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### MAP OF THE DISTRIBUTION OF CRIME PATTERNS IN BAQUBA DISTRICT IN 2020 USING GEOGRAPHIC INFORMATION SYSTEM (GIS)

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#### **ABSTRACT**

This study aims at identifying the patterns of crime and its spatial variation in Baquba District, through the statistics of crimes recorded in the police stations of the study area, as well as its reliance on the descriptive and analytical approach, in addition to the cartographic representation using geographic information systems. The study also confirmed the validity of the hypothesis which states that there is a spatial variation in crime patterns in the study area, and it has established a number of points that can control crime and limit its spread.

#### **INTRODUCTION**

The geography of crime helps in revealing the reasons behind crime and the factors affecting the change in its patterns, as well as finding solutions to prevent and reduce it. Due to the fact that crime is a human phenomenon, it does not occur in all places with the same quantity and type. It may be concentrated and increase in certain places, while it may decrease in other places.

In addition, the phenomenon of crime is distinguished from other phenomena by the fact that no society is free of it. Therefore, the phenomenon of crime, in all its kinds, has become the focus of attention of researchers and specialists at the national and international levels.

The study area, (Baquba District), Diyala Governorate Center, suffers from a clear outbreak of crime, as a result of a number of reasons, including: large increase in population, and increase in rates of unemployed people, in addition to other economic and social problems. So, this study seeks to identify the

spatial variation of crime, and identify its patterns at the judiciary levels and its administrative units.

Such type of studies related to the study of crime patterns helps decision-makers and security agencies identify the causes leading to high crime rates, and, at the same time, find solutions to confront this phenomenon, and limit its effects.

### **RESEARCH PROBLEM**

Does Baquba District Center, represented by its administrative units, witness any crime patterns? Do these crimes differ between administrative units? Is it possible to map crime patterns in Baquba District?

### **RESEARCH HYPOTHESIS**

Baquba District has different crime patterns, varying between administrative units, which prompted the need to draw a map of crime patterns at Administrative Units' level.

### **RESEARCH OBJECTIVES**

- The study aims to identify crime patterns in Baquba District.
- The study aims to find out the spatial variations of crime patterns at the level of the administrative units of Baquba District.
- The study aims at designing a map of crime patterns in Baquba District by employing GIS technology.

### **RESEARCH IMPORTANCE**

The importance of the study relies in the fact that it was able to determine crime patterns and its spatial variation in Baquba District, as well as designing a map of crime patterns at the level of the administrative units of the Baquba District, based on the importance of tracking down this phenomenon, and the necessity of examining its repercussions.

### **RESEARCH METHODOLOGY**

In order for the study to reach its objectives, the descriptive approach, the statistical method, and the cartographic analysis were utilized.

### **RESEARCH LIMITS**

#### ***Spatial Limits:***

The study dealt with the phenomenon of crime in Baquba District and at the level of administrative units, which include (Baquba District Center, Town of Buhriz, Al-Abara district, Canaan district, and Bani Saad district).

#### ***Time Limits:***

The study covered the year 2020, because the data needed were available within this exact period.

***Geographical distribution of crime patterns recorded in Baquba District Police Stations in 2020:***

People frequently use the word crime, and they cast it over many and various behavioral patterns. Despite the discrepancy in the patterns of behavior that is described as "crimes" by people in general, the common factor between all of them remains that they are hostile to others and harmful to society.

(W. Bonger) defines crime as an act committed within a group of people that constitutes a social unit that is detrimental to the interest of all. (Clinard) sees it as harmful and socially harmful behavior and its owner is subject to punishment from the authority or the state. While (Pepinsky) sees it as a sinful act committed with the intent of a crime and a guilty will, and the law determines a penalty for it because it is an act that may conflict with the social interest.

From a sociological point of view, crime is defined as every act that harms society and shall be punished by law, and crime is a social phenomenon that arises from psychological trends, tendencies, and contracts, and from the influence of a corrupt environment.

Crime is defined in the legal terminology as: every illegal human behavior, whether positive or negative, whether intentional or unintentional, for which the law imposes a penalty.

From the social point of view, several trends have emerged. The first, sees crime as all types of anti-social behavior, i.e., harmful towards the social interest, while the second, focuses on social control and the criteria it contains of controlling behavior, and the third is represented in trying to find a formulation of the definition of crime and includes all criminal acts, and acts that are abnormal to social norms that which subject to punishment.

Ten types of crimes against people and public property registered in Baquba District police stations were identified, through the use of institutions entrusted with the task of collecting and inventorying data related to police stations and according to jurisdiction. Where the total crimes in 2020 reached approximately (2,009) distributed crimes, according to their types, as shown in Table (1).

