

Risks Associated to Transportation between the Socioeconomic Costs and Territorial Management Strategies: The Case of Kalaa Sraghna in Morocco

Zouhair Ennami¹, Mohamed Marou², Ouafae Brik³

¹University of Sidi Mohamed Ben Abdellah, Fes, Morocco

²National School of Architecture, Oujda, Morocco

³University of Abdelmalek Assaadi, Tetouan, Morocco

Email: Zouhair.ennamy@usmba.ac.ma, marou7575@gmail.com, Ouafae.brik@etu.uae.ma

How to cite this paper: Ennami, Z., Marou, M., & Brik, O. (2022). Risks Associated to Transportation between the Socioeconomic Costs and Territorial Management Strategies: The Case of Kalaa Sraghna in Morocco. *Current Urban Studies*, 10, 93-106. <https://doi.org/10.4236/cus.2022.101006>

Received: June 1, 2021

Accepted: March 15, 2022

Published: March 18, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0). <http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

The concept of risk has become widely circulated within the academic communities, and the reason behind this interest is the enormity of Losses and their high cost to humans and their properties. Hence, the reasons for studying these risks and searching for effective solutions emerged to reduce the size of its losses. Risks are divided into several types, including geological hazards such as earthquakes and volcanoes and climate risks such as storms, floods and desertification and geomorphologic hazards such as landslides and sedimentation...And environmental hazards such as air and marine pollution...Social risks such as breaking the family's union and the emergence of social Disorder. This study comes to approach the problem of the risks associated with transportation and its economic and social costs, through the case of the province of Kalaa Sraghna, the transportation system poses three basic risks: The risk of traffic accidents, which leaves hundreds dead and thousands injured. The natural hazards can also make the roads affected by flooding, and the third risk is the problem of both air and sound pollution due to transportation. Geographical research has become required to provide solutions to these problems. In this context, we have presented a set of suggestions to treat and minimize the impact of these risks, for sustainable transport that satisfies the population's need for mobility and contributes to territorial development.

Keywords

Risks, Transportation, Car Accidents, Floods, the Province of Kalaa Sraghna

1. Introduction

The study of risks of all kinds is extremely important, as it enables to anticipate the danger that affects humans and their surroundings, directly or indirectly. About the types of hazards, we find natural hazards such as earthquakes, floods and landslides...Environmental hazards such as pollution and social hazards such as traffic accidents and as an example of the severity and cost of risks we present an example of natural hazards, the resulting losses are estimated at about 50 thousand million dollars, with a death toll exceeding 114 thousand people, of whom 95% are in third world countries. Hence the necessity to study the risks and search for effective solutions to overcome their huge losses.

Transportation is considered as one of the most important sectors, as the movement of people and goods depends on it, but on the other hand, it results in multiple dangers, at the first place we find traffic accidents (a social risk) and in the second place it's air and sound pollution (an environmental hazard), the road is also affected by floods (a natural hazard).

This study comes to solve the problem of risks associated with the transport sector, through the case of the province of Kalaa Sraghna, the latter suffering from a set of negative repercussions resulting from the transport system, with the aim of searching for effective solutions that ensure sustainable mobility.

1) The Problematic of study

The problematic of the study is evident in diagnosing the risks associated with transport and its economic and social costs by starting from the following problematic question: **“What are the risks associated with the transport sector in the province of Kalaa Sraghna, what are their economic and social costs, and what are the strategies to solve them?”** To answer this pivotal question we will divide it into the following sub-questions:

- What is the economic and social cost resulting from the risk of traffic accidents in the province of Kalaa Sraghna?
- Do natural hazards affect the transport and its structures in the province of Kalaa Sraghna?
- What is the reflection of the air pollution caused by transportation in the province of Kalaa Sraghna?
- What are the strategies for achieving sustainable transport?

2) Study hypotheses

The hypothesis is considered one of the basics of scientific research in general and geographical research in particular, and its aim is to guide the research and provide answers that frame the studied problem, and we have started from the following hypotheses who will be validated after addressing the main problem, and examining the repercussions of transport risks in Kalaa Sraghna province and its economic and social cost.

- The high economic and social cost of traffic accidents in the province of Kalaa Sraghna.

- The transport sector in the province of Kalaa Sraghna suffers from the impact of the floods, which affect the road and the population's movement during the eruption period.
- Air pollution affects human health.
- The multiplicity of strategies to reduce the risks of transport, but it requires dirt vigilance on the part of the actors in the province of Kalaa Sraghna.

