

## Loss of Non-Tangible Resources and Posttraumatic Growth among Survivors of the Solai Dam Disaster, Nakuru County, Kenya

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### ABSTRACT

Kenya experiences disasters regularly and these are accompanied by devastating mental health impacts. Literature on mental health outcomes of disasters in the country has focused on negative psychological outcomes. Knowledge on the growth possibilities of disaster survivors is limited, hampering the provision of effective psychological interventions. This study sought to bridge this gap by investigating the Posttraumatic growth experiences of survivors of a dam disaster at Solai in Nakuru County, Kenya. The objectives of the study were to establish the relationship between demographic characteristics of the survivors and the extent of posttraumatic growth, also establish if loss of non-tangible resources would determine the posttraumatic growth of the people affected. The target population was the adult survivors from the 223 households that were most affected by the Solai dam disaster. A purposive sample of 80 adult survivors was selected. The study applied a mixed methods design. Quantitative data were collected using standardized psychological tests of Posttraumatic Growth Inventory-Expanded (PTGI-X), and Loss of Resources scale (LOR scale). An interview guide was used to collect qualitative data. The quantitative statistical results were analyzed using the Statistical Package for Social Sciences and the qualitative data were subjected to thematic analysis. Descriptive statistics for categorical data was presented in tables, charts, frequencies and percentages. Inferential statistics was used to establish association between loss of non-tangible resources and posttraumatic growth. Overall participants reported high scores of posttraumatic growth with the majority (83.8%) indicating having experienced growth to a great extent. A chi-square analysis was used to establish the relationship between the loss of non-tangible resources and extent of posttraumatic growth. There was a significant association between the extent of loss of non-tangible resources and the extent of Posttraumatic growth ( $X^2 = 31.441$   $p = 0.000$ ) The loss of non-tangible resources was positively associated with posttraumatic growth. The findings of this study indicate the need for continued provision of mental health services to survivors of disasters as well as recommend new strategies for supporting the people affected.

**Keywords:** *Survivors, posttraumatic growth, Non-Tangible Resources*

## INTRODUCTION

On May 9<sup>th</sup> 2018, Kenya experienced one of the worst man-made disasters in her history. Solai dam that was built on a commercial farm, known as Patel farm in Rongai sub- County, Nakuru County, Kenya burst its walls from the middle to the bottom, spilling water that overran several villages. Forty-eight (48) lives were lost, hundreds of people suffered injuries, and many families from Nakuru County were displaced, while livelihoods and property worth millions of shillings were destroyed. The survivors of the Solai dam disaster were exposed to trauma, including death of loved ones as well as sustaining serious injuries which affects continuation of life. Research has shown that one of the determinants of posttraumatic growth is exposure to a shattering life experience such as a traumatic event and how life continues after the experience (Janoff-Bulman, 1992).

Disasters give rise to stressors that affect mental health (Norris et al., 2002a). Among such stressors include bereavement, injury to self or significant others, threat to self or others, fear, panic during the disaster event, loss of social networks, destruction of property, financial loss among others. Survivors of traumatic experiences have responded in diverse ways, with some experiencing negative effects such as posttraumatic stress disorder (PTSD) and anxiety several years after the event. Others have been reported to have experienced posttraumatic growth (PTG) over the same period. Tedeschi & Calhoun (2004) define posttraumatic growth as a positive psychological change as a result of struggling with highly challenging life experiences. Calhoun & Tedeschi (2006) indicate that a disaster does not only produce psychological distress, rather, in other instances, it does offer opportunities for growth.

Globally, studies that explain positive psychological outcomes of disaster events have been conducted. For instance, experiences of posttraumatic growth were reported among survivors of Hurricane Sandy which affected the North Eastern coast of the United States in 2012, (Schneider et al., 2019), Swedish survivors of the South East Asia Tsunami in 2004 (Michelsen et al., 2017), survivors of Pohang earthquake in South Korea (Seo & Lee, 2020), survivors of seasonal cyclones in Australia (Pooley et al., 2013), adult survivors of a terror attack in South Eastern Nigeria (Aliche et al., 2019), and among Somali refugees resettled in Hungary (Kroo & Nagy, 2011). Notably, few studies have focused on the posttraumatic growth experiences of survivors of disasters in Kenya and the present research sought to fill this gap in the literature.

