THE TECHNICAL UNIVERSITY OF KENYA

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

SCHOOL OF SURVEYING AND GEOSPATIAL SCIENCE

DEPARTMENT OF GEOINFORMATION AND EARTH OBSERVATION

COURSE: BACHELOR OFAPPLIED SCIENCE IN GEINFORMATICS

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UNIT 1: INTERNAL BASED LEARNING 1

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ANALYSIS OF GEOGRAPHICAL DISTRIBUTION OF FLOOD LOCATIONS IN KENYA BY FATALITIES

INTRODUCTION:

In the last week of March 2024, heavy rains commenced in Kenya, triggering flooding, mudslides, and landslides across various regions. These natural disasters have resulted in significant loss of life and damage to infrastructure. This report analyzes the geographical distribution of flood locations in Kenya by fatalities, utilizing data collected from diverse sources including Relief Web, Citizen Digital, NTV, K24, The Star, Daily Nation, OCHA, Kenya News Agency (KNA), TV47, and KBC. Furthermore, ArcGIS mapping was utilized to visualize the spatial distribution of flood locations by fatalities in Kenya.

OBJECTIVES:

The objectives include:

a) Identifying the most affected counties by flooding, landslides, and mudslides.
b) Analyzing the number of fatalities attributed to each event type in different counties.
c) Utilizing ArcGIS mapping to visualize the spatial distribution of flood-related fatalities in Kenya.

METHODS:

Data Collection:

Relevant data on flood events, landslides, and mudslides were collected from various sources including Relief Web, Citizen Digital, NTV, K24, The Star, Daily Nation, OCHA, Kenya News Agency (KNA), TV47, and KBC

Data Compilation:

The collected data were compiled into a comprehensive dataset including information on event type, location, and fatalities. This dataset was then organized into an Excel file and subsequently converted to a CSV format.

ArcGIS Mapping:

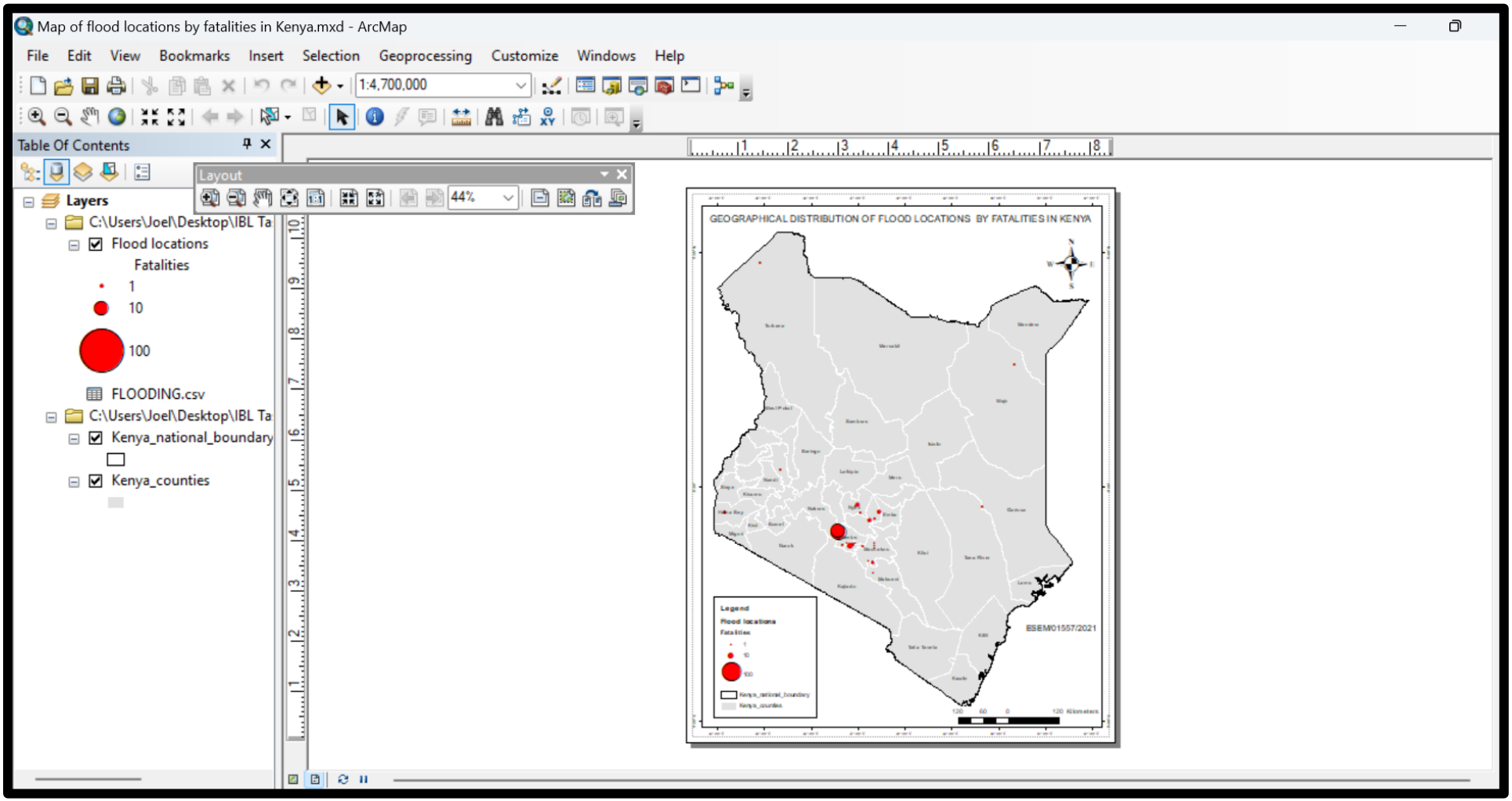
The CSV file containing the compiled dataset was imported into ArcGIS software. The dataset was merged with the shapefile of Kenya and its national boundaries to create a spatial representation of flood locations by fatalities.

