

HUMAN SETTLEMENT DYNAMICS AND CONCERNS IN THE BOYO-MENCHUM LAKE NYOS POST-DISASTER CAMPS, NORTH WEST REGION OF CAMEROON

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ABSTRACT

Natural and human induced disasters has resorted to untold damages such as increasing human fatalities, forced relocation and continue mutation of human settlements. The Lake Nyos gas disaster of 1986 that completely devastated the villages of Nyos, Chah and Subum is just one of such disasters. This study x-rays the evolution of post-disaster settlements and their resulting effects in the Boyo-Menchum Basin. The study adopted both purposive and random sampling techniques to sample ten villages with direct links to the Lake Nyos gas disaster. Primary and secondary sources were exploited for data collection. Primary sources made use of questionnaires, focused group discussions, field observation, transect walks and participatory rural appraisals while secondary data was collected from institutional reports, minutes, and peer review journals. Semi closed questionnaires collected were imputed into an Excel spread sheet and data transformed into tables and charts while qualitative data was sorted out manually. Human settlements in the study area have remained dynamic in their forms, types and locations. Findings revealed six types of post-disaster settlement phases being disaster affected villages, emergency centres, planned resettlement camps, self-resettle, self-relocation, and unresettled villages. The creation of these varied settlements were owing to weak powers of the traditional rulers, relatively number of survivors, dilapidated state of houses at the resettlement camps and low infrastructural development. Temporal resettlement camps in the study area have in the long run become permanent settlements thus, a comprehensive renovation of houses in the resettlement

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camps and accurate lay down of modalities to encourage and secured the returning population are required.

Key words: *Lake Nyos gas disaster, post-disaster settlements, settlement dynamics, infrastructure, Boyo-Menchum*

I. Introduction

Globally, the occurrences of disasters have in the last decades become the main challenge faced by the rural and urban landscapes (Danan, 2019). Almost 58 per cent of the world cities are highly exposed to either cyclones, floods, droughts, earthquakes, landslides or volcanic eruptions (Danan, 2019). In Ickowicz *et al.* (2017), hazards are considered disasters when the overwhelming devastation shocks are beyond the capacity of the affected population to cope with the development process. Consequently, Hossieni *et al.* (2016) stated that, as many people lost their homes, the major alternative becomes moving from disaster prone settlement to post-disaster temporal settlements.

Mbanga (2018) ascertained that settlement dynamics have proven to be a reality. This dynamism is as a result of socio-economic and dynamic factors operating at the local, national and global levels. In post-disaster management, settlement constitutes a crucial step of recovery and reconstruction. These come from the role they play in incubating people and providing a habitable environment while the outcomes of a disaster are being assessed. Abulnour (2014) held that settlement do not only consider the aspect of dwellings but takes into consideration physical characteristics, availability of vital services, infrastructure, vulnerability of the temporary settlement to future disasters, ease of accessibility, economic prospect, socio-cultural, educational, and financial standards of the temporary settlement occupants.

Over the past 34-years, disasters records in Cameroon have taken an upward trend. The country is prone to natural disasters like floods, landslides, droughts, volcanic eruptions, and gas explosion with increasing traces of technological related disasters and hazards. The occurrences of these disasters follow a morphological, climatic and human habitation patterns. In 1986, Boyo-Menchum was hardest hit (MINAT-DCP, 2017) by a hydrological gas explosion leaving over 1700 people death and 4000 homeless (MINAS-SAS, Wum, 2010). The government and other stakeholders in the course of enhancing coping capacities were faced with twofold challenges: whether, to rebuild in the same disaster affected area or to resettle elsewhere. To this, resettlement finally became an important decision taken as in situ adaptation measures were limited and the survivors are still leaving in camps today. This study captures the spatial evolution of settlement dynamics in the study area

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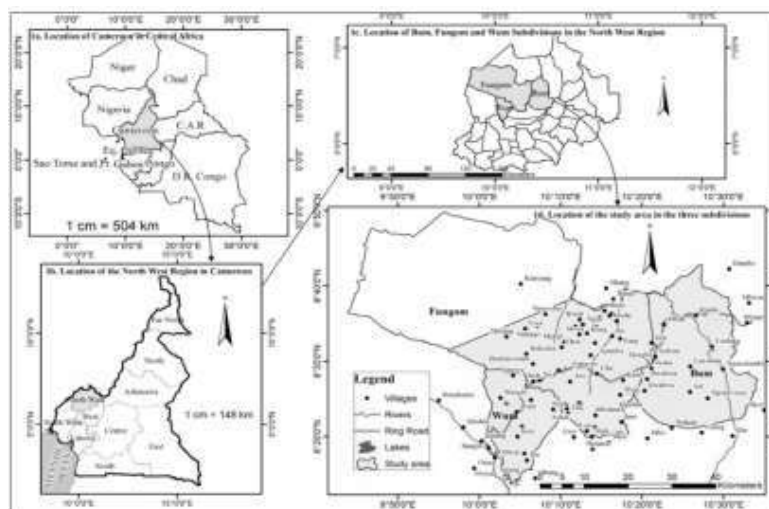
from 1986 to 2020 which permits the presentation of spatial distributions associated with the causes in the study area.