3) Study tools

In this study of the risks associated to transportation sector in the province of Kalaa Sraghna, we relied on the following tools:

- **Bibliographic study:** review the various books on the topics of risk and transportation, as well as the various books on the field of study (the province of Kalaa Sraghna).
- **The area study:** included the mobilization of 3777 samples targeting the population and transport professionals. This study was based on fieldwork, for various reasons, on the one hand, the scarcity of official data concerning traffic accidents, and on the other hand, the desire to produce information, based on the direct questioning of the sample studied forms distributed as follows:
 - A survey grid addressed to the heads of families: whose aim is to know the causes and the repercussions of traffic accidents in the province of Kalaa Sraghna;
 - A survey grid addressed to public transport professionals: as they are the main link in the transport system, as the study included bus, taxi and dual transport professionals;
 - A survey grid addressed to professionals in transporting goods and merchandise: This category is active in transporting goods within and outside the field of study, and it is important to identify the representations of this category about traffic accidents;
 - A survey grid addressed to the secret transport or unstructured transport professional;
 - A survey grid addressed to the owners of private cars: This category is also specific to the problem of traffic accidents and their repercussions in the province of Kalaa Sraghna.
- **Geographic Information Systems:** Using Arc Gis in mapping.
- **Statistical programs:** Reliance on the SPSS program in generating the results of the questionnaire, because to study social phenomena, it is necessary to use techniques and tools adapted to the nature of the subject studied. In this context, 5 field questionnaires were completed, and were sent to the various transport users. The form had a few questions about traffic accidents and their causes, where the results of the field questionnaires were uploaded via the SPSS program.

4) Transport and risk: A conceptual approach

The defining stage of concepts is a key stage in academic research, the purpose

of which is to clarify the basic concepts of research, in order to avoid any confusion, and we will limit ourselves to the study of the concepts of transport and notification.

Transport concept: Transport defines “as the sum of the means available to transport individuals, goods and goods from one field to another in a limited time period (Thorez & Emangard, 2009)” and it’s also “a set of ways, means, media, technology, regulatory and economic procedures aimed at moving and producing people from one place to another (Habib Rasoul, 1986).” While Majid Malouk Soumrani considers it as “a human economic activity based on the movement of goods and people from one place to another to travel a certain distance within a specified time period, relying on various elements such as muscular human movement, animals, cars, ships, trains and airplanes (Malouk, 2015).” Generally, transportation is “changing the location of individuals and things by using energy and using a means of transportation, this is for the purpose of obtaining or increasing a benefit, provided that it is done at a certain time and place (Affevy & Fouad, 2006).”

The concept of risk: “Risk means all the inevitable and visible hazards that can occur suddenly and that can be of great and dangerous impact on human beings, and the risk is also known as any event that leads to significant material or human loss (Ait Hssain, 2014).” Risk is classified according to the factors causing it as:

- Geologic hazards: Earthquakes, volcanoes, etc.
- Climate hazards: Storms, floods, desertification, etc.
- Geomorphologic hazards: Landslides, rock falls, landslides..., etc. (Azza, 2002).
- Social risks: The problem of traffic accidents with moral (psychological) and physical (human) losses
- Environnemental hazards: Air and marine pollution, etc.

2. The Risk of Traffic Accidents and Their Economic and Social Cost in the Province of Kalaa Sraghna

The traffic accidents are among the most serious problems affecting Morocco in general and the province of Kalaa Sraghna in particular, leading to thousands of deaths and tens of thousands of injuries of varying degrees of seriousness, and the traffic accidents cost the state safe from the millions of dirhams.

The world’s traffic accidents and their human and economic losses have become one of the most prominent problems facing the development of the current societies, and this problem is very clear and tangible in the developing countries, as both the World Health Organization and the World Bank stress that road accidents are the second main causes of death of the world’s population, especially the ages between 30 and 44. Road accidents kill about 1.2 million people annually, injuring and hindering between 20 and 50 million people worldwide. By 2020, traffic deaths are expected to increase to about 80% in low-

and middle-income countries, and road accident injuries in developing countries are estimated to cost about \$65 billion a year, more than development aid. However, most developing countries are not sufficiently concerned with the causes and consequences of traffic accidents, while the advanced industrial countries are very interested in the problem of road accidents and their consequences within their traffic safety strategy (El Mitir, 2008).

It is not excessive to say that traffic accidents in Arab societies have become a cause of death for diseases and epidemics, and if we look at the situation in traffic accidents across the world, traffic accidents are 20 to 30 times higher in developing countries than in developed countries (Mubarak, 2009).