<b>Crime Type</b>	<b>Baquba District</b>	<b>Buhriz</b>	<b>Al-Abara</b>	<b>Bani Saad</b>	<b>Canaan</b>	<b>Total</b>	<b>%</b>
Threatening	328	147	168	98	76	817	%40,7
Intentional Crime	293	231	29	47	6	606	%30,2
Fraud	156	74	47	38	28	343	%17,1
Theft	79	1	43	2	3	128	%6,4
Counterfeiting	31	0	26	2	0	59	%2,9
Premeditated Murder	2	5	13	1	2	23	%1,1

Attempted Murder	4	0	3	3	5	15	%0,7
Sexual Offense	5	0	2	2	0	9	%0,4
Kidnapping	2	3	3	0	0	8	%0,4
Embezzlement	0	0	1	0	0	1	%0,0
<b>Total</b>	<b>900</b>	<b>461</b>	<b>335</b>	<b>193</b>	<b>120</b>	<b>2009</b>	<b>100%</b>
<b>%</b>	<b>45%</b>	<b>23%</b>	<b>17%</b>	<b>10%</b>	<b>6%</b>		

**Table (1):** Geographical distribution of crimes recorded in police stations of administrative units in Baquba District

**Source:** Conducted by the researcher based on police stations’ statistics in Baquba District.

Through the analysis of Table (1), it becomes clear to us a set of facts, namely:

Baquba District topped the first place in number of crimes, reaching about (900) crimes, distributed according to their types, at a rate of (45%) of the total crimes in the judiciary. The reason for the high crime rates is due to the high population of the district, being the center of Diyala Governorate, which negatively affects the availability of job opportunities in it, and the resulting in high unemployment rates. As for Kanaan district, it came in fifth place, recording the lowest number of crimes, reaching about (120) crimes, and at a rate of (6%). The reason for the decrease in crime rates is that it is an agricultural area with tribal characteristics, in which customs and traditions that reject the phenomenon of crime prevail.

***Baquba District Crime Patterns Map:***

The geographers' studies and interests focused on the analysis of official statistics to reveal the pattern in the spatial space, including the studies of (Harries.1974 and Pyle. Ed. 1974) using various statistical methods in cartographic representation. In order to identify the types of crimes and their number in Baquba District, it has been divided into:

***Threat Crime Map:***

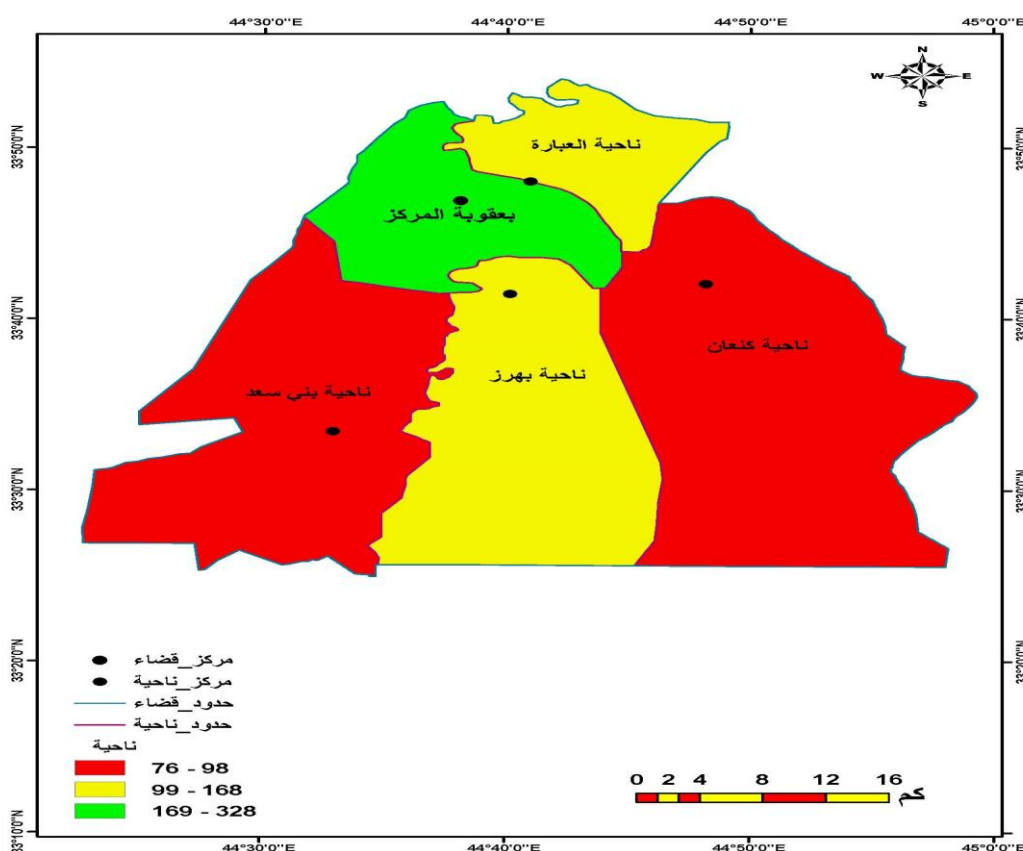
Threat Crime means a state of open emotion that may reach an uncontrollable stage and turn into an act that leads to harm, whether from the male or the female. Threat Crime ranked first in the sequence of types of crimes in Baquba District as shown in Table (1), while Table (2) and Map (1) show the distribution and numbers of threat crime according to administrative units.

Crime Type	Baquba District	Buhriz	Al-Abara	Bani Saad	Canaan	Total	%
Thretening	328	147	168	98	76	817	%40,7

**Table (2)** shows the number of threat crimes in Baquba District by administrative units for 2020

**Source:** Conducted by the researcher based on the statistics of Table (1). Several facts are clear in Table (2), which are:

1. The total of threatening crimes in the Baquba District amounted to about (817) crimes for the year 2020, and a percentage of (40.7%) of the total crimes in the district.
2. The Baquba District topped the center in the number of threatening crimes, amounting to about (328) crimes out of the total threatening crimes in Baquba District.
3. The number of crimes in Canaan district reached about (76) crimes for the year 2020, and it is the lowest administrative unit in the number of threatening crimes.