The loss of resources is one of the major consequences of disasters. Resources are those things that are valued by individuals (Hobfoll, 2001). There are four types of resources; objects, conditions, personal characteristics and energies. Objects include physical items and possessions such as houses, while conditions include non-material things like marriage and job security. Personal characteristics are things like self- esteem, and examples of energies are money and time. Resources have alternatively been categorized as tangible resources, comprising of Hobfoll's objects and energies and non-tangible resources, incorporating Hobfoll's personal characteristics and conditions (Ehrlich et al., 2010; Benight & Harper, 2002). According to Hobfoll (2001) individuals are stressed when they actually lose resources or when they experience a threat of losing resources. At the same time the failure to acquire more resources even after investing in the effort to accumulate resources also contributes to stress in the individual.

A few studies have related loss of resources with posttraumatic growth. A positive correlation was found between loss of non-tangible resources and posttraumatic growth among survivors of various disasters. Examples include survivors of Hurricane Matthew in the Caribbean, Ukrainian adult civilian survivors of armed conflict (Niewiadomska et al., 2021), survivors of climate change related natural disasters in the Phillipines and Fiji (Sattler et al., 2023), and Kashmiri college students' that had been exposed to natural disasters and armed conflict (Asai & O'Brien, 2021). Few studies in sub-Sahara Africa have directly linked loss of non-tangible resources with posttraumatic growth. A qualitative study of Muslim West African immigrants by Roubeni et al. (2015) reported that the loss of status, familial and cultural networks was associated with positive expectations in the educational accomplishments of their children. Nonetheless there is insufficient literature on positive psychological outcomes among survivors of traumatic events in Kenya, a gap the current research endeavored to bridge.

Global trends in research into the mental health impacts of disasters have largely focused on negative psychological outcomes such as PTSD and depression. This exclusive focus on the negative consequences of disasters is understandable given the immediate need to alleviate survivors' distressful symptoms. There are often few programs dedicated to enabling survivors to develop PTG. However, the effect of this approach is that unwittingly, practitioners are likely to overlook opportunities for survivors' psychological growth and this may slow and hinder the process of recovery of survivors. Disaster survivors go through difficult experiences; however, it is observed that various factors may aid recovery. Availability of resources is noted to be critical to the process of recovery from adverse life circumstances. Most times, there is inadequate funding to see the process to completion. For instance, the psychological support offered to Solai dam disasters stopped after two years due to inadequate funding. The inability to provide continued psychological support potentially hampered the full recovery of the survivors.

Against this background, this study sought to examine the relationship between demographic characteristics and the loss of non-tangible resources with the extent of posttraumatic growth among survivors of the Solai dam disaster in Nakuru County, Kenya.

## METHODOLOGY

This study applied a mixed methods design to investigate whether loss of non-tangible resources predicted the degree of posttraumatic growth of survivors of the Solai dam disaster that occurred in 2018 in Nakuru County, Kenya. Both quantitative and qualitative data were collected concurrently. The target population were the adult survivors from the 223 households that were most affected by the Solai dam disaster. This was according to the National coordination committee that was tasked to respond to this disaster. Quantitative data were collected using a standardized questionnaire while qualitative data were collected using an interview guide. The study purposively recruited a sample of 80 adult survivors who filled a questionnaire that consisted of standardized psychological tests of Posttraumatic Growth Inventory-Expanded (PTGI-Expanded), and Loss of Resources scale (LOR scale). Qualitative data was obtained by interviewing five adult survivors (three females and two males) individually in relation to their experiences of loss of resources, and posttraumatic growth in the aftermath of the Solai dam disaster. Data was analyzed using frequencies, percentages, parametric statistical analysis and thematic analysis.