2. Research Methods

2.1-Location of the study area

Boyo-Menchum basin is a geographical area in the band of both Boyo and Menchum Divisions (figure 1). These are two Divisions out of the seven administrative Divisions that make up the North West Region of Cameroon. At the sub divisional level, the study involves three subdivisions; Wum Central, Fungom, all in Menchum and Fonfuka Subdivisions in the Boyo Division. Boyo-Menchum basin is situated between latitude $6^{\circ}20'0''\text{N}$ - $6^{\circ}50'8''\text{N}$ of the Equator and longitude $9^{\circ}50'0''\text{E}$ - $10^{\circ}300''\text{E}$ of the Greenwich Meridian (figure 1). This geographical region has evolved from one traumatized movement and shocks to another ranging from the imprints of nomadic activities, natural disaster to conventional administrative and traditiono-political manipulations.

Figure 2.1: Location of the study area in the Boyo-Menchum Basin



Source: NIC (2020)

This basin consists of seven different resettlement camps (Kimbi, Buabua, Ukpwa, Esu, Komfutu, Ipalim, and Yemnge) and three disaster affected villages (Subum, Nyos and Chah). These villages as from 1986 have the same history of origin which was all established 34 years after the lake Nyos gas disaster.

2.2-Methods

The study is analytical and exploratory in nature that employs a purposive random sampling technique to ensure that all the category of victims,

resource persons as well as the stakeholders was represented. These stakeholders at their various institutions helped to furnish institutional reports. Preliminary field visits were made in the early stage to assessed visibilities and test the applicability of the variables in the questionnaires. A sample of 397 questionnaires was administered to disasters victims and non-victims in the study area from a total population of 58611 inhabitants (PNDP, 2019a; PNDP, 2019b and PNDP, 2018). Qualitative information was obtained from close ended questionnaires, Focused Group Discussions (FDGs) and participatory rural appraisal (PRAs). Three FGDs during field studies were randomly selected: one in Wum Centre with 09 participants, Kimbi (06 participants) and Nyos (10 participants) to corroborate the responses acquired using individual sample questionnaires. Since the study aimed at evaluating post-disaster settlement dynamics, two distinct groups of PRAs approach were used: One PRA was organised in the Wum centre and the other at the Nyos Palace to reconstitute the data collected. In Wum, twenty-six participants were gathered in the council shade for the restitution of the information gotten from the field while a similar activity was carried out in Nyos with thirty-one participants. This approach helped the population to revealed post-disaster settlement information gotten generally from them through trends and changes, semi-structured interviews and reports, which were collected individually, in small groups as well as field observations to match the ground realities with remote sensing imageries. Global Positioning System (GPS) waypoints were taken to spatialize the different settlements and the location of the study area. The obtained data were analysed using Microsoft Excel spread sheets and data presented into tables and graphs for better understanding.

3. RESULTS

3.1. Typologies and phases of settlements dynamics in the Boyo-Menchum Basin

Despite the 1986 Lake Nyos gas disaster, human settlements in the Boyo-Menchum Basin have remained dynamic in their forms, type and locations till today. This has had negative and a multiplier effects on human dwellings. As a response, the growth of planned and unplanned settlements has helped to secure and support the lives of the affected populations. Table 1 shows the typology of post disaster settlements in the Boyo-Menchum Basin.

Table 1: Spatial typology of post disaster settlements in the study area

Typology of Settlement	Names of Villages	Inhabitans	Subdivision	Division	Period of creation
Disaster affected Villages	Nyos-Valley (Kam)**	-Mmen -Aku	Fungom	Menchum	

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	Chah**	-Fungom			1986
	Fang*	-Fang			
	Mbonge*				
	Subum**	Bum			
Emergency centres	WADA	-Aku	Wum Central	Menchum	1986
	Wum hospital	-Mmen			
	Catholic Mission				
	Ise	Mmen	Zhoa		
	Kumfutu				
	Bafmen				
	Esu				
	Fonfuka	Bum	Funfoka	Boyo	
	Mbuh				
	Kimbi				
	Mungong				
	Nkambe	-Bum	-Nkambe	Ndunga-Mantung	
	Misaje	-Aku	-Misaje		
Plan resettlements	Buabua	-Bum	Fonfuka	Boyo	1987-1990
	Kimbi	-Bum -Hausa			
	Ipalim	-Mmen	Fungom	Menchum	
	Kumfutu	-Fungom			
	Yemnge	-Fungom			
	Esu	-Aku			
	Ukpwa	-Aku	Wum central		
Self-resettle villages	Kumenga	-Bum	Fonfuka	Boyo	1999
	Fomme-Nyos	-Aku	Fungom	Menchum	2002
	Petsi-Nyos	-Mmen			1986
	Tohnaine	-Bum -Fang			-
	Chah	- Mmen			2002

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Self-relocation villages		-Aku			
	Nyos Valley	-Houssa			2002
	Subum	- Bum -Aku	Fonfuka	Boyo	2004
Unresettled villages	-Upper Nyos -Fang	-Mmen -Fang	Fungom	Menchum	1986

Key: ** Completely devastated villages, *Villages lightly affected, WADA (Wum Area Development Authority)

Source: Field survey, 2020

In a period of 34 years, Boyo-Menchum resettlement camps have undergone through six different major types of settlements. The main pronounce phases of evolution was observed in 1986-1987 (period of emergency centres), 1987-1990 (period of plan resettlement camps) and with minimal but multifaceted phases observed between 2002 till present (periods of self-resettlement and self-relocation villages).