Visualization:

ArcGIS mapping tools were used to generate map illustrating the geographical distribution of flood-related fatalities in Kenya. The map was exported in PNG format for visual presentation.

No	Place/Name	County	Event Type	Longitude	Latitude	Fatalities	Source	Houses Damaged
1	Mai Mahiu	Nakuru	Landslide	36.58742	-0.98078	58	Daily Nation	149
2	Mathare	Nairobi	Flooding	36.8492	-1.2617	12	Star	2000
3	Athi River	Machakos	Flooding	36.979198	-1.45754	0	E-paper	1200
4	KU	Nairobi	Flooding	36.9247	-1.1821	0	Star	30
5	Kasarani	Nairobi	Flooding	36.8976	-1.2254	2	Star	20
6	Ahero	Kisumu	Flooding	34.920338	-0.174439	0	Daily Nation	600
7	Kitale	Trans-Nzoia	Flooding	35.0023	1.0191	0	Citizen Digital	30
8	Gakuyu	Nyeri	Flooding	37.0856	-0.8617	0	Citizen Digital	70
9	Sindo	Homa Bay	Flooding	34.1657	-0.5418	4	TV47 Digital	200
10	Juja	Kiambu	Flooding	37.0131926	-1.1025542	0	OCHA	100
11	Ngurumani	Kajiado	Flooding	36.0255	-1.7617	0	Citizen Digital	290
12	Kitengela West	Kajiado	Flooding	36.7919	-1.8421	0	Ntv	200
13	Kabasis	Baringo	Flooding	35.7734	0.4189	0	The Standard	3000
14	Joska	Machakos	Flooding	37.096091	-1.284578	3	OCHA	800
15	Matungulu	Machakos	Flooding	37.3453	-1.213	1	OCHA	400
16	Syokimau	Machakos	Flooding	36.938	-1.359227	0	OCHA	150
17	Kikuyu	Kiambu	Flooding	36.68166	-1.254337	2	OCHA	500
18	Kahawa Sukari	Kiambu	Flooding	36.948733	-1.196191	1	OCHA	350
19	Ngomongo village	Nyeri	Landslide	36.8936	-1.2464	2	OCHA	270
20	Old Kijabe Railway Tunnel	Nakuru	Flooding	36.57581	-0.93304	50	Citizen	900
21	Mathira	Nyeri	Landslide	36.94759	-0.42013	1	Ntv	100
22	Mukurwe-Ini	Nyeri	Landslide	37.048755	-0.560941	2	OCHA	200
23	Embu Mbeere North	Embu	Flooding	37.68612	-0.69609	0	KNA	50
24	Mwea	Kirinyaga	Flooding	37.3623	-0.6863	2	KNA	100
25	Embu West	Embu	Flooding	37.45743	-0.53987	5	KNA	350
26	Mwala	Machakos	Flooding	37.450256	-1.351982	0	Star	20
27	Matungulu	Machakos	Flooding	37.35334	-1.26316	1	E-paper	50