**Map (1)** shows spatial patterns of threat crimes by administrative units of Baquba District in 2020

**Source:** Conducted by the researcher based on the statistics of Table (2).

It is possible to derive three patterns for the spatial distribution of threatening crimes in Baquba District, according to the recorded numbers of crimes:

1. Dense style: includes the central Baquba District.
2. Medium style: includes the phrase side and the Buhraz side.
3. Low style: it includes the Bani Saad district and the Kanaan district.

**The Crime of Premeditated Harm:**

The crime of harm is known as the act of the offender against others and constitutes an attack on the integrity, health and body parts of the victim and causes bodily harm to him. (3) and map (2), showing the preparation and distribution of the crime of premeditated harm according to the administrative units for the year 2020.

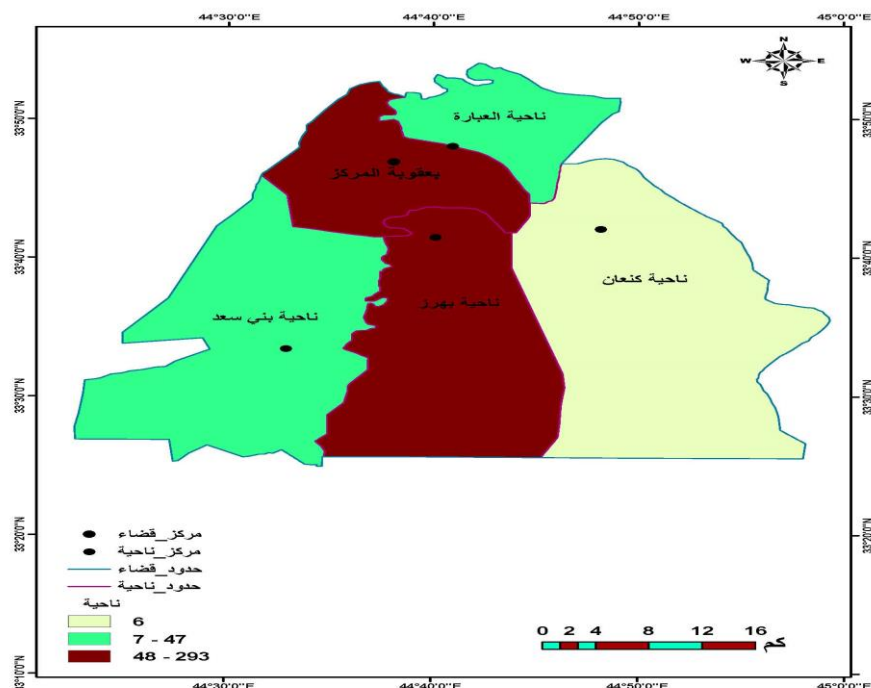
Crime Type	Baquba District	Buhriz	Al-Abara	Bani Saad	Canaan	Total	%
Intentional Harm	293	231	29	47	6	606	%30,2

**Table (3)** shows the number of Crime of Premeditated Harm in Baquba District by administrative units for 2020

**Source:** Conducted by the researcher based on the statistics of Table (1).

Through the analysis of Table (3), it becomes clear that all of my agencies' facts are:

1. The total number of intentional abuse crimes amounted to about (606) crimes, representing (30.2%) of the total crimes in the judiciary.
2. The district of Baquba District ranked first with the number of premeditated abuse crimes, amounting to about (293) out of the total premeditated harm crimes in Baquba District.
3. Canaan district recorded the lowest number of crimes of premeditated harm among the administrative units, amounting to about (6) crimes.



**Map (2)** shows the spatial patterns of intentional abuse crimes according to the administrative units of Baquba District in 2020

**Source:** Conducted by the researcher based on the statistics of Table (3).

We deduce from map (2) three patterns of the spatial distribution of the crime of intentional harm, according to the numbers recorded for the crime:

1. Dense style: it includes the central Baquba District and Buhraz district.
  2. Medium style: it includes Al-Babra district and Bani Saad district.
  3. Low style: It includes Canaan hand.
- A- Fraud Crimes:

Fraud is the appropriation of another's money by deceiving him and making him surrender that money, and it also comes from assaulting the right of ownership, whether it is movable or real property. Table (1) shows that the crime of fraud is ranked third among the types of crimes in Baquba District and as shown in Table (1), while Table (4) and Map (3) show the number and distribution of the crime of fraud by administrative units for the year 2020.

