IMPACTS OF CLIMATE CHANGE INDUCED FLOODING ON TOURISM INVESTMENTS AND LOCAL LIVELIHOODS IN THE SAMBURU REGION, KENYA.

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ABSTRACT

Tourism and climate change have been widely related. Climate change induced flooding is of serious concern because it causes financial and economic losses for investors in hotel and tourism industry. Flooding and drought are frequent environmental event in arid and semi-arid ASALs) lands of Northern Kenya. It is rich in biodiversity hence considered important for wildlife conservation and a major tourist destination. It is important in the Kenyan economy as it supports valuable economic activities including tourism and nomadic pastoralism. The region witnessed several climate change induced flooding which caused damage to tourism infrastructure and local livelihoods. The study therefore sorts to assess the economic effect of the climate-linked events on tourism activities. The study used questionnaires and face to face interviews to estimate the impacts of flooding on investments, revenue generation, household income and employment opportunities. The total economic value of the climate induced flooding in the Samburu ecosystem as a tourist destination was about USD 11 billion. Loss in investments, revenue, employment was positively correlated to the increased flooding events. The significant losses from a tourism destination calls for immediate action for climate change adaptation and mitigation policy interventions in the region.

Key words: Climate change, Tourism investment, Replacement cost, Livelihood, Household income

INTRODUCTION

Climate change is an environmental problem which is of great economic concern internationally (Richard & Tol, 2018) (IPCC, 2013). Increased temperature and higher evaporation cause droughts and floods in different regions of the world (Hegerl & Cubasch, 1996). Other effects of climate change include submergence of infrastructural development along coastal regions due to rise in sea level (Church, Wilson, Woodworth, & Aarup, 2007; Beeharry, Bekaroo, Bokhoree, & Phillips, 2022). Climate change induced catastrophes, such as flooding and droughts have tripled in the last 40 years (IPCC, 2013). These climate change induced disasters are the most expensive insured catastrophes (Huber & Gulledge, 2011) (Holland, 2009).

Tourism is a dynamic contributor to the global economy and is highly recognized as a significant pillar in the social and economic welfare in developing countries (Scott, et al., 2008) (Gossling , Hall, & Scott, 2009). The industry depends on a stable climate for satisfactory delivery of tourism services (Scott, et al., 2008). Climate therefore determines the tourism activities offered and influences choice of destination (Gossling, Hall, Peeters , & Scott, 2010). In this regard, changes in climate threaten the competitiveness and sustainability of tourism operations and destinations (Scott, Hall, & Stefan, 2012) (Dube & Nhamo, 2022) (Yu, Schwartz, & Walsh, 2009).

In Kenya, the tourism industry is an important contributor to the socio-economic development strategies. The industry provides 9.3% of the country's total employment, contributes about 9.9% of the Country's total GDP and supports many tourism enterprises. It supports local cottage industries such as bee keeping and bead work which are the mainstay for the livelihoods. It has a great potential for expansion and has made Kenya an investment choice for multinational hotels that cater for the increasing demand for business and leisure travel (KAHC, 2016). The tourism industry witnessed growth through the investment of international brands such as Radisson Blue and Villa Rosa Kempisky and in the last ten years, Kenya attracted over KES 83.6 Billion worth of tourism investments (GOK, 2015). Tourism investments in the arid and semi-arid areas are restricted to lodges and tented camps, located inside or around the national parks and national reserves (GOK, 2011). These investments in the ASAL areas creates enterprise opportunities for local population, for example in the traditional jewelry and apiculture industries. The tourism investments also offer jobs such as tour guiding, as well as employment in the hospitality services in the tented camps and lodges. The tourism investments therefore, underpin the social and economic situations in these ASAL regions (KAHC, 2014).

Samburu is an ASAL region located in Northern Kenya and is highly vulnerable to climate induced environmental events such as droughts and flooding drought (GOK, 2013). These events account for the greatest socio-economic impacts and amplify the existing threats to human life, investments and local livelihoods (Marigi, 2017). In 2010, and 2019 the River Ewaso Nyiro burst its banks and rose to unprecedented levels destroying tourist investments in Samburu including Intrepids, Larsens, Ashnill and Sentrim tented camps and Samburu lodge (Waweru & Ondieki, 2019; KRC, 2010). Some of this tented camps and

lodges such as Samburu lodge have been in existence for over 50 years and they have never suffered the level of damage witnessed lately (SEI, 2009).

