

## Analytical Approach to Crime and Boundary Aggression in Arvand River and Strategies to Combat Them

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**Abstract:** As has been reported a lot of fishing and Merchant shipsplundering and burglary in Arvand river recent years, the risk of crimes has selected the rank of the uprising mood there unfortunately and made the mentioned canal insecure on which traced on the huge hindrance for the progress of Khoramshahr and Abadan's ports. Hence, this applied study aim to offer analytical spotlight on the crimes and invasions of Arvand borders and some strategies of how to deal with them in advance on which conducted in three phase. In the first phase the focus is on the analysis and the study of the piracy meaning and maritime crimes according to the international law and due to this phase the first hypothesis of the study is formed. In the second phase, the study shift on the statistical survey of the crimes and invasions from 2007 to 2011 and the obtained data were classified according to the different months of the year and also the occurrence year of the crimes. So, by the precise investigation of these two previous phases and their results, the most crime occurrence spots were identified and in the third phase these strategies suggested to deal toward the reduction of the crimes in this canal. Next, by benefiting from expert's opinions the level of importance and efficiency of the strategies prioritized based on Shannon Entropy Method. Among all of the strategies, the third option (mutual accordance between Iranian and Iraqi borders security force) has got the most impact in declining the crimes.

**Key words:** Border security force • Border invasions • Khoramshahr and Abadan's ports • Arvand canal

### INTRODUCTION

One of the ancient well known international crimes is piracy that can endanger the security of the international trading service and hindrance the development of it because nowadays, more than 2011 percent of the foreign trade of Iran is considered through the sea [1]. The growth of the piracy trapped a lot of companies and organization into this unorganized subject [2]. We can refer to the definition that each aggressive invade toward the ship or the crew of the ship in the freeway seas as a piracy [3]. And this action is subordinate with the global qualification maxim [4-6]. And if this action occurs in the internal sea ways, it is considered as sea plundering [7].

In recent years, a lot of reports were indicating the plundering of the trading and fishing buoyant in Arvand river that caused by the ignorance of the Iraq government toward the security challenges in this canal and it is not only enhanced the rate of the crime by Iraqi fishermen but also they lead to armed plundering. This disorder has caused a problem in our country toward the international trading and also the huge loss of the economic costs [2]. For typical, it leads to the increase of the ship's insurance price for trafficking in Khoramshahr and Abadan's ports. Therefore, due to these above mentioned reasons it is so critical to delve into the study in this domain and suggest some proper strategies as stipulating or amending the internal penalty law, setting local multiple or mutual coordination for dealing with these crimes. This study is conducted to realize the below cited aims.

- The study of the piracy from the traditional meaning and international law perspective
- Analyzing the crimes and the invasions according to the different months of the year in order to notify the most critical months
- Classifying the crimes and invasions according to the year of the occurrence (2007 to 2011) and determining the success level of the pre-played actions in previous years for declining these crimes and invasions.
- Locality analysis of crimes and invasions occurrence place and determining the most eventful spots
- Presenting the suggested strategies for declining these crimes and invasions
- Prioritize the suggested strategies according to expert's comments
- Studying and surveying the everlasting and humanistic role of the sea borders force in declining these crimes in Arvand canal.

**Arvand River:** Arvand river is a vast river on which located in western south of Iran between Iran and Iraq borders that its emersion was the converse of Dejle, Forat and then Karoon altogether. There, Dejle and Forat rivers before to join with Karoon, they share their downfalls together in Gharne city near 375 kilometers of south Baqdad. Arvand longitude from Gharne to its downfall in Persian Gulf is 12011 kilometers. This downfall is through Arvand Kenar city of Iran and Fave city of Iraq on which these two countries have a long time arguments toward the ownership of this river and this argument last about 400 years and originated from the neighboring of the Ottoman Empire with the western borders of Iran. During this time, numerous treaties have been signed between two countries for better manipulating of both countries from the river. The most important treaty among them is the contract of 1975 Aljazeera that a part of it refers to the river's border determination and still is out of violation. Arvand River is located between Iran and Iraq borders and the exact determination of the borders in this location was under disagreement from the past time that can be mentioned one of the reason that leads these two countries in conflict. In Constantinople 1913 contract which on held between Iran and ottoman, the eastern border of Arvand river is determined as a borderline of the two countries and Iraq also put this under its maintain of support but Iran argue that this river it should be considered as a borderline one and according to the international convention, the border of the two countries

