XXVII FIG CONGRESS
11–15 SEPTEMBER 2022
Warsaw, Poland

Volunteering
for the future –
Geospatial excellence
for a better living

Waste Assessment and Management Utilizing Remote Sensing and Geographic Information Systems
Case Study Governorate Eldakahlia

Fawzi Zarzoura (Egypt)

Mansoura University, Faculty of Engineering, Public Works Engineering Department

Mosbeh Kaloop (Corr.Auth; Republic Of Korea**) and Jong Wan Hu** (Republic Of Korea)

Incheon National University, Civil and Environmental Engineering Department

Tamer Elgharbawi (Egypt)

Suez Canal University, Faculty of Engineering

ORGANISED BY   FIG   SGP

PLATINUM SPONSORS   esri   Trimble.

XXVII FIG CONGRESS
11–15 SEPTEMBER 2022 Warsaw, Poland

Volunteering for the future –
Geospatial excellence
for a better living

Remote sensing (RS) images are extremely helpful data for hazardous waste management and evaluation.
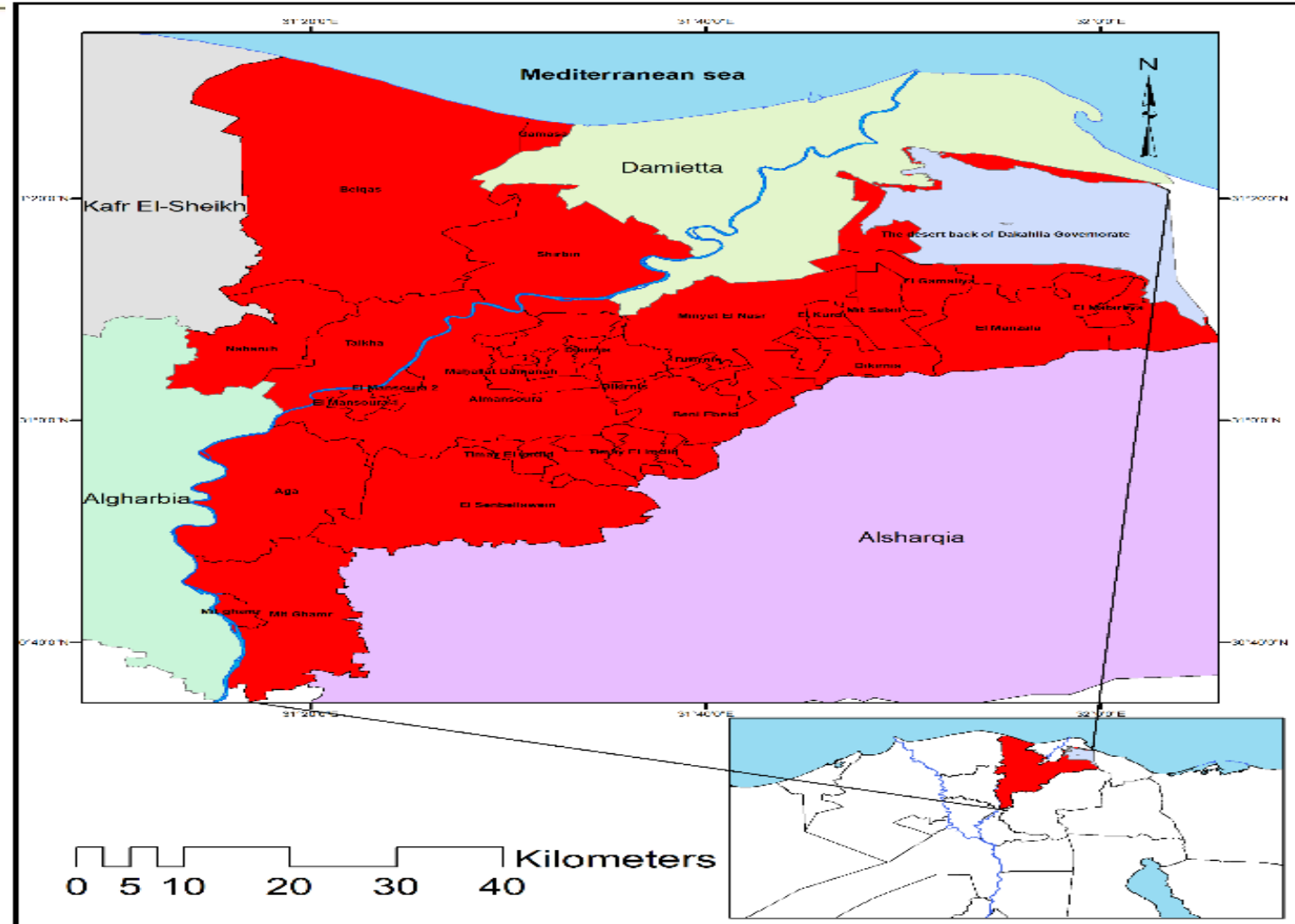The selection of the best site of waste disposal is a powerful tool for assessing environmental consequences.