The research instrument for the collection of quantitative data was a survey questionnaire that had been divided into parts. The parts included (A) Participant's demographic information (B) Loss of Resources scale and (C) Posttraumatic Growth Inventory-Expanded (PTGI-X). The survey questionnaire was an amalgamation of demographic information of the participant; gender, age, marital status, education, employment status and type of house ownership and constructs of posttraumatic growth, Posttraumatic Growth Inventory- Expanded (PTGI-X), and loss of resources, Loss of Resources scale (LOR scale). The instrument for the collection of qualitative data was an Interview Guide that contained semi-structured topical questions. Both instruments were translated into Kiswahili so that they will be localized for those that may not be familiar with English and below are the details of the subsections of the survey questionnaire.

Posttraumatic Growth Inventory, Expanded (PTGI-X). The Posttraumatic Growth Inventory measures five areas or domains that include Relating to others, New Possibilities, Personal Strength, Spiritual and Existential Change, and Appreciation of life. The PTGI-X inventory that was used in the present study is a revised version of the Posttraumatic Growth Inventory (Tedeschi et al., 2017). It is an expanded tool which has incorporated more and new items on the spiritual and existential domains. The changes to this domain were necessitated by the need to cover persons that are nonreligious and in more secular cultures as well as adherents of traditional religious belief systems. Considering that the PTGI-X includes the original 21 PTGI items, it could be used to make direct comparisons to work using the original measure. The PTGI-X consists of five factors (domains) including Factor I- Relating to others, Factor II - New Possibilities, Factor III - Personal Strength, Factor IV - Spiritual and Existential Change, and Factor V - Appreciation of life. Participants indicate the degree of change that has occurred in their lives as a result of the crisis on a scale of 0 to 5 (0 = no change, 5 = great degree of change). The scale is scored by averaging all responses with scores ranging from 0, lowest score to 125, highest score. A low score means no growth or a low degree of growth. A high score means a high degree of growth. An average score, 62.5, means moderate degree of growth. Factors are scored by adding responses to items on each sector.

The Loss of Resources scale measures two main categories of resources, tangible and non-tangible resources. Tangible resources include things such as food, furniture, residence, insurance, and means of transport such as a motorbike or car. Non-tangible resources on the other hand include aspects such as feeling valuable to other people, involvement in religious activities and retirement security. The Loss of Resources scale (LOR scale) was adapted from Erhlich et al. (2010)'s study of mothers that had experienced a hurricane experience. In their study they categorized resources into tangible and non-tangible resources. Loss of Resources scale was originally used by Benight and Harper (2002) however Ehrlich et al. (2010) had the questions divided into tangible and financial factors (tangible LOR), consisting of Hobfoll's original categories of energies and objects, and non-tangible or psychosocial factors (non-tangible LOR), comprising of Hobfoll's original categories of personal characteristics and conditions. LOR, tangible, has 16 factors, while LOR non-tangible has 23 factors.

Participants were to rate the degree to which they have experienced each loss on a scale of 0 - 4 (0 = no loss, 4 = extreme amount of loss). The Loss of Resources scale (LOR) has 39 factors (items) and the scores range from 0 (minimum score) to 156 (maximum score). An average score on this scale is 78. A minimum score means no or few losses of resources while a maximum score means

large amount of loss of resources. An average score of 78 means a moderate loss of resources. The LOR scale is divided into two sub-scales that is, tangible LOR scale and non-tangible LOR scale. The non-tangible LOR subscale has 23 factors (items) with scores ranging between 0 (minimum loss of resources) and 92 (maximum loss of resources). The average score on this subscale is 46.

### Ethical Considerations

Approval to conduct the study was sought and given following the relevant procedures. The National Commission for Science, Technology, and Innovation (NACOSTI) agency granted permission to conduct the study (License No. NACOSTI/P/23/30354). Survivors of the Solai dam disaster were explained the purpose of the study and were assured of confidentiality if they opted to participate. Those who consented to participate in the research were recruited and given questionnaires for quantitative data. Qualitative data was obtained by conducting face-to-face interviews. Survivors were approached and requested to be interviewed for the research. The interviews were audio recorded, and participants were assured of confidentiality. All the data that was obtained was stored securely. The questionnaires were designed to allow for the anonymity of the participants, and the audio-recorded material was stored in an offline hard drive, with the researcher being the only individual with access to these recordings.