Flooding has become a serious concern for investors in tourist accommodation as it causes property destruction and financial crisis. Among the local residents, flooding leads to loss of businesses and jobs, causing reduced household income and stressed livelihoods. During the 2010 and 2019 flooding events all the tented camps and lodges were closed down and all employees were rendered jobless. The local guides and local tourism-based businesses were affected causing loss of employment and disrupted flow of income.

The economic effects of climate change induced disasters are frequently overlooked when making major national investment decisions. The effects such as loss of investments and revenue, loss of employment and lost household income and livelihoods have great social-economic impacts and therefore need to be understood before important decision are made (GOK, 2011). The research work on the impacts of climate change on tourism investment, revenue, jobs and business ventures are few in this region.

The unpredictable climatic change induced catastrophes continue to destroy hotel infrastructure, reduce revenue generation, discourage investment and destroy jobs and local business ventures. It is not understood how the 2010 and 2019 flooding impacted on tourism investments and revenue, local employment, household income and livelihoods. In view of this, the study sort to estimate the loss in tourism investment, revenue generation in tented camps and lodges in the Samburu region. The study also assessed the loss of employment, closure of tourism-based business ventures and changes in household income and due to the 2010 and 2019 flooding events.

The results of this study will help policy makers in developing policies to guide tourism investments to avoid losses and support emergency response to save lives and to cushion local livelihoods. The information will also guide policy makers in the tourism sector to formulate climate change adaptation measures such as diversification of tourism attractions, access to financial incentives for resilient investments and skills empowerment and business opportunities for tourism dependent economic activities.

MATERIALS AND METHODS

STUDY AREA

Samburu and Buffalo Springs National Reserves form a single ecosystem located in an arid and semi-arid region with erratic rainfall pattern and frequented by droughts and flooding. Rainfall range between 150mm and 550mm per year while temperatures range between 29°C and 25°C, with high rates of evapotranspiration. River Ewaso Nyiro North is the only river traversing the region hence it is the lifeline for wildlife and livestock. The main economic activities are nomadic pastoralism and tourism activities. It has a human population of 223,947 with a population density of 11 persons (GOK, 2013)

Tourism and recreation are the dominant economic activities in the region hence there are several lodges including, Serena Samburu lodge, Sarova Shaba lodge, Samburu lodge and Samburu Sopa lodge

region. Additionally, there are several tented camps including Samburu Intrepids, Larsens camp, Elephant Bedroom, Ashnil. Many of these tourism investments are located along the floodplain of the river Ewaso Nyiro North. (Samburu County Goverment, 2013).

The region is endowed with a diversity of attraction including beautiful geographical features such as rocks cliffs, river beds, and hills. The region also has special species of animals not found anywhere else in the world, including Grevy's Zebra, Reticulated Giraffe and Somali Ostrich, Beisa Oryx, and Gerenuk (Okello, Bobby, & Avignon, 2001). The region has many attractions such as special five and cultural artifacts such as beads and necklaces.

In the last 20 years the incidences and power of floods has increased remarkably in the region which is attributed to climate change. River Ewaso Nyiro North breaks its boundaries and floods annually (Samburu County Goverment, 2013), however extreme and destructive flooding events occurred in 2007 and 2010 causing a lot of damage to tourism investments and local economic activities (OCHA-Kenya, 2010)