3.1.1. Settlements affected by Gas Disaster in the Boyo-Menchum Basin

Five villages were affected during the lake Nyos 1986 gas disaster (table 1). Three were completely devastated (Nyos, Chah and Subum) and two (Fang and Mbonge) lightly affected. Four of these affected villages (Mbonge, Nyos Valley, Fang and Chah) were under Zhoa subdivision in the Menchum Division while one (Subum) was under Fonfuka subdivision in the Boyo Division. These villages were completely devastated or affected by the lake Nyos gas disaster. In addition, these settlements are the immediate villages that were around the Lake, with downstream locations as well as the villages that were further away from the Lake but found along the valley that experienced the toxic gas flow.

3.1.2. Three villages of Lake Nyos gas disaster found in fourteen emergency centres

Following the human devastation of the disaster in Nyos, Chah and Subum (commonly known as the “three disaster village”), emergency centres were self-created by the victims and later on adopted by the state as emergency relief camps. Figure 2 presents the spatial distribution of emergency centres and the population after the disaster.

Figure 2: Population and the spatial distribution of emergency centres

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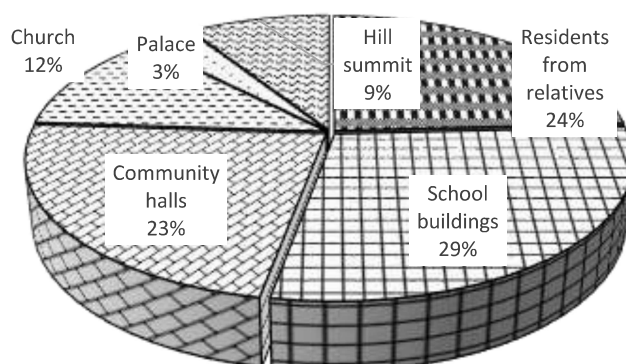
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Source: Field Survey, 2020

From Figure 2, emergency centres immediately after the disaster were unevenly distributed and the affected population were disproportionately distributed as a result of limited hosting facilities. Kimbi and Saint Gabriel in Bafmen hosted the highest number of the population, 1041 and 907 survivors respectively. While in the emergency centres, temporal care facilities offered to the victims varied and differ across the various locations (figure 3).

Figure 3: Temporary care facilities to victims after the disaster



Source: Field survey, 2020

Majority of the victims, 29% sought refuge in school buildings (such as Catholic School Ise and Catholic School Kumbutu) and resident from relatives (24%). The significant proportion of the survivors taking refuge in school buildings and community halls are attributed to the high number of the survivors that were displaced after the disaster. To this, only schools halls, community halls and church buildings as the case with Esu, Ise, Kumbutu, Wum Area Development Authority and Mungong were tenable to accommodate the victims. It is observed that the proportion of the population that took refuge in

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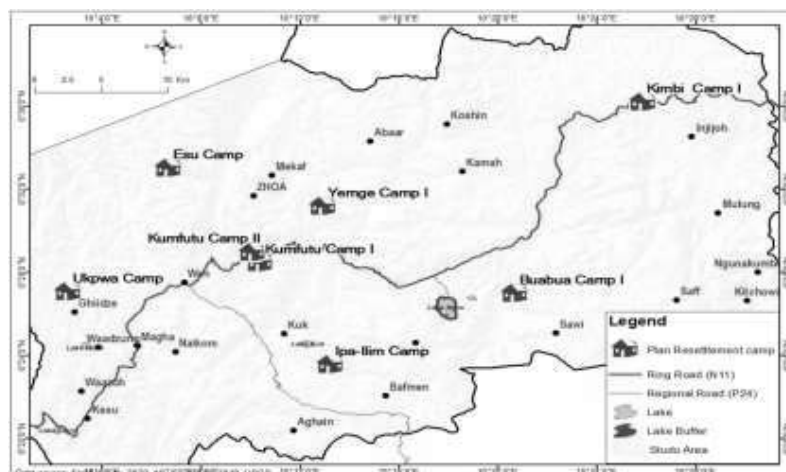
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residents offered by relatives, 24% was attributed to the delay from the state side and the international stakeholders who were to intervene immediately after the disaster. Households stated that the first external assistance after the tragic event came in after three days. This delay forced people to choose where to live on their own. These emergency centres were later closed in 1987 and early 1988 to the mercy of planned resettlement camps.