was believed to be the Thalweg Line or the deepest part of the river. Hence, these two countries drag their argument into a national society in 1934 but as a result there was no rapport. In the year of 1937 the first treaty between the two countries is assigned. According to this treaty, the borderline of these two countries was running during the eastern coast of the river but a part of a four miles harbor on which located near Abadan was dedicated to Iran and in this section, the borderline of the two countries is allocated. However, the two countries were disagreeing with this contract while Iraq believed that Iran has used the unorganized political situation of that time against Iraq for benefiting the condition. Therefore Iran was malcontent of this situation and invalidated the contract in 1960 and asked for new borderline determination and in the sake of this, supports the Kurdish rebels in the north of Iraq in order to enhance the pressure on this country. Finally, in the 1975 treaty of Aljazeera with the intercession of Aljazeera president between Muhammad Reza Pahlavi and Sadam Hussain, Iraq has accepted Iran's conditions about Shat- al- Arab and the Thalweg Line became the official borderline of these two countries for the first time. As the result of this, Iran also accepted the condition to finish the support of the Kurdish rebels but after five years and before five days to the inception of war, this contract terminated by sadam Hussain because of the claim that this contract violated by Iran and has lost its validity [8].

These rivers mean Arvand, Dejle and Forat was important to merchants from the old time because they were used in Babylonian, Greek and Sassanian times and some cities on which placed in the path of these important trading line. They were the capital of great and majestic empire and well-known as the most luxurious cities of the world. In 1922 a stamped punch was found near Baqdad that was analogous to northern India punches. This kind of discoveries shows that Arvand River was the only linking trading line between east and west for millennia. According to this that Dejle river was used for the benefits of small ships until Beyn-al-nahrain land, it proves the maritime transportation of goods by Persian Gulf, Arvand river and Dejle river until the smaller Asia and there also was possible to connect the trade by link the land lines with Mediterranean sea. This line was the cheaper and the easiest way and beside this the shortest and the most direct line of the trading path. In that time because the capacity of the ships were low, so this line was suitable for those ships [8].

**Research Hypotheses:** According to the goals of this study the below mentioned hypotheses are presented:

- We can assume the crimes and the robbery from the trading and hunting ships in Arvand water canal as a piracy.
- The number of the crimes and invasions are homogenies in all of the months of the year.
- There was a decreasing rate signal during 2007 to 2011 toward the crimes and invasions.
- The suggestive policies of crimes and invasions controlling have different effects.

## MATERIALS AND METHODS

The present study from the scope of target, because surveying the procedures and the policies of how to reduce the crimes and maritime invasions is considered an applied one and to the nature, it is descriptive and benefited field's method for collecting the data. The subjects of this research are consisted of all maritime security officers and port organization experts in Arvand and also all of those ships commanders on which experienced the attack of the invasion. So, due to ambiguity of the exact number of the subjects, the statistical sample of the subjects were estimated through distribution of the first questionnaire between 20 individuals of the maritime and port organization experts and by obtaining the first variance in the reliable level, 95 percent of the sample, it mean 80 individuals were estimated. The first collecting data tool in this study is the five years recent crimes and invasions in Arvand water canal. These data were collected by research and maritime saving centers of Khuzestan province ports. These reports on which collected by the above mentioned centers are precisely going to provide and clarify all of the event information such as time, space, plot, the number of the ships and the financial and criminal damages and the way that the event is saved. In this study the focus is just on the study zone on which cover Arvand water canal and the prioritization of the suggested policies based on the expert's opinion is considered as a secondary tool.