The main goal of the research :

is to help decision-makers in Eldakahlia Governorate, Egypt in choosing the best location suitable for waste landfill that does not interfere with human activities by using GIS based on satellite images, aiming to reduce waste transport costs and reduce problems caused by bad site selection.

WARSAW FIG CONGRESS 2022

XXVII FIG CONGRESS
11–15 SEPTEMBER 2022 Warsaw. Poland

Volunteering for the future –
Geospatial excellence
for a better living

Study Area

Eldakahlia is a governorate in Egypt located northeast of Cairo. It covers around 3,500 km^2. Mansoura is its capital has an average elevation of 15 meters and is located between 31^0 03' 00" N and 31^0 23'00" E. The study area is located in northern Egypt and had a population of 6,516,489 in July 2017.

XXVII FIG CONGRESS

11–15 SEPTEMBER 2022 Warsaw, Poland

Volunteering for the future –
Geospatial excellence
for a better living

Methodology

The study methodology is based on the following steps:

- Determining the water sources and classify according to the distance of the landfill from the water sources;

- Determining the main and secondary roads and classify according to the distance of the landfill from the roads;

- Determining the green places and classify according to the distance of the landfill from the green areas;

- Determining building locations and classify according to the distance of the landfill site from the buildings.

- Determining the topography of the land.

- Determining the appropriate tendencies of the land for the work of a landfill.

- Determine the buffer from the borders of the neighboring governorate.

- The best location of the landfill is the area which meets the previous requirements.

XXVII FIG CONGRESS
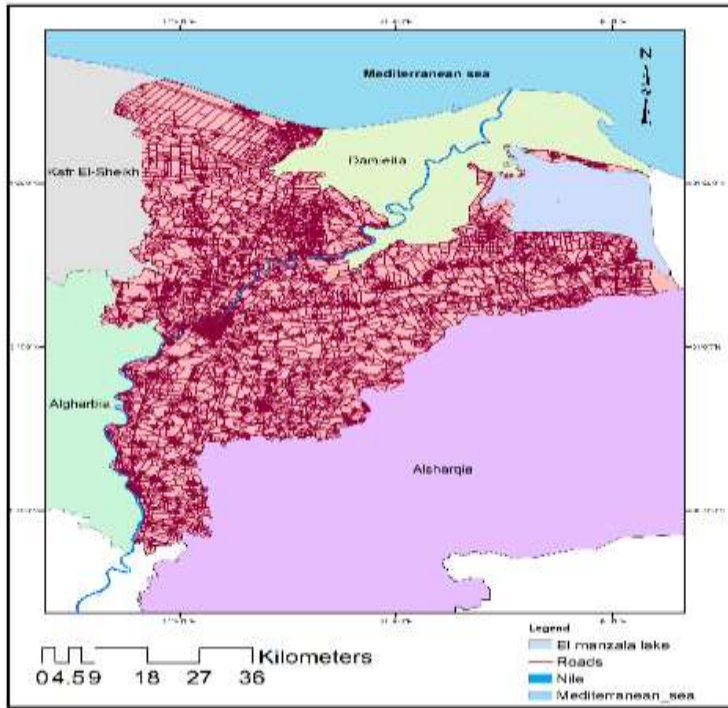11–15 SEPTEMBER 2022 Warsaw, Poland

*Volunteering for the future –
Geospatial excellence
for a better living*

Assumptions:

Table 1 Requirements weights

Requirements	Concept	Weights
Physical	Slope	6
	Water resource	7
	Settlement	8
Social	Road	6
	Green area	5

Table 2 The effect of distances

Type	Moderately suitable	Very suitable	Acceptable	Unsuitable
Distance from roads	≤ 100m	From 100-700m	From 700-1500m	From 1500-4500m
Distance from water source	above 1000m	500m-1000m	300m-500m	0-300m
Distance from settlement	above 1500m	900-1500m	400m- 900m	0 to 400m
Distance from green area	above 1000m	500m-1000m	300m-500m	0-300m
Slope	0-4%	4-8%	8-15%	≥15%