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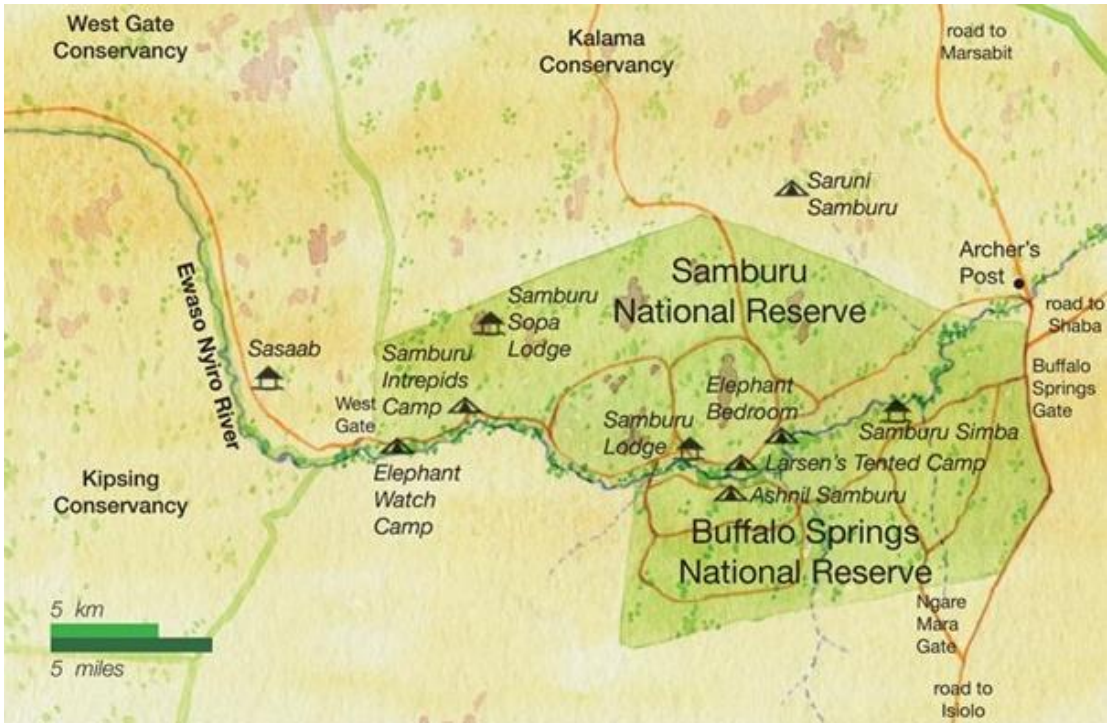
Figure 1: Map of the study area



Source: Global Travel Publishers

DATA COLLECTION

Economic estimates of the impact of climate change are typically based on damage functions that relate economic losses to climatic events (Christian, 2021). The estimates of economic costs linked to the damage functions cover a variety of climate impacts that are usually grouped as market impacts and nonmarket impacts (Shane, Simon, & Kate , 2022). A range of valuation methods have been used to estimate the economic impacts of climatic events including nonmonetary valuation

and monetary valuation methods (Freeman, 2003) (Champ, 2003) (US National Research Council, 2005) (Welsch, 2009). The monetary valuation methods include the revealed-preference and the stated preference methods (Saarinen & Tervo, 2006). The replacement cost method is used to estimate the loss of a natural system service based on the cost of replacing the lost infrastructure (e.g., the cost of rebuilding a bridge that has been washed away by floods (Farber, Constanza, & Wilson, 2002). The defensive expenditure estimates the costs people incur while protecting themselves against an environmental change e.g. building flood proof infrastructure (Daily, et al., 2000) (Farley, 2008) (Fisher & Turner, 2008).

The samples were selected purposively for data collection and included three tented camps and 2 lodges. In this purposive sampling, the researchers selected the sampling units based on the personal judgement and the situation on the ground. To estimate the economic effects of climate change on hotel investment along the Ewaso Nyiro North River, the study used the replacement cost method (Niemi, 2009). The study distributed dichotomous type questionnaires to the team leaders in the selected tented camps and lodges located along the Ewaso Nyiro River in the Samburu and Buffalo Springs National Reserves. The questionnaires were designed to collect reliable quantitative estimates of the cost of replacement of destroyed tented camps and lodges. The methods considered the total cost of replacing the tented camps and lodges including the cost of reconstruction and refurnishing of restaurant, kitchen and energy generation and distribution infrastructure as well as replacement of the administrative equipment such as computers. The study also estimated the lost revenue for the tented camps and the lodges when the reserves were closed up for all tourism activities for about one year.

The study also assessed the common household income generating activities and the changes in household income in the regions. The study performed a purposive sampling of household heads among the Samburu dancers, women bead entrepreneurs and other business ventures around the Samburu and Buffalo-Springs national reserves. Dichotomous questionnaires were distributed to a total of 15 identified household heads. To assess the changes in the jobs and employment, the study used purposive sampling to select the tented camps and lodges resident guides and other staff in the region. Dichotomous questionnaires were distributed to 6 resident guides and 18 tented camp and lodge staff.