3.1.3. Settlement dynamics from emergency centres to planned resettlement camps

Between 1987 and 1990, well-planned state social houses were designed and constructed to serve as temporal resettlement camps in Esu, Yemnge, Ipalim, and Kumfutu in Fungom Sub-Division, Ukpwa in Wum, Buabua and Kimbi in Fonfuka Sub-Division (figure 4).

Figure 4: Spatial distribution of planned resettlement camps in the study area from 1987-2020



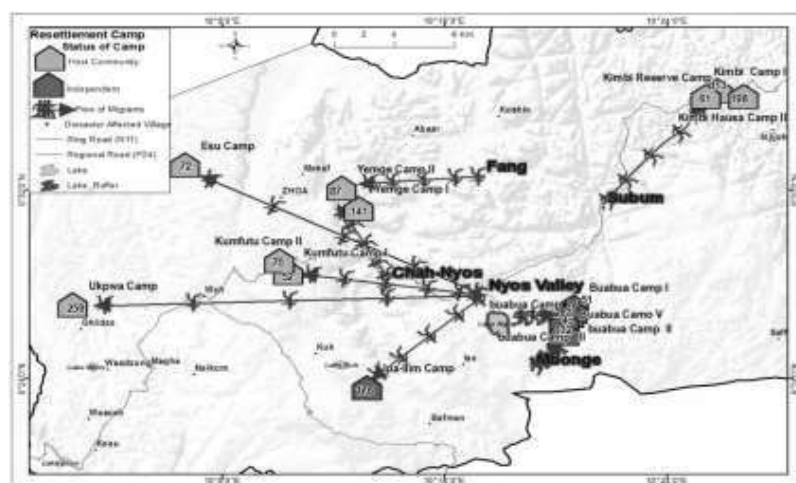
Source: Field survey, 2020

Field observations transect walks and insights from FDGs further classify these planned resettlement camps into two categories: camps constructed by the state and attached to already existing communities (host communities) and camps that were constructed independently. Figure 5 presents the state of planned resettlement camps in the Boyo-Menchum.

Figure 5: Status of the resettlement camps in the Boyo-Menchum

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Source: Field survey, 2020

In the planned resettlement camps, houses and compounds were disproportionately constructed. This was done by the state and non-state stakeholders only in accordance with the number of victims who chose to be resettled in a specific camp. Table 2 shows the number of compounds and houses that were constructed per camp in the planned resettlement camps.

Table 2-Spatial distribution of houses per camp during the 1987-1990 resettlement schemes

Resettlement camps	No. of compounds	No. of buildings	No. of people Resettled	
			Adults	Children
Ipalim	47	49	75	176
Yemnge	42	48	94	134
Buabua	106	118	247	355
Esu	13	19	29	43
Kumfutu	25	31	61	61
Kimbi	66	74	171	201
Ukpwa	44	62	109	150
Total	343	401	370	455

Source: Field survey, July 2020; MINAS/SAS, Wum (2010), Muscat (1988)

From table 2, housing distributions per camp were uneven and only equivalent to the number of household heads to be resettled in each village. Compounds were constructed by the state and non-state stakeholders and accorded to polygamous families while single houses were design to single households. Amongst the number of people resettled per camp, Buabua and

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Kimbi villages under Fonfuka Sub-division represent the most densely populated camps (figure 5). These high densities can be attributed to the fact that all the population displaced from Subum were concentrated only in two camps which were still closer to the affected area (Subum): Buabua and Kimbi unlike those in Fungom Sub-Division that were scattered into five different resettlement camps distant from each other. These corroborates with the findings of Maarseveen *et al.* (2019) which stated that after the disaster, many people still found shelter closer to their homes. From these statistics, it is clear that the number of persons resettled, surpasses the total number of houses constructed per camp. Thus, it was ascertained by the people that, houses were only attributed to heads of households and to single survivors of 18 years of age. Also children below 18 that survived without parents were given to guidance or extended family members. This explains why the total number of houses constructed during resettlement was less than the number of persons censused after the disaster. Figure 6 presents some of the houses constructed in planned resettlement camps across the Boyo-Menchum Basin.

Figure 6: Sample of planned resettlement houses still maintained today in the Boyo-Menchum



Source: Field survey, 2020

In the state planned resettlement camps, housing, livelihoods and infrastructural conditions remained sore and survivors had resorted to other alternatives and the development of self-settled villages.

3.1.4. Developed and self-resettled villages despite the state constructed planned settlements

Other types of settlements that emerged after the disaster were self-settled villages. These villages in the study area include: Kumanga, Fomme-Nyos, Petsi-Nyos and Tohnaine. Households posit that, these settlements were developed after planned resettled camps as a result of uncondusive camp conditions. The resettled population have increased from 1384 inhabitants in 1990 to 5160 in 2017 (MINAS-SAS, 2017). As of 2020, self-settlement has appeared to be the most appropriate option to the displaced population in the Boyo-Menchum basin. This self-settled population in the study area is further

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influenced by the quest for grazing land, water, farming land, access to fuel wood and construction materials. Evident from Norwegian Refugee Council-NRC (2014) also affirms that unless Internally Displaced Persons receive shelter and materials, they will take shelter in a structure that they have built or another structure that appears not to have been affected by the disaster.