## RESULTS

### Post Traumatic Growth Index by Participants' Demographics

Posttraumatic growth was measured along a 6-point continuum of no change, very small, small, moderate, great, and very great responses with respective weightage of 0, 1, 2, 3, 4 and 5 points for the change that occurred in one's life as a result of Solai Dam disaster. Based on the distribution of the obtained data, the categories were further reduced to 4 points to check how it is distributed across the respondents' demographics.

#### Gender

Overall, both male and female participants reported high scores of posttraumatic-growth with majority (83.8%) indicating as having experienced growth to a great extent and very great extent. Female participants reported higher scores (89.1%) of posttraumatic-growth compared to male participants (76.5%). 5.9% of the male participants reported experiencing no posttraumatic growth while 17.6% reported posttraumatic growth of small to moderate extents as shown in table 1 below.

**Table 1:**

*Distribution of Post Traumatic Growth Index by Participants' Gender*

|        |        | No effect<br>(0) |      | Small and Moderate<br>extent (0.22-0.69) |       | Great extent<br>(0.70-0.85) |       | Very great extent<br>(0.86-1.0) |       | Total |
|--------|--------|------------------|------|------------------------------------------|-------|-----------------------------|-------|---------------------------------|-------|-------|
|        |        | N                | %    | N                                        | %     | N                           | %     | N                               | %     | N     |
| Gender | Male   | 2                | 5.9% | 6                                        | 17.6% | 10                          | 29.4% | 16                              | 47.1% | 34    |
|        | Female | 0                | 0.0% | 5                                        | 10.9% | 18                          | 39.1% | 23                              | 50.0% | 46    |
|        | Total  | 2                | 2.5% | 11                                       | 13.8% | 28                          | 35.0% | 39                              | 48.8% | 80    |

#### Age

The majority of the participants across the age groups (66.7%) reported great extent to very great extent posttraumatic growth after the Solai dam disaster. All the participants aged between 46 and 65 years (100%) reported having experienced posttraumatic growth to a great extent and very great

extent. They were followed by participants aged between 18 and 45 years (90%) who also reported posttraumatic growth to a great extent and very great extent. On the other hand, elderly participants aged 66 years and above reported no posttraumatic growth (6.1%), posttraumatic growth of small to moderate extent (27.3%). 66.7% participants of this age group reported posttraumatic growth to great and very great extents as shown in table 2 below.

**Table 2:**

*Distribution of Post Traumatic Growth Index by Participants' Age*

|            |                | No effect<br>(0) |      | Small and Moderate<br>extent (0.22-0.69) |       | Great extent<br>(0.70-0.85) |       | Very great extent<br>(0.86-1.0) |       | Total |
|------------|----------------|------------------|------|------------------------------------------|-------|-----------------------------|-------|---------------------------------|-------|-------|
|            |                | N                | %    | N                                        | %     | N                           | %     | N                               | %     | N     |
| <b>Age</b> | <b>18 – 45</b> | 0                | 0.0% | 2                                        | 10.0% | 9                           | 45.0% | 9                               | 45.0% | 20    |
|            | <b>46 – 65</b> | 0                | 0.0% | 0                                        | 0.0%  | 12                          | 44.4% | 15                              | 55.6% | 27    |
|            | <b>66+</b>     | 2                | 6.1% | 9                                        | 27.3% | 7                           | 21.2% | 15                              | 45.5% | 33    |
|            | <b>Total</b>   | 2                | 2.5% | 11                                       | 13.8% | 28                          | 35.0% | 39                              | 48.8% | 80    |

### **Marital Status**

Majority of the participants (83.8%) across the marital status groups reported experiencing posttraumatic growth to a great extent and very great extent. Married participants (100%) and widowed participants (100%) reported experiencing posttraumatic growth to a great extent and very great extent. A huge number (75.8%) of the single participants reported experiencing posttraumatic growth to a great and very great extent, while 72.2% of the separated/divorced participants indicated as having experienced posttraumatic growth to a great and very great extent. However, 6.1% of the single participants reported experiencing no posttraumatic growth with another 18.2% indicating a small to moderate extent of posttraumatic growth. A few of them (27.8%) of the separated/divorced participants reported posttraumatic growth to a small and moderate extent as shown in table 3 below.