RESULTS

The 40 respondents interviewed during the study were made up of 52% women and 48% male. About 40% of them were in the 20-40-year age bracket while 23% of the respondent were in the 60-80 age bracket. 52% of the respondent hand primary level education, 33% secondary level education and 15% post-secondary level education. The tented camp and lodge managers who participated in the interview had 1 to 2 years work experience

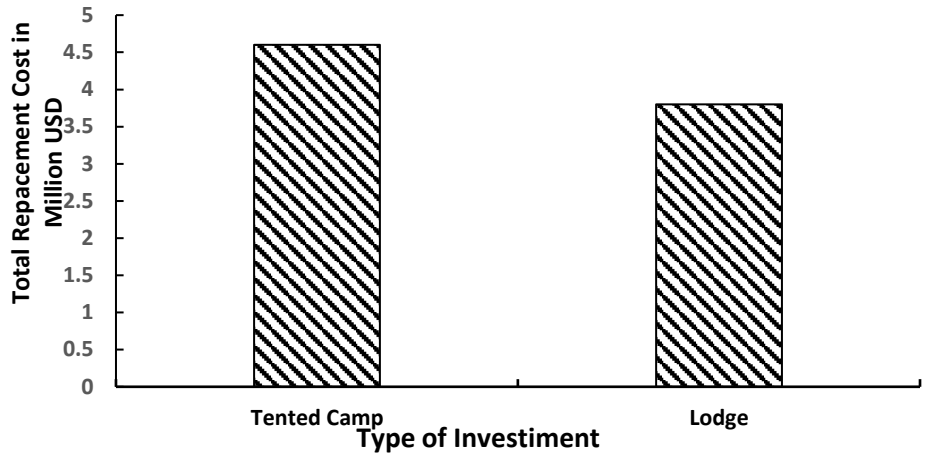


Figure 1 The total cost of replacement of accommodation investments due to flood damage

The mean replacement cost of a tented camp and a lodge including accommodation furniture, restaurant and kitchen infrastructure, administration block and energy generation and distribution infrastructure was USD 0.92 Million and USD 0.8 Million respectively. This was directly related to the climate linked flooding in the Samburu and is therefore the considered as the economic costs of climate change for investors in the region (fig 1). The replacement and renovation were as a result of climate linked flooding and was directly extrapolated as the real economic loss due to climate change.

During flooding tourism activities were suspended for about one year to allow for restoration of the damaged road and tourism infrastructure. The tented camps and lodges damaged by the flooding were closed down for replacement and renovations and were therefore not available for use by the tourist and could not generate any revenue for the investors. The total annual revenue lost by the tented camps and the lodges was a total of 0.23 and 0.18 Million USD respectively

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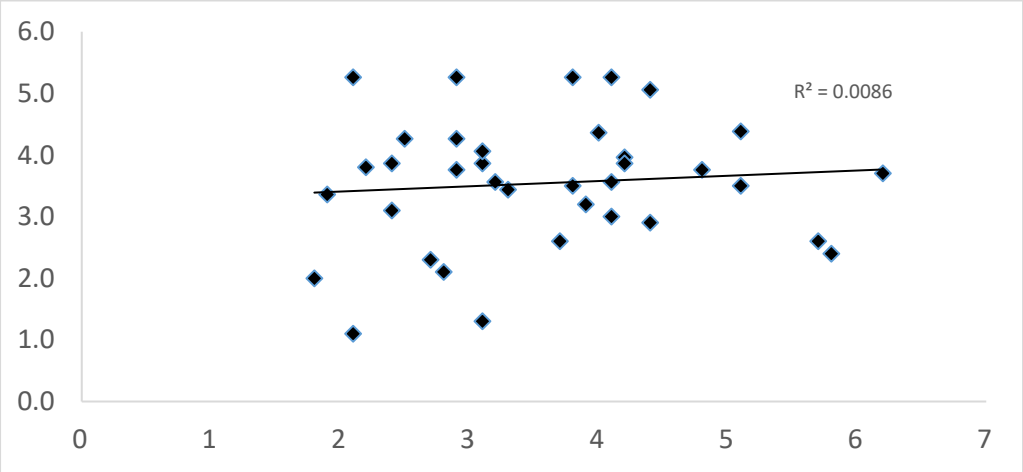

Figure 2 Correlation between Flooding and loss in investments

The tourism investments were affected by flooding because they were lost and damaged during flooding, however the two showed a weak positive correlation (Fig. 2).