3.1.5. Disaster devastated villages now relocation villages in the Boyo-Menchum

Devastated villages as mentioned in table 1 have now become relocation villages in the study area. According to the population, after the final resettlement, survivors were not totally integrated into the immediate communities. Even the houses and the land they leaved and worked today is still classified under state land and state own social houses. Worse of all is the fact that, no land certificate has ever been issued to the disaster victims. Away from the land and property ownership, this displaced people have increased in size and knowledgeable about the fact that they are living on land that they do not own. These have obliged them to relocate back to their former ancestral areas of Subum, Nyos and Chah (figure 5) despite the precarious housing situation (figure 7).

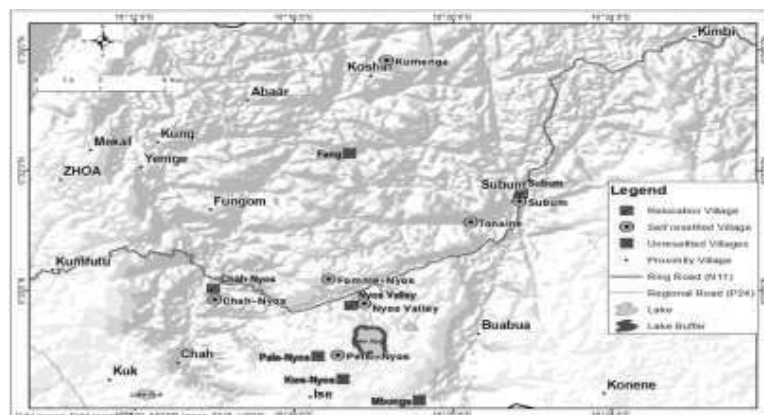
Figure 7: Poor houses constructed in relocation villages (Nyos valley)



Source: Field survey, June 2016

Households further explained that these settlements are fragile in both rainy and dry seasons. In the dry seasons, houses are exposed to bush fires set by farmers, hunters and graziers as most of the settlements are surrounded by grazing lands and forest patches while in the rainy seasons, the thatched grass on the roofs are continuously wetted by rain droplets which makes the roofs heavy leading to collapsing walls. Also, the population of the study area adds that in moments of rainfalls, the roofs are dripping and thus, keep the population awake. Figure 8, shows the spatial distribution of self-resettle villages, relocation, proximity and unresettled villages in the study area.

Figure 8: Spatial distribution of self-resettle, relocation and unresettled villages.



3.1.6. Unresettled villages

Unresettled villages in the study area include Upper Nyos (Kwe-Nyos, Pale-Nyos), Mbonge and Fang (figure 8). These are villages with minimal effects of the Lake Nyos gas disaster and were not included in the state planned resettlement camps project. Households indicated that, only five persons were affected by the gas disaster in Fang while in Mbonge, only the crops and the vegetation were corroded.

3.1.7. Host communities to the affected villages of the lake Nyos 1986 disaster

Other settlements identified are the host communities. These host communities comprise of those settlements that existed prior to the disaster and during the resettlement process, these communities assisted in allocating land for the disaster affected villages to leave in. These host communities also helped to facilitate a wider community social network among the survivors and the host population in the study area. It was observed that the pre-planned resettlement camps were constructed separately and attached to the host communities with the adoption of their names. These settlements include Esu, Kumfutu, Yemnge and Kimbi (figure 5).

3.2. Drivers of post-disaster settlement dynamics in the Boyo-Menchum Basin

The Lake Nyos gas disaster highly affected three villages in two distinct administrative setups, but in the course of the resettlement schemes, survivors from these three devastated villages were spread over seven different resettlement camps. Thirty-four years after the unforgettable gas explosion, the returns of the displaced persons have consequently become a cause for concern.

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Drivers of settlement dynamics in the study area are classified into two: spatial distribution of post disaster planned resettlement camps and the return of the survivors and non-victims of the 1986 Lake Nyos gas disaster to the disaster affected areas.

3.2.1. Distribution of post-disaster planned resettlement camps in the Boyo-Menchum

Several variables were chosen and scaled in this study to express the reasons for the spatial distribution of the displaced population in the Boyo-Menchum Basin (table 3).

