation to research question number 3

Schools must shut down projects that are not viable; those that need lots of water and prioritize on the less water-intensive ones. Government should drill solar- powered boreholes to reduce reliance on hydroelectricity. Gutters and tanks need to be installed in schools to encourage water harvesting.

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