**Table 3:**

*Distribution of Post Traumatic Growth Index by Participants' Marital Status*

|                           |                           | No effect<br>(0) |      | Small and<br>Moderate extent<br>(0.22-0.69) |       | Great extent<br>(0.70-0.85) |        | Very great<br>extent (0.86-<br>1.0) |       | Total |
|---------------------------|---------------------------|------------------|------|---------------------------------------------|-------|-----------------------------|--------|-------------------------------------|-------|-------|
|                           |                           | N                | %    | N                                           | %     | N                           | %      | N                                   | %     | N     |
| <b>Marital<br/>status</b> | <b>Single</b>             | 2                | 6.1% | 6                                           | 18.2% | 9                           | 27.3%  | 16                                  | 48.5% | 33    |
|                           | <b>Married</b>            | 0                | 0.0% | 0                                           | 0.0%  | 2                           | 10.0%  | 18                                  | 90.0% | 20    |
|                           | <b>Separated/Divorced</b> | 0                | 0.0% | 5                                           | 27.8% | 8                           | 44.4%  | 5                                   | 27.8% | 18    |
|                           | <b>Widowed</b>            | 0                | 0.0% | 0                                           | 0.0%  | 9                           | 100.0% | 0                                   | 0.0%  | 9     |
|                           | <b>Total</b>              | 2                | 2.5% | 11                                          | 13.8% | 28                          | 35.0%  | 39                                  | 48.8% | 80    |

### **Education**

The majority of the participants (83.8%) regardless of education level reported posttraumatic growth to a great extent and very great extent. Participants with college/university level of education (100%) indicated as having experienced posttraumatic growth to a great extent and very great extent. Similarly, 100% of participants with no formal education reported experiencing posttraumatic growth to a great extent and very great extent. Many participants (86.7%) with High

school level of education reported posttraumatic growth to a great extent and very great extent, while 65.4% of participants with Primary school level of education reported as having experienced posttraumatic growth to a great extent and very great extent. Among participants with Primary school level of education, 7.7% reported no posttraumatic growth, and a further 26.9% indicated as having experienced posttraumatic growth to a small extent and moderate extent. A few participants (13.3%) with a high school level of education reported experiencing posttraumatic growth to a small extent and moderate extent as shown in table 4 below.

**Table 4:**

*Distribution of Post Traumatic Growth Index by Participants' Education Level*

|                  |                           | No effect<br>(0) |      | Small and<br>Moderate extent<br>(0.22-0.69) |       | Great extent<br>(0.70-0.85) |       | Very great<br>extent (0.86-<br>1.0) |       | Total |
|------------------|---------------------------|------------------|------|---------------------------------------------|-------|-----------------------------|-------|-------------------------------------|-------|-------|
|                  |                           | N                | %    | N                                           | %     | N                           | %     | N                                   | %     | N     |
| <b>Education</b> | <b>No Education</b>       | 0                | 0.0% | 0                                           | 0.0%  | 13                          | 68.4% | 6                                   | 31.6% | 19    |
|                  | <b>Primary</b>            | 2                | 7.7% | 7                                           | 26.9% | 10                          | 38.5% | 7                                   | 26.9% | 26    |
|                  | <b>High school</b>        | 0                | 0.0% | 4                                           | 13.3% | 3                           | 10.0% | 23                                  | 76.7% | 30    |
|                  | <b>College/University</b> | 0                | 0.0% | 0                                           | 0.0%  | 2                           | 40.0% | 3                                   | 60.0% | 5     |
|                  | <b>Total</b>              | 2                | 2.5% | 11                                          | 13.8% | 28                          | 35.0% | 39                                  | 48.8% | 80    |