Table 3: Drivers of spatial distribution of post-disaster planned resettlement camps

Variables	Scaling (%)					
	A			D		Total
Government decision	0.3	8.2	9.7	.0	.8	100
Tribal links/relatives in the area	1.8	8.3	3.6	2.8	3.5	100
Inadequate physical space	8.2	4.3	5.2	.8	3.5	100
Self-identification as a member of the affected villages	0.3	6.0	3.1	.3	6.3	100
Weak powers of the traditional rulers	8.0	1.4	9.0	0.1	1.6	100
Disunity amongst the traditional rulers	8.5	5.4	5.2	0.9	0.1	100
Personal decision	0.4	0.5	.0	.5	.6	100
Minimize the risk of another disaster	1.2	6.7	4.4	1.6	6.1	100
The spread of false information	1.2	4.9	7.1	2.7	4.1	100
Laxity of the state authority	8.7	8.9	8.6	9.9	3.9	100
Absence of on-spot proper report	5.8	2.4	7.1	0.8	3.9	100
Selfish ambitions of some political leaders	3.7	8.1	7.9	7.4	2.9	100
Physical proximity	3.3	7.7	5.1	.8	.1	100
The survivors were too many to be resettled in one camp	4.0	3.2	1.6	.6	2.6	100
Reduce environmental damage/pressure over resources	1.3	0.4	.8	.8	4.7	100

Source: Field survey, 2020

With increasing uncertainty about the disaster and the hope of satisfying the disaster victims, personal decisions (50.4%) remained the main driver behind the distribution of settlements. The population asserts that a choice was given to them by the state to choose where to settle to attract the amenities of the government and not for themselves. Also, the governments' first decision (40.3%) was to resettle the survivors at Furu-awa, but the survivors unanimously refused the idea. Thus, this adversely played back on the survivors as options concerning the final resettlement sites were still proposed by a commission of government authorities made up of the Senior Divisional Officer, the Divisional Delegate of Agriculture, the Divisional Delegate for Livestock and Animal Husbandry and a representative from WADA. In Kom

(1987) and Nguieyep (2019), these State authorities proposed areas such as Njinijou for the resettlers in Kimbi, Imo-Fungom or Ngonekong where some have been respected till date. The representatives of the two clans: Fungom and Bafmen both migrated down to Chah for faming purposes to form Chah-Fungom, Chah-Nyos and Chah-Mmen. After the disaster, this family following tribal links (41.8%) were still maintained. Similarly, the Aku (graziers) in Nyos migrated from Naikom and Mbinjam (Wum) during the 1973 Aghem women farmer-grazier conflict. This explained why graziers in Nyos choose to resettle in Ukpwa at Wum. Nyos during the disaster was autonomous and with their traditional leader whose palace was not affected by the disaster. During the resettlement phase their powers were weakened (28%). For instance, the Fon of Nyos failed to insist that his people should be resettled either at Petsi, Kwe-Nyos or Pale-Nyos: areas up the Lake that were deemed to be safer and closer to the palace. This was further worsened by disunity amongst the traditional rulers (28.5%) that were concerned with the disaster relief management. The *Fon* of Saff wanted the survivors to be resettled at Saff and dislodge from the Fon of Sawi, the Fon of Alung at Laika Bum, the *Fon* of Fang, the Fon of Mmen and that of Fungom all proposed that they all have land and that the survivors should be resettled in their various jurisdictions. As a result of incompetency, the survivors blamed the state for being relaxed (28.7%). The state authority did not make any effort to see in to it that the *Fon* of Nyos was alive or death. Tang Oliver Kuma an unresettled survivor at Nyos further added that “*when people dem die someone dem remain, them get for first run go cover the pikin them before looking for the one them were them dong die*” which mean that the government was supposed to first of all identify and evacuate those who were still alive and particular to the disaster affected villages before considering those from the proximity population and uphill. These have facilitated the easy return to the disaster affected areas by these survivors. Equally, the disaster affected villages were closer to the Dumbu range, the Kimbi game reserve as well as the Kom-Wum forest reserve. For fear of human pressure to be exerted on these protected areas (41.3%), the survivors were scattered into seven different villages in their smaller numbers further away from the Reserves.

3.2.2. Concerns and return of the survivors and non-victims to the disaster affected zones

These concerns are better observed traverse socioeconomic and infrastructural domains

3.2.2.1. Socioeconomic concerns

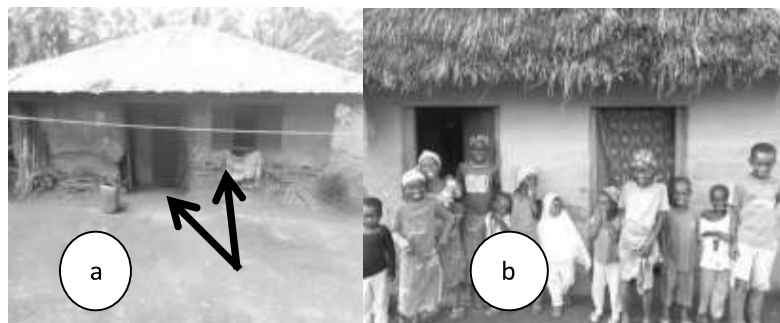
i. Dilapidated state of houses at the resettlement camps: After the disaster the population affected were displaced and resettled in camps built by the Cameroon Government. Today, these buildings have not only succumbed to dilapidation and influence of wind, but have also become inappropriate for conducive living (figure 9a). About 401 buildings as seen in table 2 were

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originally constructed to accommodate the survivors. Today, these buildings are old and unable to accommodate families whose numbers have increased in sizes (figure 9b). Resettlement camps initially constructed to accommodate 1384 people today can no longer support the present population estimated at 10,000 inhabitants (MINAT, 2019).