XXVII FIG CONGRESS
11–15 SEPTEMBER 2022 Warsaw, Poland

Volunteering for the future –
Geospatial excellence
for a better living

Proximity to major high ways

a) Roads
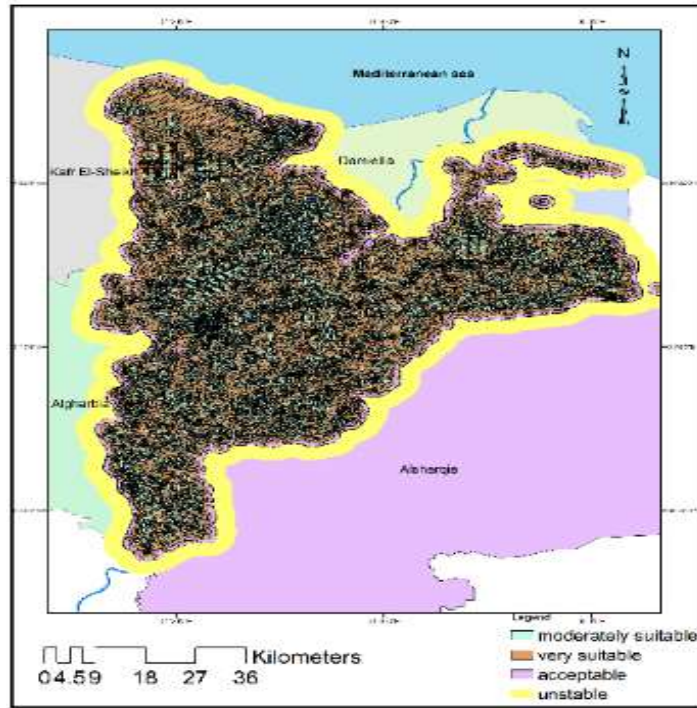
b) Roads buffers

c) Roads the best buffers

XXVII FIG CONGRESS
11–15 SEPTEMBER 2022 Warsaw, Poland