### ***Employment Status***

The majority of the participants (83.8%) regardless of employment status reported having experienced Posttraumatic growth to a great extent and very great extent after the disaster. 100% of the employed participants reported having experienced posttraumatic growth to a great extent and very great extent. Many of them (85.4%) of the non-employed participants reported experiencing posttraumatic growth to a great extent and very great extent. They were followed by self-employed participants (78.8%) who reported having experienced posttraumatic growth to a great extent and very great extent. At the same time, 6.1% of the self-employed participants reported no posttraumatic growth while 15.2% of the participants in this group indicated as having experienced posttraumatic growth to a small extent and moderate extent. 14.6% of non-employed participants reported experiencing posttraumatic growth to a small extent and moderate extent as shown in table 5. Thus, survivors of the Solai dam disaster who experienced posttraumatic growth to a great extent and very great extent were female, middle-aged, married, widowed, having no formal education, having a college/university education, and employed. Survivors who experienced no posttraumatic growth were male, elderly, single, having Primary school education, and self-employed.

**Table 5:**

*Distribution of Post Traumatic Growth Index by Participants' Employment Status*

|                              |                      | No effect<br>(0) |      | Small and<br>Moderate extent<br>(0.22-0.69) |       | Great extent<br>(0.70-0.85) |       | Very great<br>extent (0.86-<br>1.0) |       | Total |
|------------------------------|----------------------|------------------|------|---------------------------------------------|-------|-----------------------------|-------|-------------------------------------|-------|-------|
|                              |                      | N                | %    | N                                           | %     | N                           | %     | N                                   | %     | N     |
| <b>Employment<br/>status</b> | <b>Employed</b>      | 0                | 0.0% | 0                                           | 0.0%  | 4                           | 66.7% | 2                                   | 33.3% | 6     |
|                              | <b>Self employed</b> | 2                | 6.1% | 5                                           | 15.2% | 12                          | 36.4% | 14                                  | 42.4% | 33    |
|                              | <b>Not Employed</b>  | 0                | 0.0% | 6                                           | 14.6% | 12                          | 29.3% | 23                                  | 56.1% | 41    |
|                              | <b>Total</b>         | 2                | 2.5% | 11                                          | 13.8% | 28                          | 35.0% | 39                                  | 48.8% | 80    |

### Relationship between Loss of Non-Tangible Resources and Posttraumatic Growth

The relationship between the loss of non-tangible resources and the extent of posttraumatic growth among participants is presented in Table 6. There were two main categories of responses that emerged in relation to loss of non-tangible resources, thus Loss of resources to a small extent and loss of non-tangible resources to a great extent. On the other hand, responses to posttraumatic growth were categorized into three, Small to moderate extent of growth, Great extent of growth and very great extent of growth. The categories for loss of non-tangible resources were related to the categories for Posttraumatic growth to determine the association between the two constructs.

The majority of the participants (68%) experienced loss of non-tangible resources to a small extent. Of these participants, 52.8% experienced posttraumatic growth to a great extent, 28.3% reported experiencing posttraumatic growth to a very great extent and 18.9% of them reported experiencing posttraumatic growth to a small extent and moderate extent. Thus, survivors that experienced loss of non-tangible resources to a small extent had a high likelihood of experiencing posttraumatic growth to great and very great extents.

A smaller percentage of the participants (32%), experienced loss of non-tangible resources to a great extent. Of these participants, most of them (96%) indicated experiencing a very great extent of posttraumatic growth to a very great extent. 4% of the participants reported experiencing posttraumatic growth to small and moderate extent. Thus, survivors of the Solai dam disaster that reported a great extent of loss of non-tangible resources were more likely to experience posttraumatic growth to a very great extent.

The loss of non-tangible resources was a predictor of posttraumatic growth among survivors of the Solai dam disaster. A great extent of loss of non-tangible resources was related to a very great extent of posttraumatic growth among survivors. A chi-square analysis was used to check the relationship between the loss of non-tangible resources and extent of posttraumatic growth. There was a significant association between the extent of loss of non-tangible resources and the extent of Posttraumatic growth ( $X^2 = 31.441$   $p = 0.000$ ).