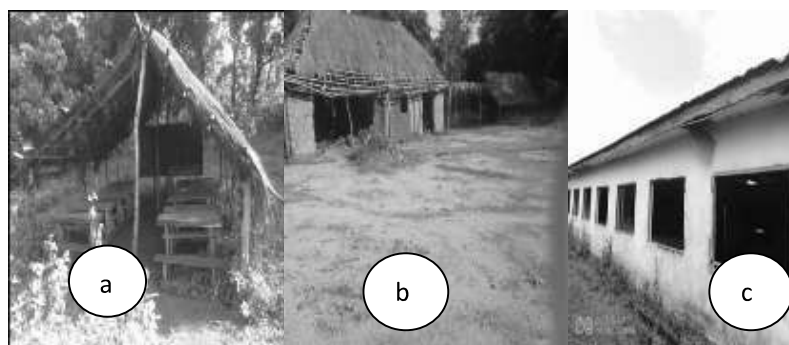
Figure 9: Dilapidated houses and poor accommodation



Source: Field survey, 2020

ii. Road infrastructures: In terms of road infrastructures, Boyo-Menchum is almost cut off from the rest of the country. Most of the roads are seasonal and in a deplorable state. A situation which is further compounded by the absence of telephone networks such as Cameroon Telecommunication (Camtel), MTN, Orange and Nextel Cameroon. In the area of education, primary and secondary schools are increasingly gaining grounds since 2008 but the problem of personnel and lack of infrastructure is draconian (figure 11a, 11b and 11c). While in Government primary schools (G.S) Chongkang and Subum, pupils are taught under the open space (figure 11a and figure b).

Figure 11: Deplorable educational infrastructure in Subum, Buabua and Ukpwa



Source: Field survey, June 2016; July 2020

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Due to the absence of better educational facilities and well trained personnel's, most children are compelled to school in Wum, Ise, Buabua, Bafmen and Fundong. Also, the hygienic conditions in the camps are poor as there exist few health centres but with inadequate trained medical staff. This is peculiar to Kumfutu and Ukpwa where they have only untrained and voluntary nurse. At night, women put to birth with the use of gas lighters and bush lamps. During FDGs, households lamented that many women died during child birth due to the absence of prenatal care and midwives services.

iii. Limited sources of livelihoods: Other than this, insufficient land for agropastoral activities is also a cause for settlement dynamics. Agriculture and cattle rearing are two competing economic activities in the study area and the population are left with no option than to return to the disaster area where the landscape and fertile soils are relatively free and quite appropriate for the agropastoral activities.

3.2.2.2. Infrastructural concerns

i. Low infrastructural development: Though, rural electrification remains the main preoccupation in the study area, the mutations in settlements are conditioned by the absence of electricity and pipe born water in the resettlement camps. Amongst the ten sampled villages, only Esu was having access to electricity. Though most of the camps were furnished with pipe born water (figure 10a), the water infrastructures are dilapidated with most of the stand taps abandoned. With this, the population depend solely on rain water, small streams and springs (Figure 10b). On electricity supply, the indigenes largely depend on bush lamps and solar energy to charge phones.

Figure 10: Water sources in the study area



Source: Field survey, 2020

Further, the presence of priority technical infrastructure such as the degasification project, tarring of the road from Nyos Junction to Lake Nyos and the construction of a dyke over the spill way in the lake have encouraged the displaced and non-displaced populations to return to the disaster affected areas and other areas such Tohnaine, Kichako and Fomme. The absence of a

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programme to facilitate the socio-economic empowerment of victims of the disaster has remained a serious drawback. About 34 years after the disaster, the victims have remained in their primitive state. No trade, not even a single rural development project has been put in place to assist them. They have continued to depend on subsistence agriculture and small animal breeding for their survival.

4. The people's opinion on the different settlements

The studied population decried their neglect in the resettlement camps and have diverse opinions within the different settlement options (table 4).

Table 4: Rate of household assessment in different settlements

Variables	Very satisfied		Satisfied		Indifferent		Not satisfied		Don't know		
	F	%	F	%	F	%	F	%	F	%	Total
Plan resettlement camps	80	20.2	62	15.6	47	11.8	195	49.1	13	3.3	100
Self-relocation villages	92	23.2	149	37.5	62	15.6	90	22.7	4	1.0	100
Self-temporal relocation villages	74	18.6	201	50.6	37	9.3	84	21.2	1	.3	100
Host villages	100	25.2	134	33.8	39	9.8	109	27.5	15	3.8	100
Unsettled villages	111	28.0	81	20.4	33	8.3	129	32.5	43	10.8	100