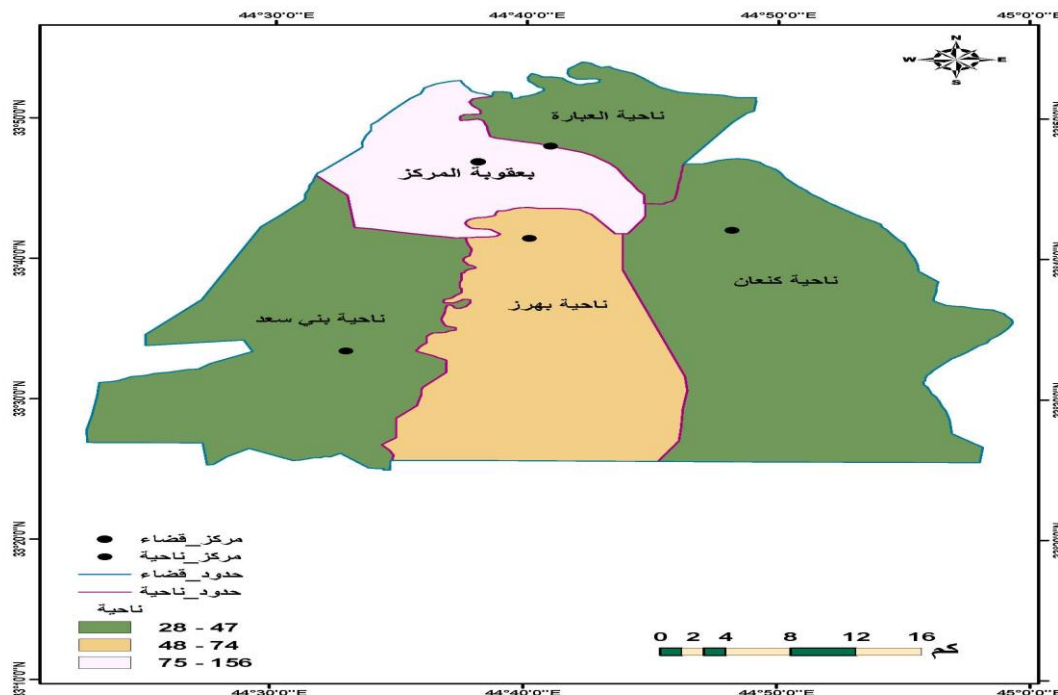
Crime Type	Baquba District	Buhriz	Al-Abara	Bani Saad	Canaan	Total	%
Fraud	156	74	47	38	28	343	%17,1

**Table (4)** shows the number of Crimes in Baquba District by administrative units for 2020

**Source:** Conducted by the researcher based on the statistics of Table (1).

Through the analysis of Table (4), a number of facts become clear:

1. The total number of fraud crimes in the Baquba District amounted to about (343) crimes for the year 2020, with a rate of (17.1) percent of the total crimes in the district.
2. Baquba District topped the center in the number of fraud crimes, amounting to about (156) of the total fraud crimes in the judiciary.
3. Canaan district recorded the lowest number of fraud crimes, which amounted to about (28) crimes among the administrative units for the year 2020.



**Map (3)** shows spatial patterns of fraud crimes by administrative units of Baquba District in 2020

**Source:** Conducted by the researcher based on the statistics of Table (4).

We deduce from Map (6) three spatial patterns of premeditated murder in the administrative units of the Baquba District, as follows:

1. Dense style: The Baquba District has the center.
2. Medium style: featuring hand-brushed.
3. Low style: it includes Al-Fabara sub-district, Kanaan sub-district, and Bani Saad sub-district.

**Theft Crime:**

Linguistically, theft is defined as taking money secretly, but legally it is taking movable money owned by others with the intention of owning it without their consent. This type came in fourth place, according to what Table (1) shows, while Table (5) and Map (4) show the number and distribution of the crime of theft by administrative units for the year 2020.

Crime Type	Baquba District	Buhriz	Al-Abara	Bani Saad	Canaan	Total	%
Theft	79	1	43	2	3	128	%6,4

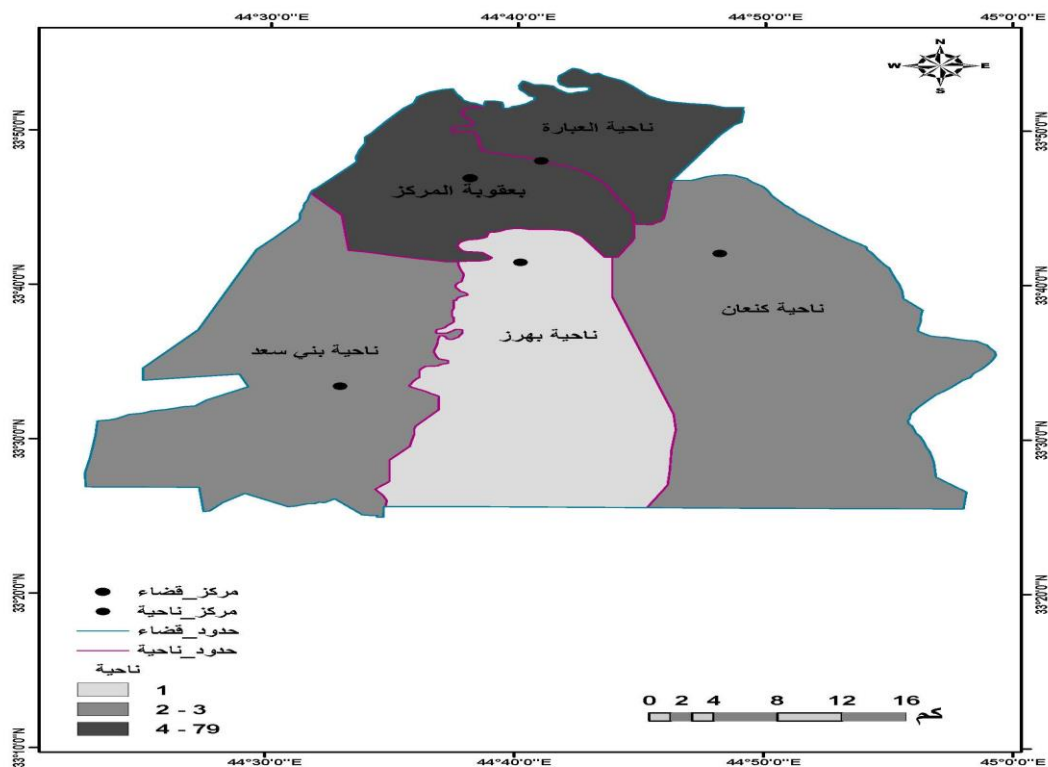
**Table (5)** shows the number of Theft Crimes in Baquba District by administrative units for 2020