**Table 6:**

*Relationship between Loss of Resources Non-Tangible and Posttraumatic Growth*

|                         |                     | PTG                     |       |              |       |                   |       | X <sup>2</sup> |
|-------------------------|---------------------|-------------------------|-------|--------------|-------|-------------------|-------|----------------|
|                         |                     | Small & Moderate extent |       | Great extent |       | Very great extent |       |                |
|                         |                     | N                       | %     | N            | %     | N                 | %     |                |
| Non -Tangible LOR Index | Small extent (n=53) | 10                      | 18.9% | 28           | 52.8% | 15                | 28.3% | 31.441 (0.000) |
|                         | Great Extent (n=25) | 1                       | 4.0%  | 0            | 0.0%  | 24                | 96.0% |                |

## DISCUSSION

### Demographic Characteristics and the Posttraumatic Growth of Survivors

The extent of posttraumatic growth across the demographic characteristics of the participants is presented in Table 1 through to table 5. Overall participants reported high scores of posttraumatic-growth with the majority (83.8%) indicating having experienced growth to a great extent and very great extent. Based on their demographic characteristics participants that experienced posttraumatic growth to a great extent and very great extent were female (89.1%), middle aged thus 46-65 (100%), married (100%), widowed (100%), having no formal education (100%), having a college/university education (100%) and employed (100%). Participants that experienced no posttraumatic growth were male (5.9%), elderly thus 66 years and above (6.1%), single (6.1%), having Primary school education (7.7%) and self-employed (6.1%). Tedeschi & Calhoun (2004) coined the term posttraumatic growth to describe a phenomenon in which positive psychological changes occur in the process of an individual struggling to come to terms with highly challenging life experiences. Thus, growth occurs in the midst of suffering and not in its absence. Janoff-Bulman (1992) asserts that traumatic events challenge the individual's assumptions about the world. Psychological chaos may be the result of this conflict in the individual's views of the world before and after the traumatic events.

One of the ways to resolve this conflict is to reorganize their assumptive world in a new meaningful way that may result in psychological growth. Concerning the relationship between gender and posttraumatic growth, Helgeson et al. (2006) observe that females have a greater probability to experience growth. Thus, the finding that females experience a greater degree of growth concurs with previous literature. However, the finding that middle-aged participants experienced the highest degree of PTG compared to other age groups contradicts Helgeson *et al.* (2006)'s previous result that found younger people to show a greater probability of posttraumatic growth. The participants' high scores in posttraumatic growth seem to confirm previous observations in the literature.

### Relationship between Loss of Non-Tangible Resources and Posttraumatic Growth

#### ***Small Extent of loss of Non-tangible Resources and Extent of Posttraumatic Growth***

A majority of the participants (68%), reported experiencing loss of non-tangible resources to a small extent. Of these participants, 52.8% experienced posttraumatic growth to a great extent, 28.3% reported experiencing posttraumatic growth to a very great extent and 18.9% of them reported experiencing posttraumatic growth to a small extent and moderate extent. Survivors that experienced loss of non-tangible resources to a small extent had a high likelihood of experiencing posttraumatic growth to great and very great extents. This finding contradicts previous research that indicated that traumatic events of low severity are not likely to trigger posttraumatic growth among survivors (Levine et al., 2008; Kliems & Ehlers, 2009). A possible explanation is that posttraumatic growth tends to occur as time passes after the occurrence of a traumatic event (Helgeson et al., 2006). It has been six years since the Solai dam disaster. The survivors have the potential to growth as they struggle to overcome the challenges in their lives after the disaster.

#### ***Great Extent of Loss of Non-tangible Resources and extent of Posttraumatic Growth***

The majority of the respondents (96%) that indicated experiencing a very great extent of loss of non-tangible resources experienced posttraumatic growth to a very great extent. 4% of the respondents reported experiencing posttraumatic growth to small and moderate extent. Thus,

survivors of the Solai dam disaster that reported a great extent of loss of non-tangible resources experienced posttraumatic growth to a very great extent. Qualitative data supported the findings from quantitative data. In the narration of their post-disaster experiences during the interviews, participants reported loss of Non tangible resources such as Feeling less valuable to others, Loss of life meaning and purpose, Diminished sense of accomplishment of life goals, psychological dysfunctions, Lack of intimacy with friends and Family instability. However, they also expressed having experienced posttraumatic growth as they reported having an appreciation of their lives, a strong faith in God, discovering personal strength they were unaware of before, having new opportunities and Sense of acceptance of life circumstances.