Source: Field survey, 2020

The population expressed great dissatisfaction with the planned resettlement camps, 49.1% as a result of government failure to develop income generation activities, no post-secondary institutions; poor roads leading to camps as well as unfulfilled government promises have remained challenging. Further investigation from the key stakeholders FDGs revealed that in Yemnge, dissatisfaction is as a result of the host communities considering survivors as refugees in their homes, limited land for grazing and farming. In Ukpwa land problems between the host communities and those in camps, no health centre and many school dropouts due to poverty are specific while Ipalim and Esu have no water supply projects. Also, the unresettled villages, 32.5% for instance in Upper Nyos have never benefited anything from the resettlement schemes while the host villages, 27.5% blamed the survivors of settling on their land and tilting all development projects in favour of the camps. The survivors on their own part cried of marginalisation by the host communities. That notwithstanding, self-relocation and self-temporal relocation village's options undertaken by the survivors have proven to be satisfactory at 37.5% and 50.6% respectively. This satisfaction is attributed to the available fertile and grazing land found in the relocation villages. Also, this can be attributed to the accessibility of these relocation villages (Subum, Nyos and Chah) to the ring road unlike Ipalim located further away from the ring road and Wum centre.

5. Discussion of Results

This study finds that, settlements of various categories are the first post-disaster response undertaken by the victims and then further strengthened by the national government to help victims take refuge while mitigation actions are taking place. This is confirming on the report presented by the Presbyterian Church in Cameroon-PCC (1987). In the study, the Lake Nyos post-disaster settlements dynamisms have evolved from disaster affected settlements, emergency centres, planned resettlement camps, self-resettled, unresettled, proximity to self-relocation settlements. This slightly agrees with the findings of Tom and Antonella (2005), who also categorized post disaster settlements into six transitional settlement options: dispersal in host families, rural self-settlement, urban self-settlement, collective centres, self-settled camps, and planned camps. Both studies agree that when a disaster hits, emergency centres are constructed without respecting administrative or tribal lineage. Both works also found that, natural disasters triggers settlement mutations while the underlying action of man further defined the motives, period and the directions of movements. In the study, after the disaster, survivors were still allowed to settle closer to their affected homes. This neatly fits into the findings of Maarseveen *et al.* (2019); Norwegian Refugee Council (2014) and MINAT (2019) who conclusions were that IDPs remain close to their homes and belongings even after the disaster. Inaccessibility and government neglect has proven to be a major challenge in the study area, a situation which does not tie with previous studies on post-disasters settlements as Singh *et al.* (2017) and Boillat *et al.* (2015) found that infrastructural development for relocated communities is usually far better assessed as they are constructed at the city centres by the state and International Organisations.

6. Conclusion and Recommendations

Natural disasters affect man in several ways but the effects on human dwellings are the most pronounced. In response, settlements of various categories are the first post-disaster response undertaken by the victims and then further strengthened by the national government and international institutions to help victims take refuge while mitigation actions are taking place. The Lake Nyos gas disaster has resulted to varied settlement dynamics. These dynamisms have evolved from disaster affected settlements, emergency centres, planned resettlement camps, self-resettled villages to self-relocation settlements. Other settlements found in the Boyo-Menchum Basin are unresettled villages and the proximity settlements. When a disaster hits, emergency centres are constructed without respecting administrative or tribal lineage. The study also found that, natural disasters triggers settlement mutations while the underlying action of man further defined the motives, period and the directions of movements. The main drivers of the spatial distribution of the planned resettlement camps to seven different villages across

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the study area were the role of the government, tribal links, a high number of displaced population and the weak powers of traditional rulers. Other than this, dilapidating camp houses, absence of electricity and pipe born water, poor roads, insufficient land for agropastoral activities and absence of programme to facilitate the socio-economic empowerment remained contemporary issues further pulling away survivors in the planned resettlement camps. Only self-relocation and Self-temporal relocation options undertaken by the survivors have proven to be satisfactory. These displacements after the 1986 lake Nyos gas disaster have disrupted lives, settlements and have transformed the physical landscape. Thus, the study recommends that as temporal resettlement camps in the study area have in the long run become permanent settlements, a comprehensive renovation of houses in the resettlement camps and accurate lay down of modalities to encourage and secured the returning population are required. That further displacement should be kept to a minimum by the state and if possible avoided in the Boyo-Menchum Basin through the construction of priority infrastructure, introduction of programs for the socio-economic empowerment of the survivors and secure land for agro-pastoral activities. A township engulfing both Nyos and Subum should be created in other to solve the problem of ethnic diversity, low infrastructural development and incompatibility among the local population. Also, in planned resettlement camps for instance Yemnge and Upkwa, some people collect gifts who are not victims. To this, an integrated management of the population should be adopted to avoid the concentration of external helps only to the resettlement camps. Selling of houses and moving to towns is today on the rise in the study area. The study reiterates that the prefectural decision of 2009 prohibiting the selling and buying of houses in the resettlement camps should be reinforced by the Divisional Officers in their respective areas of command in order to control the illegal sales of the state land. Armed attacks have led to the destruction of houses and subsequent displacements of the resettle population. A re-resettlement project should be initiated by the state and bilateral partners.

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