28	Kalama	Machakos	Flooding	37.32692	-1.60498	4	E-paper	150
29	Kangundo	Machakos	Flooding	37.3453215	-1.3055671	1	E-paper	100
30	Machakos Town	Machakos	Flooding	37.224397	-1.59096	1	E-paper	80
31	Mathioya sub-county	Murang'a	Landslide	37.25191	-0.72102	6	KNA	250
32	Nyando	Kisumu	Flooding	35.1167	-0.2833	0	People Daily	1500
33	Mororo	Tana River	Flooding	39.6325	-0.466	0	Star	58
34	Tana North	Tana River	Flooding	40.3386	2.599	2	Kenya News Agency	200
35	Ruaka	Kiambu	Flooding	36.7796	-1.2056	1	Kenya News Agency	400
36	Vumbi	Garissa	Flooding	39.64601	-0.45275	0	k24 tv	800
37	Kona Punda	Garissa	Flooding	39.658333	-0.446944	3	k24 tv	1000
38	Ithanga	Muranga	Land and mudslides	37.3507	-1.0019	0	Kenya News Agency	270
39	Muguru	Muranga	Land and mudslides	36.9649	-0.6855	0	Kenya News Agency	300
40	Kiganjo village	Muranga	Land and mudslides	37.0025	-0.3935	6	Kenya News Agency	200
41	Kamor	Garissa	Flooding	39.63492	0.4447	0	k24 tv	500
42	Kalimapus	Turkana	Flooding	34.9167	4.75	3	Kenya News Agency	100
43	Loropio	Turkana	Flooding	34.85175	4.49174	0	Kenya News Agency	80
44	Napetet village	Lodwar	Flooding	35.6041	3.1155	0	Nation	50
45	Cheptiret	Uasin Gishu	Flooding	35.3555	0.3571	2	Star	70
46	Kimumu	Uasin Gishu	Flooding	35.3082	0.5566	0	Kenya News Agency	30
47	Kiamunyi Estate	Nakuru	Flooding	36.0774	-0.2761	0	Reliefweb	100
48	Kaptembwa	Nakuru	Flooding	36.0295	-0.2917	0	Reliefweb	140
49	Mauthini area	Tharaka nithi	Mudslides	38.1266	-0.0147	0	Citizen Digital	40
50	Mukaa	Makueni	Flooding	37.3273	-1.8347	1	kbc	37