**Shannon Entropy and Objective Weights:** Shannon and Weaver proposed the entropy concept, which is a measure of uncertainty in information formulated in terms of probability theory. Since the entropy concept is well suited for measuring the relative contrast intensities of criteria to represent the average intrinsic information

transmitted to the decision maker, conveniently it would be a proper option for our purpose. Shannon developed measure H that satisfied the following properties for all pi within the estimated joint probability distribution P [9]:

It is proved that the only function that satisfied these properties is:

$$H_{shannon} = -\sum_i p_i \log(p_i) \quad (1)$$

Shannon's concept is capable of being deployed as a weighting calculation method, through the following steps [10]:

**Step 1:** Normalize the evaluation index as:

$$p_{ij} = \frac{x_{ij}}{\sum_j x_{ij}} \quad (2)$$

**Step 2:** Calculate entropy measure of every index using the following equation:

$$e_j = -K \sum_{i=1}^m p_{ij} \ln(p_{ij}) \quad (3)$$

Where

$$K = (1/n(m))^{-1} \quad (4)$$

**Step 3:** Define the divergence through:

$$div_j = 1 - e_j \quad (5)$$

The more the  $div_j$  is the more important the criterion jth

**Step 4:** Obtain the normalized weights of indexes as [11]:

$$p_{ij} = \frac{div_j}{\sum_j div_j} \quad (6)$$

**The Geographical Study Zone:** The geographical confinement study zone is international Arvand River. Arvand river or Shate-al-arab is a vast river on which located in western south of Iran between Iran and Iraq borders that its emersion was the converse of Dejle, Forat and then Karoon altogether. There, Dejle and Forat rivers before to join with Karoon, they share their downfalls together in Gharne city near 375 kilometers of south Baqdad. Arvand longitude from Gharne to its downfall in Persian Gulf is 12011 kilometers. This downfall is through

Arvand Kenar city of Iran and Fave city of Iraq that it is not clear until yet to determine the exact borderline and this has been considered as one of the leading cause of Iran and Iraq's war [8].

**Research Procedures:** At the first phase, the definition of the piracy is going under the extension of analysis according to the international convocations and rules and finally it is decided to count the Arvand river invasion as a part of piracy or not? It is obvious that this phase is considered as a first hypothesis of the study. Next, in the second phase all of the invasion and crimes' statistic that had been happened during the period of 2007 to 2011 is classified according to the different month of the year and occurrence. We can detect the most event occurring space by the analysis of these crimes and invasion. And this can be the second and the third research hypothesis respectively. And so on in the third phase, we can offer some suggestive procedures that are useful to crime and invasions reduction. There by benefiting the experts' opinions and the level of importance by their effects, these crimes were prioritized by Shannon Entropy Model and the third hypothesis is emerging.

## RESULTS

### First Phase

**Maritime Crimes Prioritization:** Toward the threats evaluation against maritime and marine security industry, experts should offer a new prioritization of marine major crimes that are really practical when they come into the practice under the politicians' hands and the crimes against the ships should be in the framework of these four groups [12, 13].

**Bribery:** Taking from the ships or any collusion by the government responsible persons or ports' stuff.

**Piracy:** Invading a ship in a port while it's on the riverside and anchored.

**Marine Banditry:** Any kind of invade against ships that are in motion in free seas and straits or canals.

**Marine Terrorism:** Any kind of crime against ships that are organized by special terrorism organization.

**Bribery:** It is most seen in the countries with the low economical annual rate such as Bangladesh, Philippine and Indonesia because it is common among the stuff there [14].

**Piracy:** Nowadays, most of the invasions that are reported are those that related on the anchored trading ships [15]. These invasions are made due to target the security and personal equipment of the crews. Some of these invasions are targeting the anchored ships and some of them are focused on the movement ships in the particular water on which concomitant with violence. Those kinds of crimes that committed in the governmental bordered water should be called a piracy and civil penalty rules are dedicated for them [16].

**Marine Banditry:** There are two common definitions of this term, the first one is derived by the maritime international organization and it is based on the 1982 convocations of the national organization seas rules. This action is put in the framework of words that inclusive any violence action or illegal stoppage or any damage that are lead because of personal purposes by the ship or airplane crews as the following in particular:

- In the free sea against ship or airplane or against others property
- Against ship, airplane, personnel or property in the place out of governmental borders.
- Any voluntarily cooperation in ship or plane invades action that is known as banditry.
- And facilitating action that provoking the action of part (a and b)-(stipulation number 101 convocations of 1982 of marine rules) [17]. Here, this definition is limited to free water and out of country borders [18]. But international bureau of marine rules has cited another definition for the marine banditry:

Any clear invading action that aimed to enter a ship and using force to do a crime or robbery [19]. The marine international bureau definition of marine banditry is so extensive that include each invade or the invade inception toward the ship, further, it is also include the invades that leaded for political purposes not just the personal purposed [12]. International maritime organization put itself into an effort to fill in the gap o which exists between the definition of the term by using the 1982 convocations maritime rules and international maritime bureau. In this point, international maritime security committee in the 992(22) commitment of penalty research about marine banditry and piracy against ships will define the ship armed robbery such as:

Any kind of illegal and violence action for stoppage, plundering, threat or suppression of the ship, crews or their property with the aim of personal in the governmental borderline limitation [11].