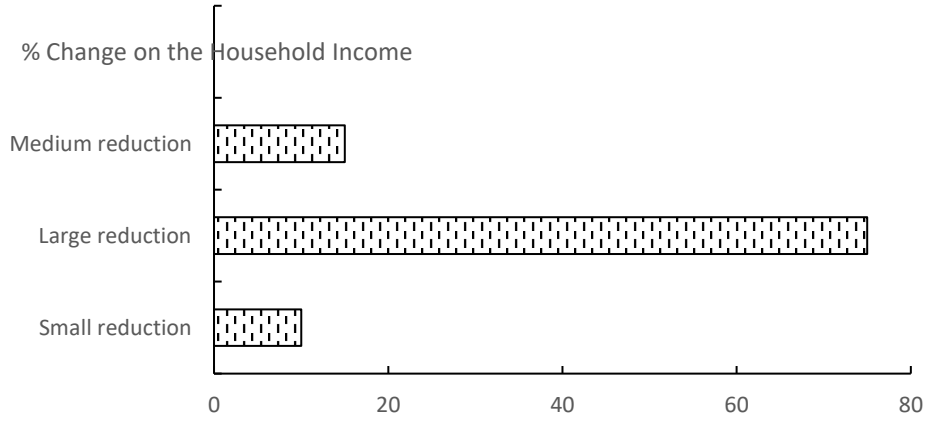

Figure 3 Changes in Household income due flooding

Tourism and nomadic pastoralism were reported as the main contributors to the household income with tourism-based activities contributing over 60% of the income. About 75% of the household indicated large reduction in household income as a result of the closure of the Samburu and Buffalo-Springs national reserve during the 2010 and 2019 flooding (Fig. 3). The reduction in income was positively correlated with the flooding in the region (Fig 4).

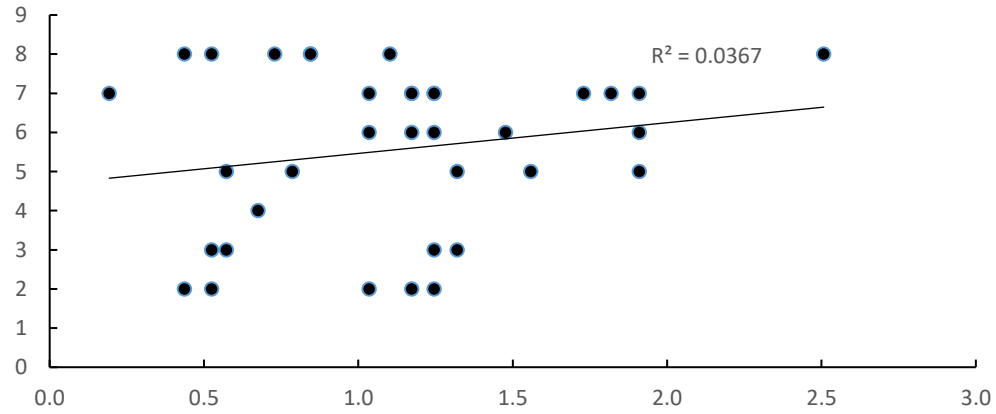

Figure 4 The correlation between the income reduction and Flooding

The study reported a higher increase in unemployment in the region which was correlated to the flooding and the closure of the region for tourism activities. The tourist guides had the highest prevalence of unemployment, followed by the Samburu dancers (Fig.5)