**Source:** Conducted by the researcher based on the statistics of Table (1).



Through the analysis of Table (5), a number of facts become clear, namely:

1. The total number of theft crimes in the Baquba District amounted to about (128), with a percentage of (6.4%) of the total crimes in the district.
2. Baquba District topped the center in the number of theft crimes, amounting to about (79) crimes.
3. Bani Saad district recorded the lowest number of theft crimes, amounting to about (2) crimes among the administrative units for the year 2020.



**Map (4)** shows the spatial patterns of theft crimes according to the administrative units of Baquba District in 2020

**Source:** Conducted by the researcher based on the statistics of Table (5).

We infer from map (4) three spatial patterns of theft crimes at the level of administrative units in the Baquba District:

1. Dense style: The Baquba District includes the center and the ferry district.
2. Medium style: it includes the Canaan sub-district and the Bani Saad sub-district.
3. Low style: featuring hand beading.

**The Crime of Counterfeit:**

Counterfeit is changing the truth in a document with the intent of fraud in one of the ways specified by law, a change that would cause harm, and from table (1) it is clear that this type came in the fifth rank among the types of crimes in Baquba District, while table (6) and map (5) show Preparing and distributing the crime of Counterfeit according to the administrative units for the year 2020.

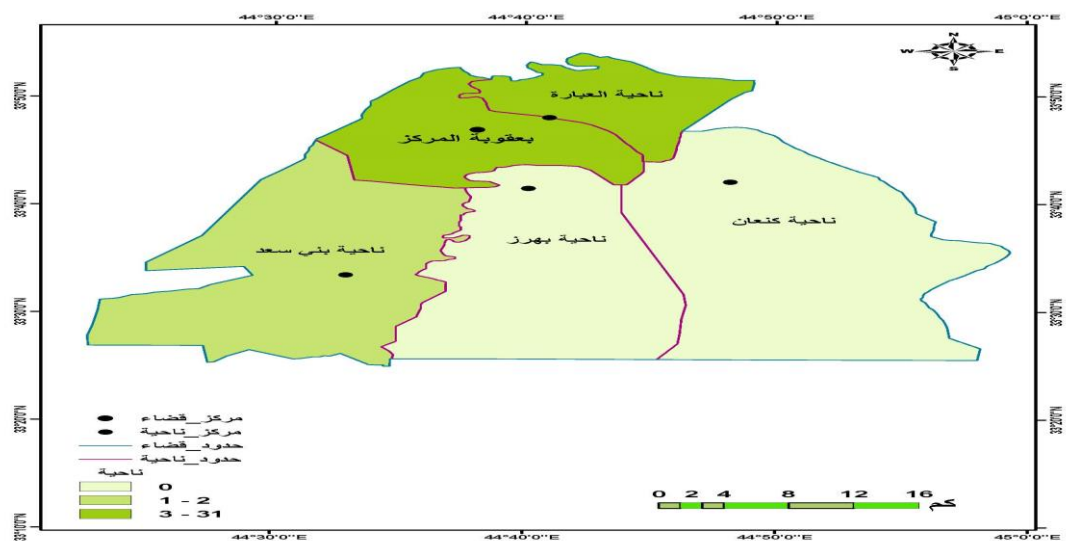
Crime Type	Baquba District	Buhriz	Al-Abara	Bani Saad	Canaan	Total	%
Counterfeit	31	0	26	2	0	59	%2,9

**Table (6)** shows the number of Counterfeit Crimes in Baquba District by administrative units for 2020

**Source:** Conducted by the researcher based on the statistics of Table (1).

Through the analysis of Table (6), the following facts become clear:

1. The total number of counterfeit crimes amounted to about (59) crimes, at a rate of (2.9) % of the total crimes in Baquba District.
2. Baquba District topped the center in the number of counterfeit crimes, which amounted to about (31) crimes among the administrative units for the year 2020.
3. As for Buhriz and Canaan, no crimes of theft were recorded in 2020.



**Premeditated (Intentional) Crime:**

Intentional killing is intended to intentionally end a person's life by the act of another person. This type of crime ranked sixth as shown in Table (1), while Table (7) and Map (6) show the number and distribution of the crime of premeditated murder according to the administrative units for the year 2020.