### **Comparison Between Marine Banditry and Ships Armed Robbery:**

According to the 1982 convocations definition of the maritime rules about marine banditry, none of the crimes and robbery on which occurred in Arvand river will mentioned as piracy and this has been a major point of emerging a new term such armed robbery against ships in that environment and included in the maritime international organization rules set Armed robbery against ships is defined as any form of illegal and violence action that target the crews and the property of the ship in the governmental borders [12].

Compared with the rule number 101 of 1982 convocations of maritime rules, it should be mentioned here that, piracy is something differ than armed robbery against ship according to their commitment and environment. According to rule number 101 of convocations, piracy include any violent action, stoppage, plundering or any provoking action that facilitate such crimes and armed robbery against ships is any form of violent action, stoppage, plundering and threats that going to facilitate such actions other than piracy [14, 15].

So according to presented definition of the piracy, this term will only come into meaning, that the action will occur in the free water and out of governmental borderlines and if these action occur in the borderlines of the specific country will not mentioned as piracy and categorized due to that country penalties. Therefore, those kind of robbery that occurred in Arvand river, because this river is located in the environment of governmental borders of Iran and Iraq, it is not a piracy but an armed robbery against ship. So the first hypothesis (crimes and robberies from hunting and trading ships in Arvand canal is mentioned as piracy) is rejected.

### **Second Phase:**

**Analysis of the Crimes and Invasions According to Different Months of the Year:** It is highly valuable to analyses such data by different months of the year because we can drag out the most dangerous and critical point of any kind of events in the months, hence, we can find the cause of such events. By this monthly analysis, we can attain the severity of invasions alternation model during the year. This model is going to help the controlling facility in particular time level due to reduce the events.

In the analysis of these crimes according to the occurrence months, (Table 1 and Figure 1) are presenting the crimes in the first halves of the year, the first 3 months in particular. So, because of the high activity of the

hunting ships in that months, Iraqi ships that come to fishing according to that seasonal time may encounter with Iranian fishing ships because of fishing net mixing in Arvand river and this contact may lead to physical argument and armed robbery levy. Therefore, according to the different density of the crimes in the different months of the year, the second hypothesis (the number of crimes and invasions are analogous during the year) is rejected.

**Crimes Analysis According to Different Years:** Another way to classify the crimes is to put them in the annual categorization because this statistics can help us to determine the successive line of the done procedures in the recent years and shows the rate of rising or the falling mood of the crimes. Undoubtedly, for such an organization like the security force of Islamic Republic of Iran on which dealing with these crimes to program the long term procedures, it can be so efficient to perform such studies for security progress in the Canal. This annual statistical analysis can answer the above mentioned questions. Figure 2 shows that, crimes and invasions between the years of 2007 to 2011 were in the falling mood rate except the years of 2010 to 2011, so the third hypothesis is approved here.

**Locus Analytical of Crimes and Invasions:** This analytical part of the study is delved to Arvand River as a locus of invasions. The most focus of it is neighboring Favo of Iraq (Figure 3) that owns the maximum proportion. The most major reason of these crimes and arguments are the contact of the Iraqi fishing ships with the Iranian ones. But what is going to enhance these contacts are determined of two main reasons: first, the shortage or the absence of security force in this area and second, feeling some kind of safety in this locus, that if any kind of argument going to incept, suddenly the invaders can turn back to their city (Fave).

Based on the previous studies concerning this problem, we can estimate that every year, these crimes are going to reduce and the most important reasons of this reduction are:

- The enhancement of the comparative security in Iraq
- The enhancement of the armed and security facilities
- The enhancement of the security force readiness in the clashes
- The mutual cooperation between the Iranian and Iraqi security forces.