Traffic accidents have severe health, social and economic effects on individuals, families and groups, as well as the direct physical and psychological impact on those directly affected by road traffic injuries, traffic incidents have a social impact (United Nations Agencies, General Assembly, 2013). It is a social problem because it affects the daily lives of individuals and is aggravated by social disasters, which cause family disintegration by loss of breadwinner, as well as by depriving the family of its natural functions. Accidents, especially those resulting in deaths or serious injuries, often cause the injured person not to provide his or her family's needs, especially if the victim is a family victim (Farraj Al-Sharif, 2011). Three findings of individual traffic incidents can be distinguished:

- **Death:** Every victim who died from a traffic accident in less than 30 days from the date of the accident;
- **Serious injury:** More than 6 days of hospital care;
- **Light injury:** A victim whose hospital treatment is no longer than 6 days.

The table below (Table 1) illustrates the evolution of the number and losses of incidents in Morocco between 2007 and 2016.

The number of traffic accidents in Morocco evolved significantly between 2007 and 2016, from 58,924 in 2007 to 80,680 in 2016, leaving 3785 dead, or 10 dead a day, and injuring 119,162 daily, 326 seriously. On a regional level, Marrakech-Safi is ranked third nationally by 10,586 incidents in 2016, leaving 580 deaths, 13,606 slightly injured, and 1632 serious injuries.

Table 1. Evolution of the number of traffic accidents in Morocco between 2007 and 2016.

	2007	2009	2011	2013	2015	2016
Accidents outside cities	16,940	19,048	18,960	18,341	21,027	21,638
Urban accidents	41,984	47,910	48,122	49,585	56,976	59,042
Total number of accidents	58,924	66,958	67,082	67,926	78,003	80,680
Deadly accidents	3252	3489	3636	3265	3365	3317
Number of deaths	3838	4042	4222	3832	3776	3785
Number of injured	89,264	102,743	102,011	102,040	115,042	119,162

Source: Ministry of equipment, 2017.

At the level of the province of Kalaa Sraghna, the traffic accidents in 2016 killed 104 victims, including 9 urban deaths, 95 village deaths, 2220 minor injuries and 237 serious injuries, the province of Kalaa Sraghna, along with 15 provinces, is classified among the fields that knows the biggest number of accidents in Morocco at an annual rate of more than 1500, and the company of 11 provinces is classified as the highest number of deaths by more than 100 deaths annually.

For the categories of traffic accidents committed in the province of Kalaa Sraghna, we provide figures for 2016 where: injuries: Motorcyclists suffer the largest number of injuries with 1258, followed by the drivers category with 561 injuries, the two men with 323 injuries, and the bicycles with 176 injuries to the truck drivers with 72 injuries, with a total of 2457 injured. Deaths: The motorcycle category records the highest number of deaths, with 42 deaths, followed by the motorcycle category with 31 deaths and 16 deaths, with a total of 104 deaths. The high number of traffic accidents in the province of Kalaa Sraghna causes us to search for the reasons of this phenomenon, which is highlighted by the following statement numbers.

The main cause of traffic accidents is 52.2%, followed by a 21.6% network weakness, which is higher for both cargo and cargo transport professionals and passenger transport professionals. They are also led by the poor composition of the driving license and the spread of some illegal methods by 8.4%, and other causes, namely alcohol, poor surveillance and the natural factors represented in the drop-out of transportation. Another factor, low awareness and the deterioration of the C90 motorcycle drivers, also shows factors that lead to traffic accidents.

Although transport professionals and private car owners understand that speed is the main cause of traffic accidents, they pass it and commit traffic violations of all kinds, as about 44% of drivers say they commit traffic violations, and this figure appears small compared to reality, while 56% answered No. This percentage varies by transport items, the legal speed is still the most recorded violations by 64.25% and the irregularities recorded vary by item:

- Clandestine transport: Illegal passenger transport (31.7%).
- Goods and commodities transport: Legal cargo exceeding (33.9%).
- Passenger transport: Exceeding legal speed (82.4%) and exceeding the legal number of passengers (13.7%).
- Private cars: Owners of motor vehicles are characterized by speed violations (58.5%), disrespect of a roof mark (6.4%), and passage in red light (5.4%).

3. Natural Hazards, Air Pollution and Its Impact on Transport and Its Building in the Province of the Kalaa Sraghna

Natural hazards and air pollution are just as important as the risk of traffic accidents; in terms of natural hazards, they are large in areas with fragile geological

formation and areas of wobbly nature, while air pollution from transport clearly shows its reflections on major cities.