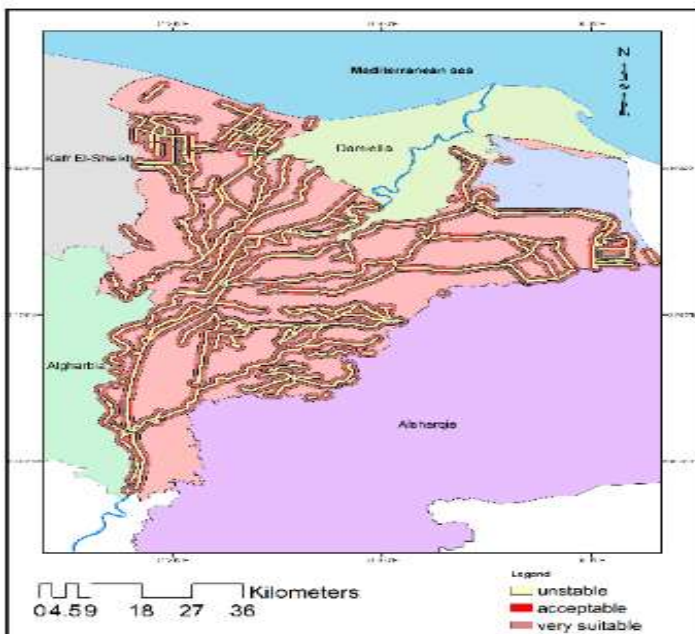
Volunteering for the future –
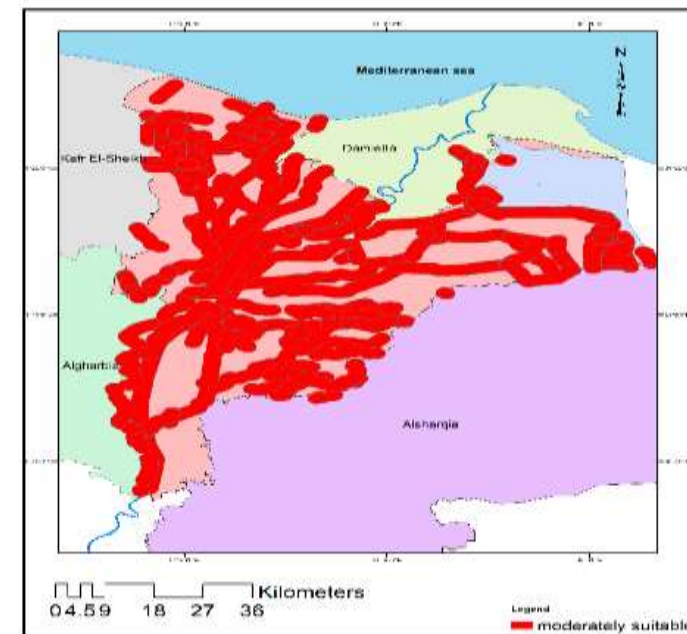Geospatial excellence
for a better living
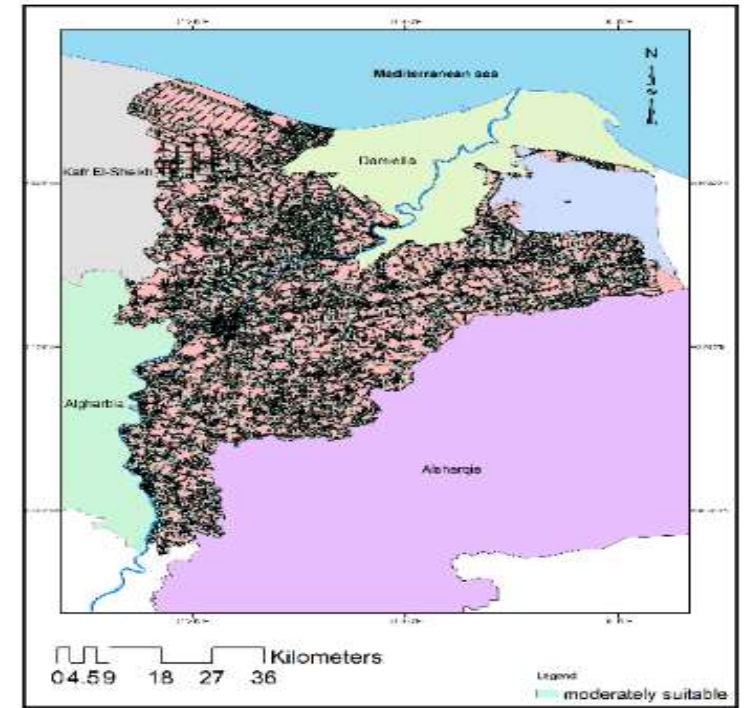
Proximity to water sources (rivers, drainage systems)
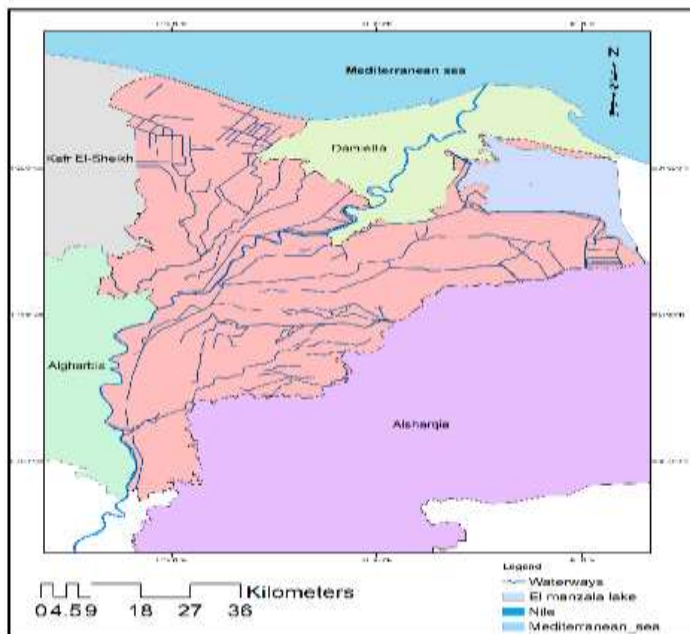
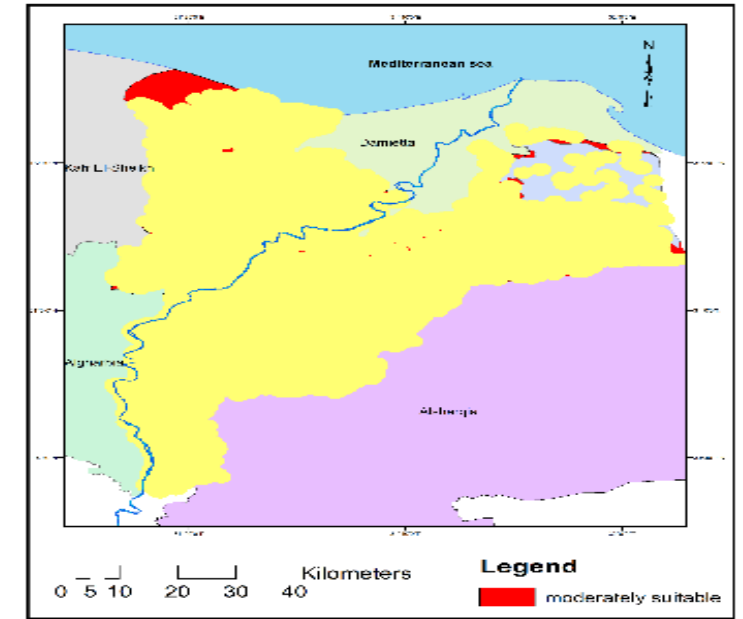a) water sources