Table 1: Monthly analysis of invasions

Month	March	April	May	June	July	August	September	October	November	December	January	February
NO	10	9	9	5	4	0	5	3	2	0	2	2

Table 2: Recommended actions and their priorities

Recommended Actions	Weight	Priorities
Increasing the equipping of police stations and military	0.133	3
A more Preparation for quick action (military forces)	0.171	6
The mutual cooperation between the Iranian security force and the Iraqi ones	0.182	1
Preventing the fishing net distribution in the width of the canal	0.1	7
Create an intangible military cultivation	0.13	2
The deployment of police in commercial fishing vessels randomly	0.141	4
Training of vessels crew on how to act in these situations when fall into robberies	0.143	5

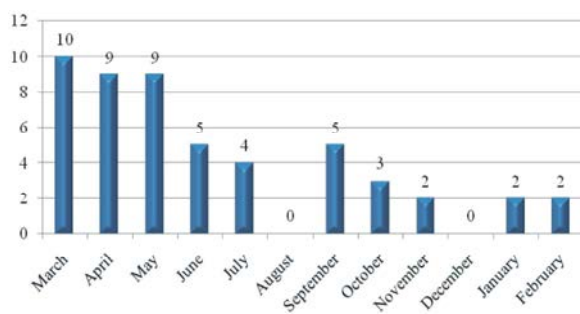


Fig. 1: Monthly analysis of invasions

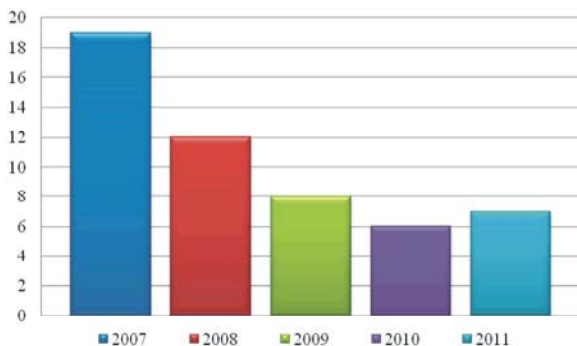


Fig. 2: Crimes and invasions between the years of 2007 to 2011



Fig. 3: Location of crime focus in the Arvand

All of the above mentioned set of reasons caused one to third reduction of crimes in 2007 to 2011. This strategic canal by Iran efforts has made to a safe canal for trade trafficking toward the ports.

**The Third Phase:** In this step, based on the results that are obtained in the previous phase, some of the suggestive procedures toward the crimes reduction are offered and finally by benefiting the experts' opinions these procedures were prioritized according to their importance by Shannon Entropy Method. So, it is clear that these procedures are not the same in the prioritization level and importance and this is going to prove the correctness of the forth hypothesis (crimes reduction procedures have different effect on crimes and invasions reductions).

## CONCLUSION

The present study is aimed to probe the crimes and the invasions of Arvand River and representing and prioritizing some procedures in order to reduce these crimes in three phases. In the first phase, the maritime crimes and piracy terms are defined according to maritime international convocations and finally by comparing the definitions it is recognized that Arvand River's crimes are not classified as piracy but categorized as marine robbery [20]. In the second phase, crimes and borderlines invasions were analyzed according to the occurrence months of the year between 2007 to 2011 and the results revealed that because of the high trafficking of the Iraqi fishing ships in the first three months of the year, these crimes are in the high level and also by annual analyzing it is revealed that because of the borderline security force efforts, the amount of the crimes were reduced significantly in the years of 2007 to 2011 [21, 22]. So by proper safety that is provided by security force, the more progress in the industry of the maritime transportation in

the ports, Khoramshahr and Abadan in particular, has been seen. The locus analysis is claim that the most crime leading part is near Fave city of Iraq and considered of two reasons, first, the shortness or the absence of the security force of this area and second, invaders are feeling some kind of safety because they are near to Iraq lands and can hide there when the strike is began. Fortunately, by high observing the matter by security forces in those areas, these crimes were reduced. In the third phase, according to the obtained results in the previous phases, some suggestive procedures were offered and by benefiting experts' opinions the level of their importance is determined and prioritized by Shannon Entropy Method. At last, the third procedure, the mutual cooperation between the Iranian security force and the Iraqi ones has got the maximum score and the forth procedure, preventing the fishing net distribution in the width of the canal, has got the minimum score.

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