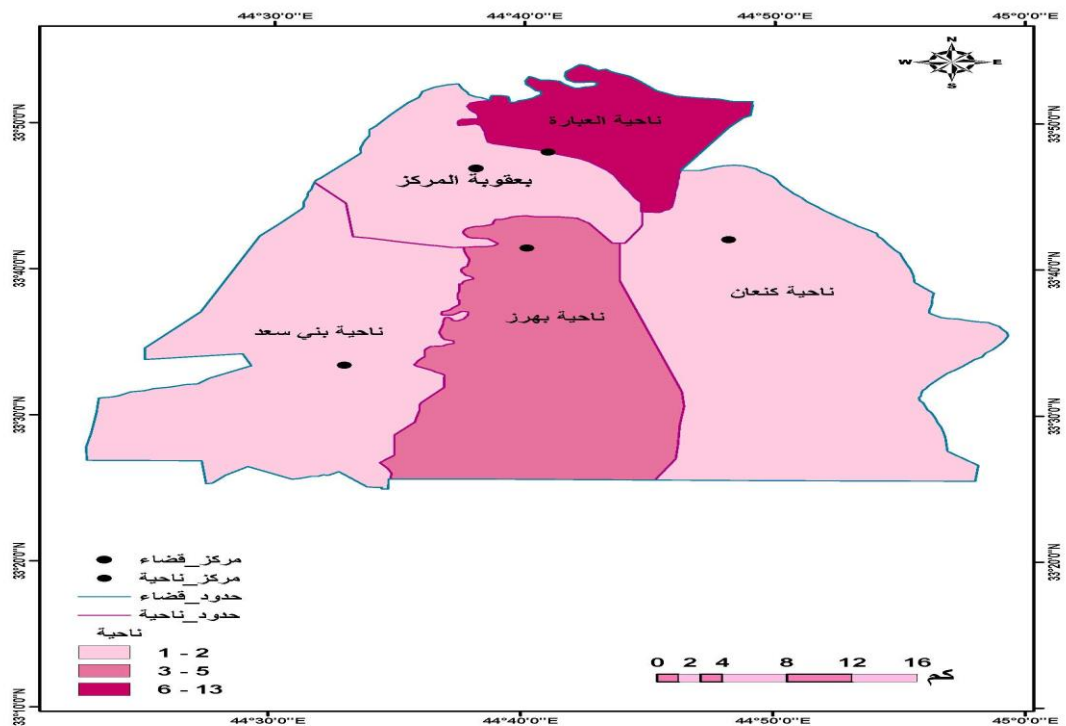
Crime Type	Baquba District	Buhriz	Al-Abara	Bani Saad	Canaan	Total	%
Intentional Murder	2	5	13	1	2	23	%1,1

**Table (7)** shows the number of Premeditated (Intentional) Crime in Baquba District by administrative units for 2020

**Source:** Conducted by the researcher based on the statistics of Table (1).

Through the analysis of Table (7), the following facts become clear:

1. The total crime of premeditated murder amounted to about (23) crimes, and (1.1%) of the total crimes in Baquba District.
2. The phrase area topped the number of premeditated murders, which amounted to about (13) crimes.
3. Bani Saad district recorded the lowest number of premeditated murders among the administrative units, amounting to about (1).



**Map (6)** shows spatial patterns of premeditated murders by administrative units in Baquba District in 2020

**Source:** Conducted by the researcher based on the statistics of Table (7).

We deduce from Map (6) three spatial patterns of premeditated murder in the administrative units of the Baquba District, as follows:

1. Thick pattern: featuring a phrase hand.

2. Medium style: featuring hand beaded.
3. Low style: It includes the district of Baquba District, the center, the district of Kanaan, and the district of Bani Saad.

**The Crime of Attempted Murder:**

Attempted murder is when a person prepares and prepares reasons for carrying out the killing, that is, the person makes an intention to take the life of another person. According to Table (1), this type is ranked seventh among the types of crimes in Baquba District. As for Table (8) and Map (7), they show the numbers and the distribution of the crime of attempted murder according to the administrative units for the year 2020.

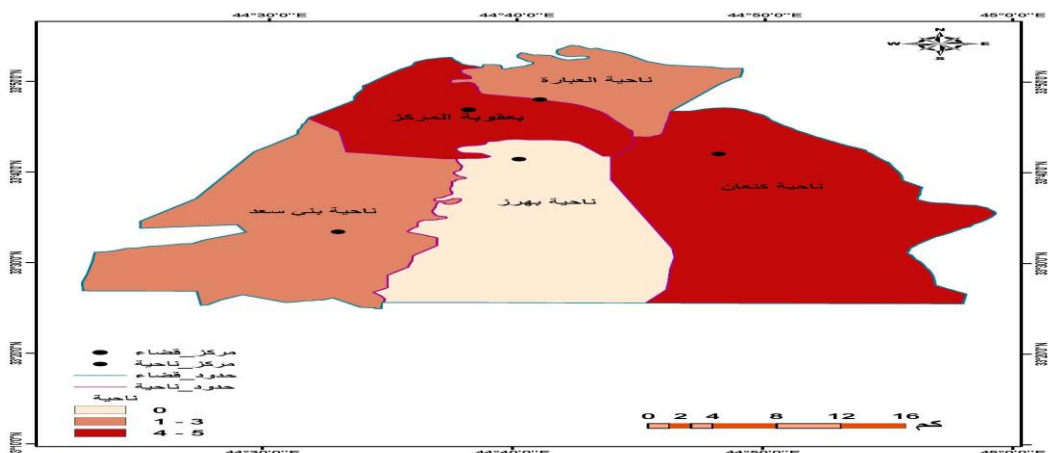
Crime Type	Baquba District	Buhriz	Al-Abara	Bani Saad	Canaan	Total	%
Attempted Murder	4	0	3	3	5	15	%0,7