b) water sources buffers

c) water sources the best buffer

XXVII FIG CONGRESS
11–15 SEPTEMBER 2022 Warsaw, Poland

Volunteering for the future –
Geospatial excellence
for a better living

Settlement-based proximity
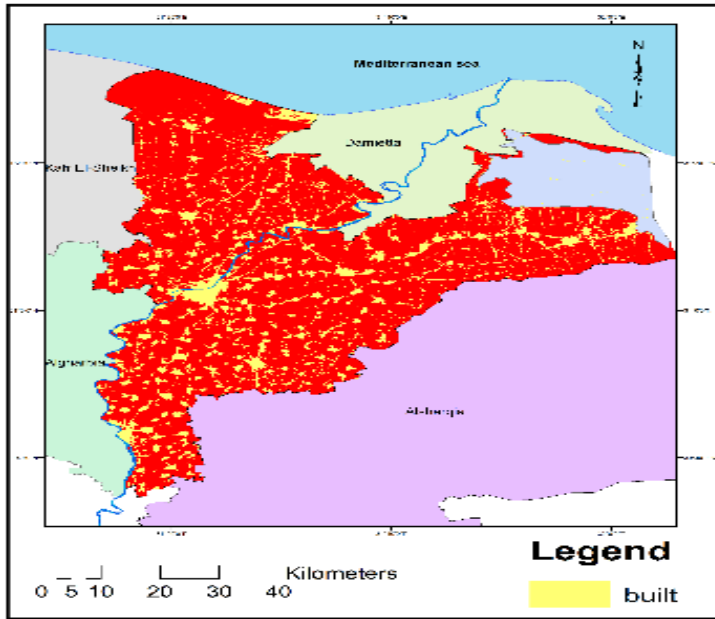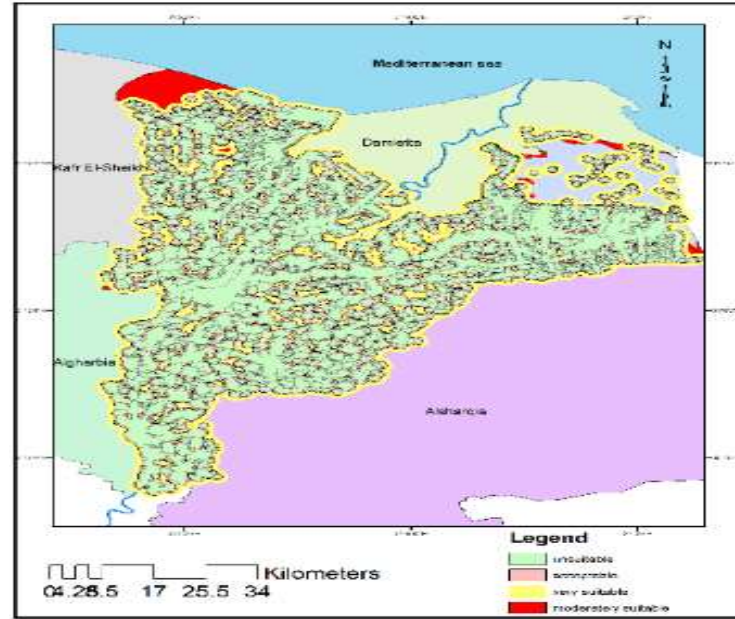
a) buildings   b) buildings buffers   c) buildings the best buffer

XXVII FIG CONGRESS
11–15 SEPTEMBER 2022 Warsaw, Poland
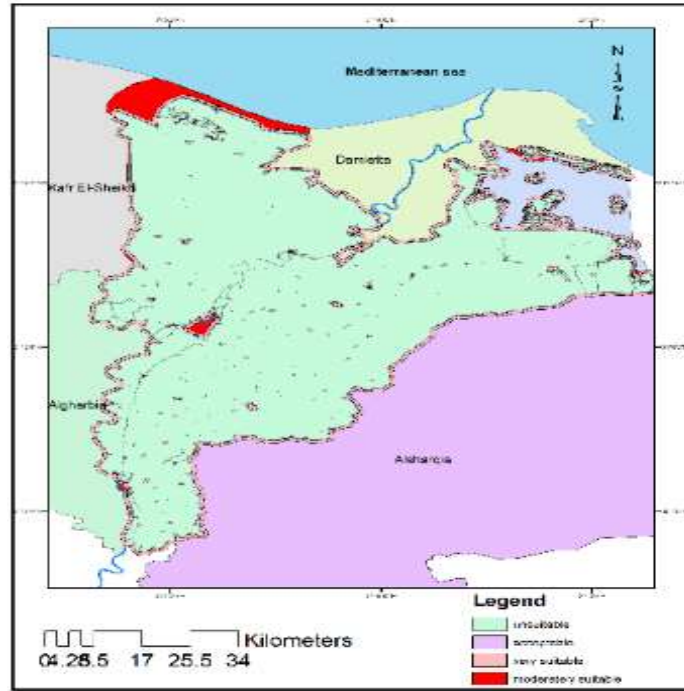
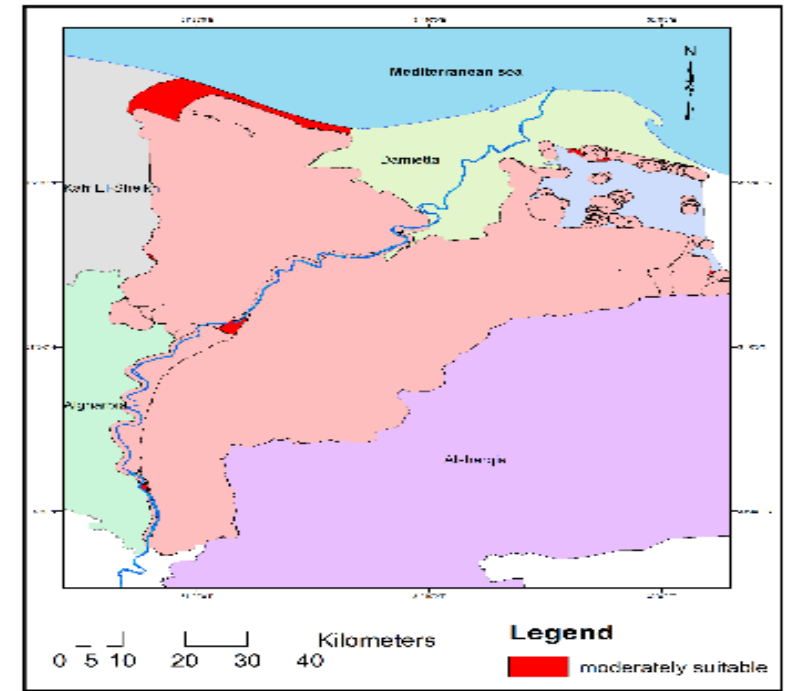Volunteering for the future –
Geospatial excellence
for a better living