Map of flood locations by fatalities in Kenya.mxd - ArcMap
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Legend
Flood locations
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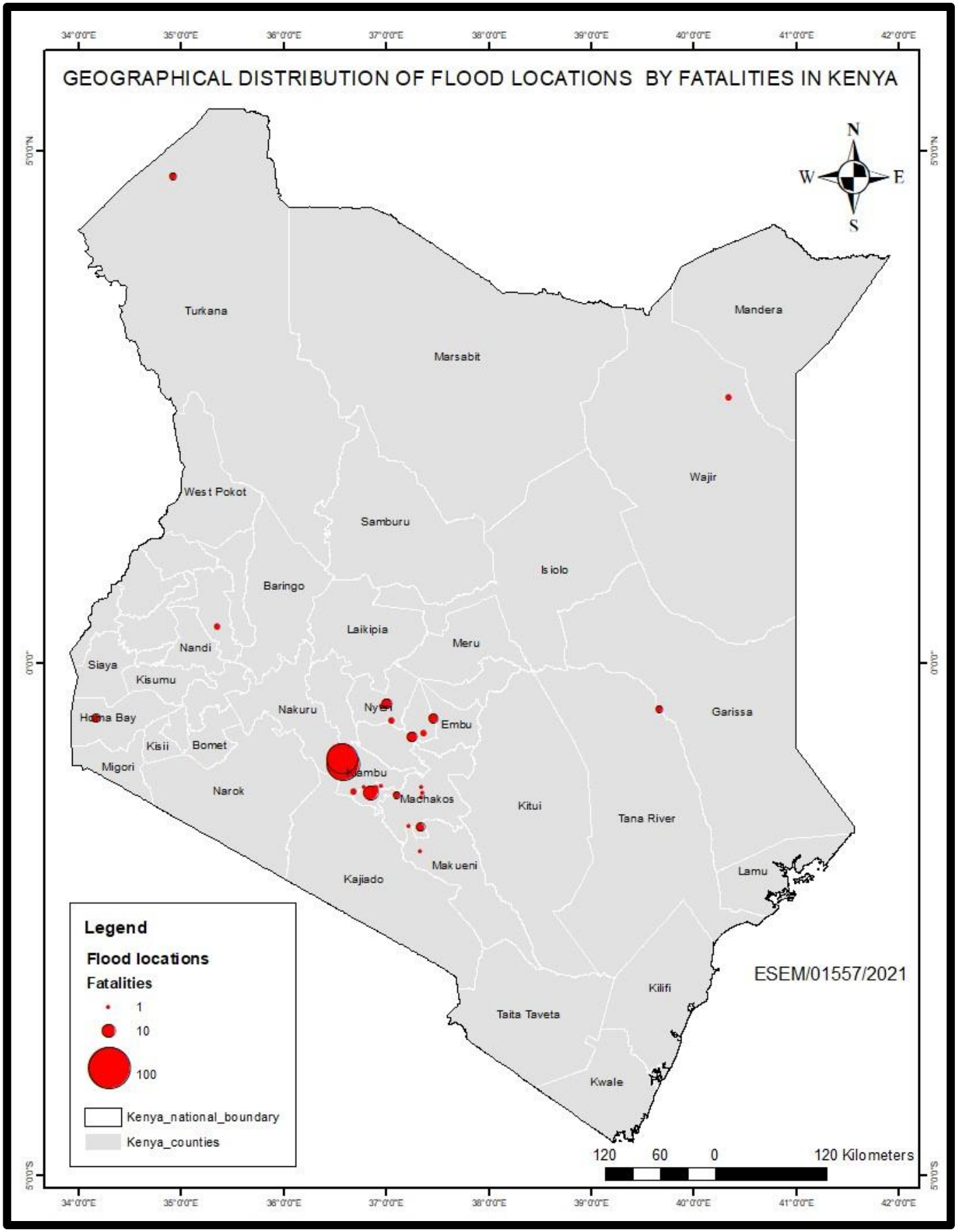
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Results:

Most Affected Counties: Analysis revealed that Kisumu, Nairobi, Turkana, Nakuru, Uasin Gishu, Kiambu, Machakos, Kajiado, Murang'a, Kirinyaga, Tana River, Lodwar, Embu, Tharaka Nithi, and Makueni were among the most affected counties by floods, landslides, and mudslides.

Fatalities by Event Type: The number of fatalities varied across event types and counties. Some counties experienced higher casualties due to floods, while others were more affected by landslides and mudslides.

Spatial Distribution: The ArcGIS mapping illustrated the spatial distribution of flood-related fatalities, highlighting clusters of high-risk areas and vulnerable communities.

Conclusion:

The analysis underscores the significant impact of heavy rains and subsequent flooding, landslides, and mudslides on human lives and infrastructure in Kenya.

The most affected county was Nakuru county with the highest number of fatalities.

The most serious event was in Mai Mahiu whereby 58 people were killed by landslides, triggered by heavy rainfall

Most affected parts due to heavy rainfall include the central region and Nairobi region

Challenges:

Data Availability: Limited availability of comprehensive and up-to-date data from some sources hindered the accuracy of the analysis.

Technical Expertise: Adequate technical expertise and resources were required for data processing and ArcGIS mapping.