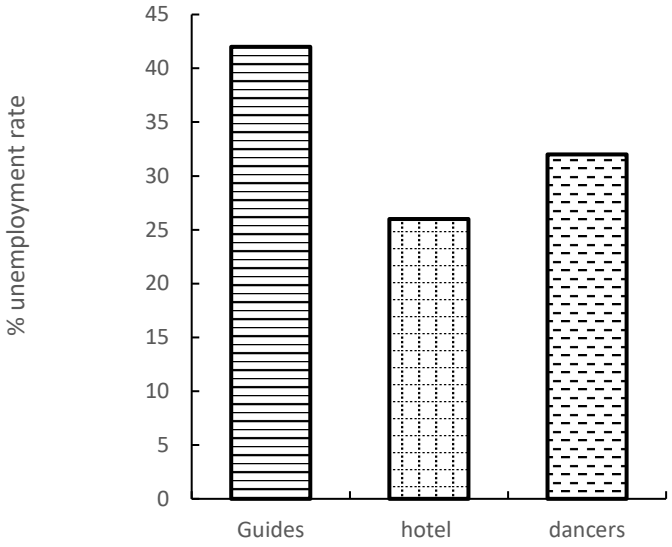

Figure 5 Loss of employment

DISCUSSION

The Samburu region which encompasses Samburu and Buffalo-springs National Reserves in this study is one of the key tourist destinations in Kenya. It has attracted many investors in tented camps and lodges as well as small scale ecotourism businesses. Consequently, the region supports large-scale and small-scale economic ventures that offer employment and profit and are the region's main economic pillar.

The tourism investments and revenue were affected by floods which was as a result of loss of the flood control ecosystem services. Lodges and tented camps are investments that are most vulnerable to climate induced changes because they are immovable properties. Climate change induced flooding disrupted tourism business operations, caused profit loss, and damaged tourism investments. The loss in tourism investments in the Samburu region of USD 1.72 Million was lower than the loss of USD 4.31 Million caused by a climate change induced typhoon in Taiwan. This is different from the estimates by Bernard and Cook (2013) who reported a loss of USD 95, 500,000.

Similarly, the loss in revenue in Samburu region as a result of cancellation and closure was very low compared to USD 326.8 Million revenue loss when hotels were closed during the typhoon (Yi-Ping, Hall, & Ozanne, 2013). The results of the study relate closely to a study in Holland (2009) which reported a loss of USD 1.5 million as the result of a cancellation of international conferences due to an undesirable environmental event. The two tourist destinations were cut off due flooded roads and the hotels were flooded and uninhabitable.

The common activities that contributed to the household income included nomadic pastoralism and tourism with tourism contributing over 50% of the income. Consequently, the flooding and closure of the Samburu and Buffalo Springs national reserves affected the households which

almost entirely depended on tourism. Tourism contributed positively to the household income which were dependent on the existing tourism investments and tourism dependent business ventures.

Tourism hospitality services were offered by the local people and the local tourism investments thereby creating employment. Increased tourism activities were reported to lead to increase in employment opportunities and promote business and household income. Tourism therefore significantly increases household income by increasing employment and improving entrepreneurship infrastructure.

The Samburu ecosystem has a very high economic value including its investment value, revenue value, employment and business opportunities value and a destination value. Hence the total economic value of the Samburu ecosystem as a tourist destination is about to about USD. 11 billion. This is the amount of value is at risk when the region is flooded and closed for tourism activities.

The flooding event caused interruptions in tourism activities in the Samburu region and created bad publicity in the international market. Bringing back the image of this great destination will require increased investment in advertisement and marketing in order to change tourist's behavior and mindset. This is important because tourists change during such events and chose to travel less or stay closer to home which reduces tourist arrivals. Similarly, foreign investors choose to reduce their net foreign investments and prefer to invest at home or other safer areas.

The findings of this study are significant for tourism investment in the Samburu regions. This information will be used to make decisions that will lead to major readjustments in investments and climate change preparedness especially along the river Ewaso Nyiro. The County governments of Isiolo and Samburu could use this information to develop a policy on the relocation of the high risk hotel and tented camp businesses.

CONCLUSION

This study has revealed that the Samburu region is frequently affected by climate change induced environmental event which led to great loss of property, employment and household income. The regions therefore, urgently need to put in place policy, institutional and regulatory measures to reduce the impacts on the economic systems as well as improve the local adaptive capacities. These policies and system will also guide the establishment of new tourism facilities in flood prone areas in the national reserves. These strengthening of adaptive infrastructure, both physical and informational, will improve businesses preparedness to cope with the climate induced disasters. Climate induced flooding has greatest impacts which have resulted in huge economic losses, property destruction and loss of livelihoods.

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