Based on proximity to a green region
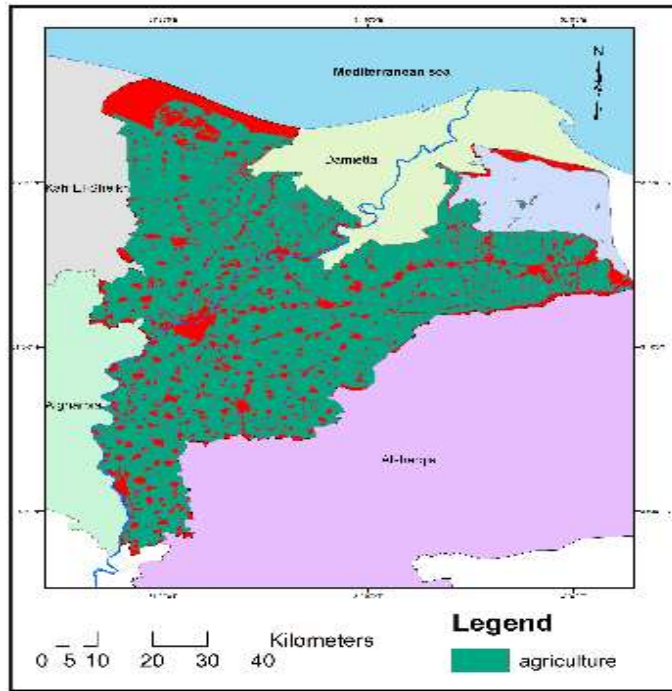
a) green areas