**Table (8)** shows the number of Attempted Murder Crimes in Baquba District by administrative units for 2020

**Source:** Conducted by the researcher based on the statistics of Table (1).

Through the analysis of Table (8), the following facts become clear:

1. The number of attempted murder offenses in Baquba District amounted to about (15) crimes, at a rate of (0.7%) of the total crimes in Baquba District.
2. Canaan district topped the number of attempted murders, which amounted to about (5) crimes among the administrative units in 2020.
3. As for the area of Buhrz, the crimes of attempted murder were not recorded.



**Administrative Units in Baquba District In 2020**

**Source:** Conducted by the researcher based on the statistics of Table (8).

We deduce from Map (6) three spatial patterns of attempted murder crimes in the administrative units of the Baquba District, as follows:

1. Dense style: It includes the central district of Baquba District and the district of Canaan.
2. Medium style: it includes Al-Babra district and Bani Saad district.
3. Low style: featuring Guhriz District.

**Sexual Offenses:**

These crimes are considered one of the serious crimes that violate morals and public morals that affect honor and pose a threat to the security and safety of society. According to Table (1), sexual crimes ranked eighth among the types of crimes in Baquba District, while Table (9) and Map (8) show the number and distribution of crimes Nationality by administrative units for the year 2020.

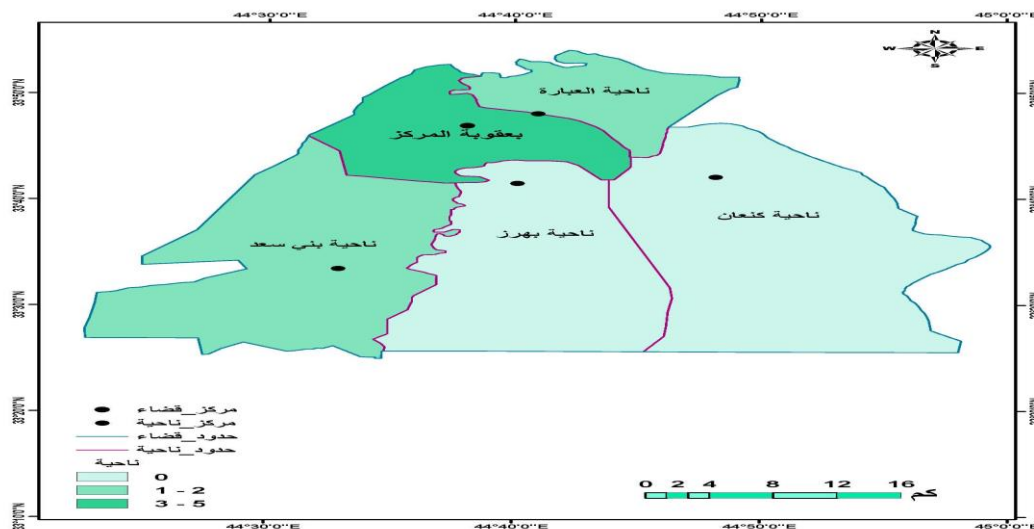
Crime Type	Baquba District	Buhriz	Al-Abara	Bani Saad	Canaan	Total	%
Sexual Offenses	5	0	2	2	0	9	0,4%

**Table (9)** shows the number of sexual Offenses in Baquba District by administrative units for 2020

**Source:** Conducted by the researcher based on the statistics of Table (1).

Through the analysis of Table (9), the following facts become clear:

1. The number of sexual crimes in Baquba District amounted to about (9), with a rate of (0.4) % of the total crimes in Baquba District.
2. Baquba District topped the center in the number of crimes, amounting to about (5) crimes.
3. As for the districts of Buhraz and Kanaan, there were no sexual crimes recorded for the year 2020.



**Map (8)** shows spatial patterns of sexual crimes by administrative units in Baquba District in 2020

**Source:** Conducted by the researcher based on the statistics of Table (9).

From Map (8), we notice that there are three spatial patterns of sexual crimes, according to their recorded numbers:

1. Dense style: The Baquba District has the center.
2. Medium style: it includes Al-Abara district and Bani Saad sub-district.
3. Low style: it includes the Buhraz region and the Canaan region.

***Kidnapping Crime:***

Kidnapping is a serious and effective criminal act that includes the intentional transfer of the kidnapped by the offender from his family, clan and place of origin to another place with the aim of keeping him and closely monitoring him. According to Table (1), the crime of kidnapping ranked ninth, while Table (10) and Map (9) They explain the number and distribution of the crime of kidnapping according to the administrative units for the year 2020.