This corroborated the quantitative findings that showed that the loss of Non tangible resources to a great extent predicted posttraumatic growth to a very great extent (96%). During the interviews participants described experiencing psychological health challenges in their families post-disaster and yet they still experienced posttraumatic growth.

Respondent 1 described her experience thus:

*[...] "life was a very difficult thing, now I am like people are mentally unstable, almost everyone at this time, the entire family is not united, everyone has gone their separate ways.... the only thing I've learned is to trust in God. Pray to God in the morning to give you food, and thank Him, there is nothing else."*

Respondent 2 described a similar situation:

*[...] "Mmh, since the disaster, there are many changes even in my health. I fall sick often, I experience pain in my body, mentally I am disturbed especially when I realize that I am unable to meet the needs of my children. I wish we will get assistance even from the government to educate the children... I'm just saying that I trust God more this far I am."*

Respondent 5 described his experience in relation to psychological dysfunction in the family thus:

*[...] "They (his children) were carried by the water and were injured by the heavy stones, metals and nails that were in the water and they were badly hurt. Fortunately, God was able to save them and now they have recovered although their bodies are weak because they have been in a difficult situation. They have developed intellectual disability. Before the disaster they used to perform well in school being among the top ten and they were often between number one and five. But after the disaster they are at the bottom of the class, they are actually among the bottom five. They have been damaged and I think psychologically they have been affected so much. Even today you hear them shouting when sleeping in the night. Even when they had come to stay with me during the December holidays, I would hear them screaming in their sleep at night" However he expressed his faith in God regardless of the difficulties "Other changes I have observed I have come to depend on God for all things because I have no power, I have no money, I have no job and this business is not a reliable source of income. So, I have learned to be satisfied with what God is giving me. When I come to open work I don't know where I will get what I will eat in the evening. I depend on God to give me what I need because if He doesn't bring, I don't have the ability to do so."*

This finding that loss of non-tangible resources was associated with posttraumatic growth among survivors of the Solai dam disaster is related to previous research. Sattler et al. (2023) reported that loss of non-tangible resource of personal characteristics was associated with posttraumatic growth among survivors of climate change related natural disasters in Philippines and Fiji. Niewiadomska et al. (2021) found a positive correlation between loss of non-tangible personal resources and a high spiritual change among Ukrainian civilian adults that survived armed conflict. Similarly, the loss of freedom or autonomy (non-tangible resources) was associated with greater posttraumatic growth among Kashmir College students that were survivors of natural disasters and armed conflict (Asai & O'Brien, 2021).

The loss of non-tangible resources was a predictor of posttraumatic growth among survivors of the Solai dam disaster. A great extent of loss of non-tangible resources was related to a very great extent of posttraumatic growth among participants. A chi-square analysis was used to check the

relationship between the loss of non-tangible resources and extent of posttraumatic growth. There was a significant association between the extent of loss of non-tangible resources and the extent of Posttraumatic growth ( $X^2 = 31.441$   $p = 0.000$ ).

### **Conclusion**

The study established the relationship between the demographic characteristics of the Solai Dam disaster survivors and posttraumatic growth, establishing that even though most studies tend to focus on PTSD, it evidenced that there may be positive psychological outcomes following a traumatic event. The findings of this study established that the loss of non-tangible resources predicted the degree of posttraumatic growth among survivors of the Solai dam disaster. The greater the extent of loss of non-tangible resources the greater the degree of posttraumatic growth among the survivors. Additionally, the study established that the Solai Dam disaster received initial psychological support which ceased after two years following the disaster. The lack of continued support had the effect of slowing the process of recovery of the survivors.

### **Recommendations**

The study therefore recommends a vibrant new strategy in supporting the survivors using technology that will enable them access information on mental health on their own, and empower them on entrepreneurial skills.

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### **CONFLICT OF INTEREST**

The authors declare no conflict of interest

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