b) green areas buffers

c) green areas the best buffer

XXVII FIG CONGRESS
11–15 SEPTEMBER 2022 Warsaw, Poland

Volunteering for the future –
Geospatial excellence
for a better living

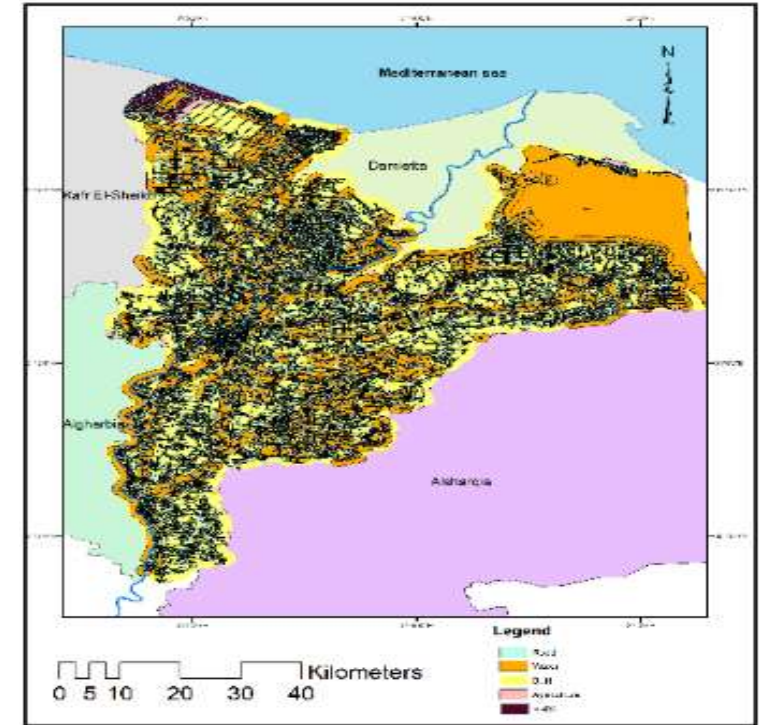# Slope of the ground
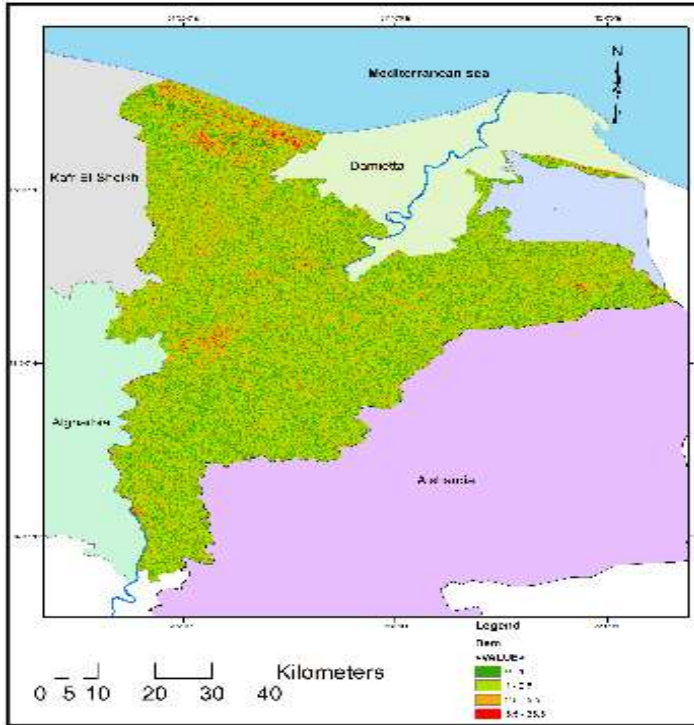
a) DEM
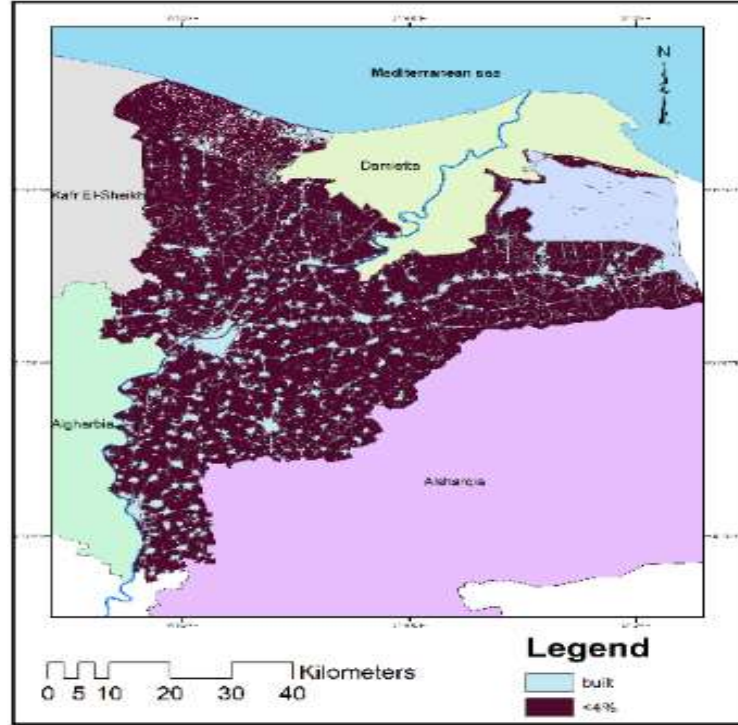
b) slope ≤ 4%

c) the best buffers layers

XXVII FIG CONGRESS
11–15 SEPTEMBER 2022 Warsaw, Poland

Volunteering for the future –
Geospatial excellence
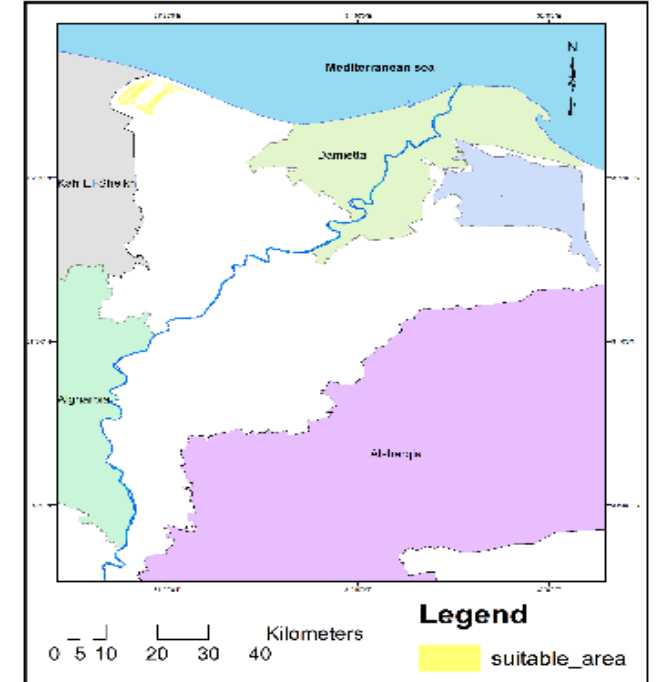for a better living