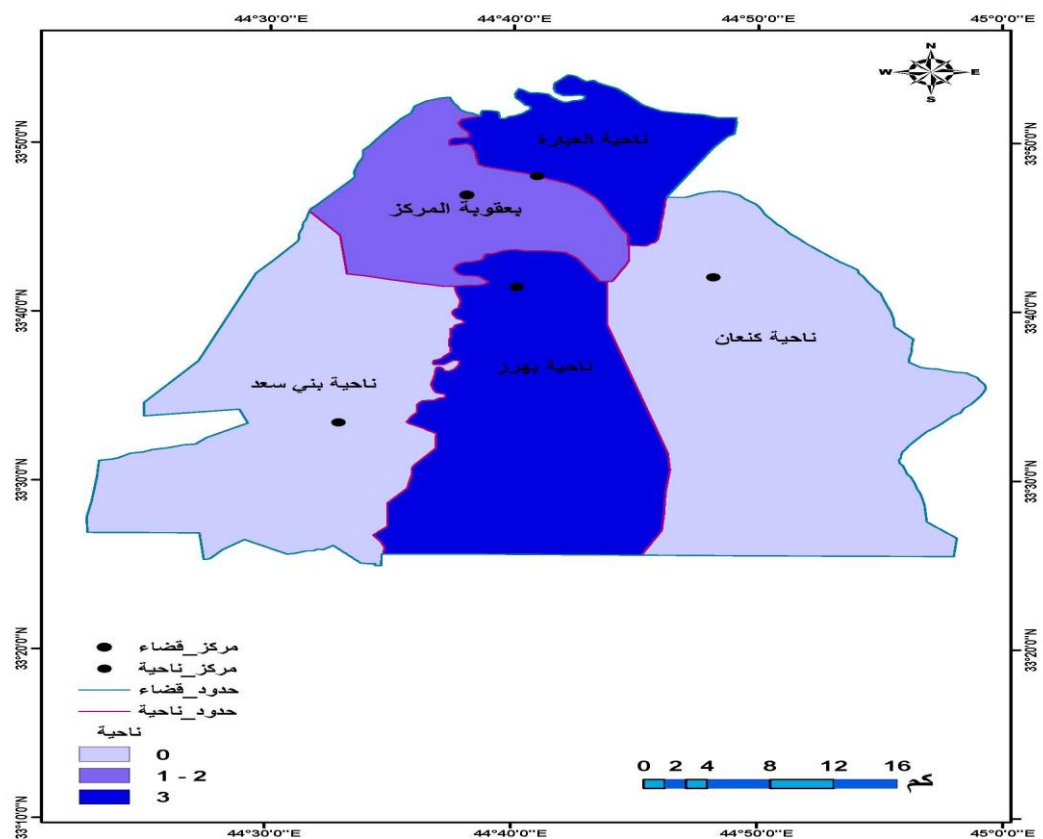
Crime Type	Baquba District	Buhriz	Al-Abara	Bani Saad	Canaan	Total	%
Kidnapping	2	3	3	0	0	8	%0,4

**Table (10)** shows the number of Kidnapping Crimes in Baquba District by administrative units for 2020

**Source:** Conducted by the researcher based on the statistics of Table (1).

Through the analysis of Table (10), the following facts become clear:

1. The number of kidnapping crimes in the Baquba District amounted to about (8) crimes, at a rate of (0.4) percent of the total crimes in the Baquba District.
2. Buhraz and Al-Abbarah districts topped the number of kidnapping crimes, with (3) crimes for both.
3. As for the two districts of Bani Saad and Kanaan, no kidnappings were recorded for the year 2020.



Baquba District that vary in number and patterns according to the administrative units, as some administrative units witnessed a concentration of some types of crimes, while other patterns witnessed dispersal, and this is due to a number of economic and social factors that have a significant impact on crime rates.

***Trends in Controlling Crime and Reducing its Effects:***

Protecting society and achieving internal security is one of the duties of the police, and the duties of the police are not limited to detecting crime and arresting the criminal only, but rather searching for the reasons for committing the crime to prevent its occurrence or reduce its high rates. From the above, the researcher reached a number of points that could have a role on controlling crime in Baquba District and limiting its effects:

- Enabling the police to benefit from studies and scientific research specialized in the phenomenon of crime to find out the causes and patterns of crimes, which helps them in drawing up and developing crime control strategies.
- Every police station must have a social researcher to conduct interviews with the perpetrators of crimes and see their personal, economic and social lives, in order to reach the causes of the crime and study it in order to address it by the competent authorities.
- Giving importance to the security media because of its role in controlling crime as a means of persuasion based on facts and real evidence, and attention to proposals and communications issued by citizens and responding to them as soon as possible.
- The speed of investigation procedures and the prosecution of the criminal and avoiding delaying them for a long time, as the interest in this aspect reflects a positive image of the society about the strength of the police force and the speed of its procedures to deter criminals and prevent crime before it occurs.
- Emphasizing the role of society in controlling crime, based on the principle of security, the responsibility of all.
- Efforts are made by the local government in Baquba District to find appropriate solutions to reduce unemployment and poverty, in addition to paying attention to the educational aspect and reducing the cases of students failing and dropping out of school, because of the role of these two aspects in controlling crime and building a family capable of understanding good behavior and aware of the seriousness of the crime phenomenon.

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Using the program ARCMAP 10\_7\_1 in cartographic representation.