Final results
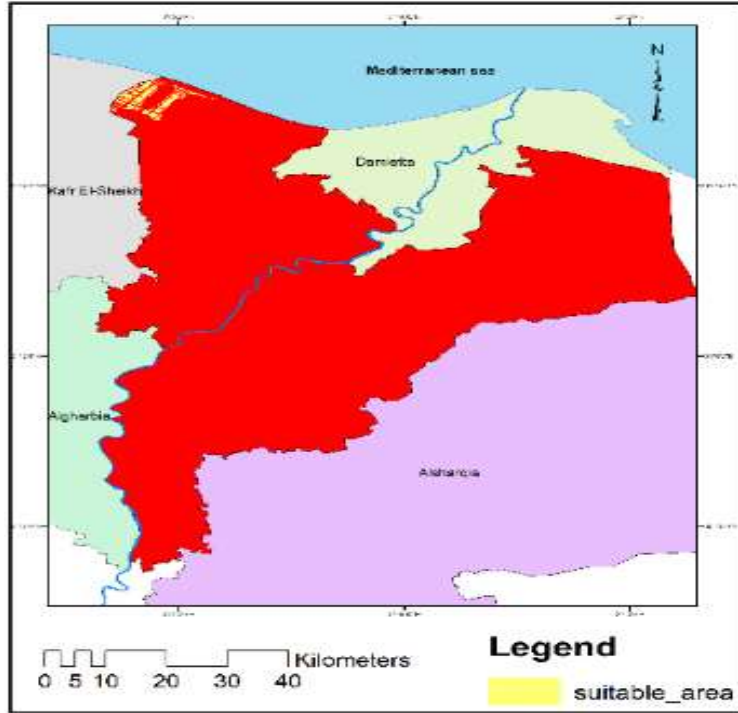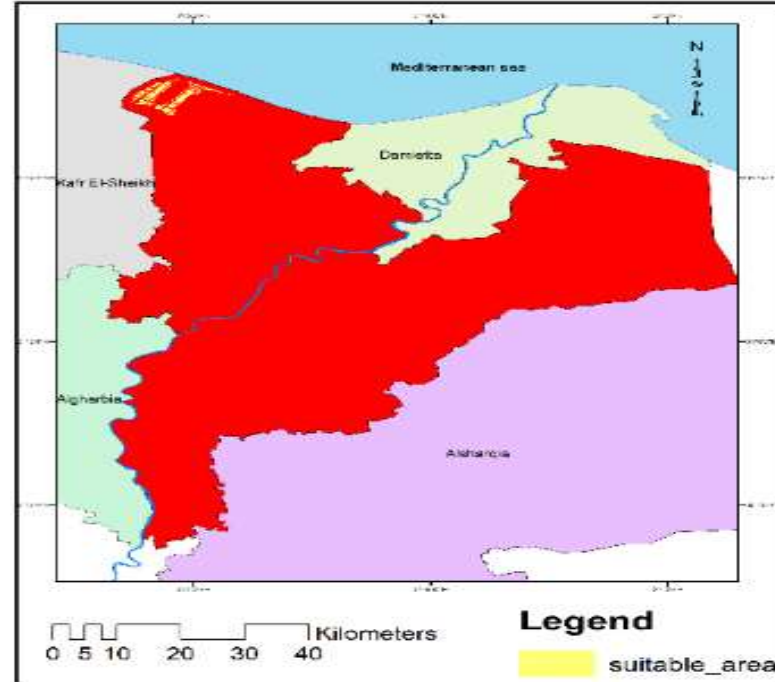
a) the suitable area   b) the suitable area after buffering boundary   c) the best site

XXVII FIG CONGRESS
11–15 SEPTEMBER 2022 Warsaw, Poland

Volunteering for the future –
Geospatial excellence
for a better living

CONCLUSIONS

- The research was achieved the main objective, which is to reach the most suitable place to establish landfill in Eldakahlia Governorate, as the resulting place of the study is located in the desert back of Eldakahlia Governorate and away from the various activities at distances that do not affect those activities.

- The study found that 0.568 percent of the municipality's research area was most suitable for such a dump.