1) Natural hazards and their impact on transport

There are many natural hazards affecting transport in Morocco, where the foothills and landslides affect road network quality, traffic stops for long hours and sometimes days due to snow build-up, sand storms are affected, floods affect roads and traffic stops, and railways are affected by geological factors. In the province of kalaa sraghna, the transport system suffers from the main danger of floods, as the road network is destroyed and traffic is cut, and climatic factors remain with little effect on the transport system.

2) The effect of floods on technical objects and on static mobility

The province of kalaa sraghna has a range of waterways, the most prominent of which are Tassaout, Lakhdar, Kaino, as well as a group of water sources, like ain Ekli, ain Bsibisa, ain Ghebri, ain Al-Zarqa, etc. these waterways know the frequency of floods.

- **Lakhdar valley:** A valley of laKhdar affects the static movement of Sidi Issa Bin Sulaiman group, especially territorial communes, Ouelad Ibrahim and Ouelad Yousef, although a bridge was built in Al-chekaka area, it benefits only the population of the southern commune. While the north area are forced to cross the course during periods of exccercation for shopping and also to study, especially the preparatory phase (preparatory of Sidi Issa), secondary (Al-Razi High School in Fraita) and university in the two cities of kalaa Sraghna and Marrakech.
- **Tassaout valley:** During the 1990s, the flooding of Tassaout valley destroyed the provincial road bridge 2135.
- **Kaino valley:** A **seasonal** waterway from the El-Gibilat chain south of the city of kalaa Sraghna, due to the poor vegetation coverage of the El-Gibilat series, its important decline and geographical proximity to the city of Kalaa Sraghna (less than 5 kilometers). The latter defined the frequency of multiple flood periods as the 1996 flood with which traffic on the 206 regional road stopped, the 2003 flood, the 2009 flood, which in turn cut off the 8th national road, and the 208th and 206 regional routes. It also caused internal roads to travel in the city of Kalaa Sraghna, especially Mohammed V Street.

3) Climate impact

The study of climate characteristics is an important factor in recognizing the direct and indirect impact of climate on transport methods and methods, as they affect other geographical factors in their different forms (Ibrahim, 2003) and this influence is reflected in its various elements. Snow-capped in mountainous areas stop traffic, preventing static traffic from moving around facilitates transport slip, and water plays a major role in the deterioration of paved roads and the dirt roads in the rural world.

Heat affects the mobility of cold periods in autumn and winter, high temperature decreases the number of movements in the middle of the day during sum-

mer, and the effect of fog is reflected by causing traffic accidents, while wind leads to sand-breaking desert roads.

In order to know the impact of climate factors, we relied on three climate plants, one in the south of the field of study (Al-Attawiya), the second in the middle of the field of study (Frtaâ) and the third in the south (Boida). In order to know the climate of a particular region, we must rely on a climate chain of more than 30 years, and in this respect we relied on the reference period from 1968 to 2017, that is, almost half a century (49 years).

- **Precepitations:**

In our review of the precepitations in the province of kalaa Sraghna, we infer the absence of snow and its restriction on rain-cages. The latter is characterized by irregular, resulting in water levels rising during thunderstorms and resulting in overflowing overflow affecting the movement of transport, as an example; the floods of the Valley of Kaino on 3th November 2017 cut the 2127 regional road linking the kalaa Sraghna and Al-Attawiya fortress.

Rainstorms also lead to the dissolution of village roads (**Figure 1**), and during the summer the Territory knows the frequency of thunderstorms, which impedes traffic.

On Monday, April 17, 2017, strong rain fell in Atawiyah, where water flooded the city's streets with asphyxiation of water drainage channels. Here, the road network is weak and unresponsive to weather conditions, and the picture above is on the city's main street, although it has undergone a landscaping.

- **The heat:**

In our study of the heat in the province of kalaa Sraghna, we conclude that it is generally moderate, rising in summer and falling in winter and autumn, summer is the highest rate in August and winter, the lowest in January. Mobility is impaired in periods of high temperatures, especially in the summer from 12.00 to 16.00, and decreases to below zero in winter, requiring covered passenger seating at the terminals, which are met by summer and cold winter.

One aspect of natural hazards is their high cost, and the physical cost (losses



Figure 1. The effect of the rain on the 2008 regional road in Al-Attawiya.

and maintenance costs) can be distinguished from the intangible costs of impeding transport movement, increasing the length of travel and the psychological impact on individuals of isolation. According to the data provided by the Water Basin Agency for Tensift, the number of roads in the Kalaa Sraghna province through the floods is 11, with the movement of the traffic stopping from two to two hours in case of any damage to be maintained, and the annual maintenance cost is 575,500 dirhams (Tensift Hydraulic Basin Agency, 2003).

4) The risk of air pollution from traffic accidents and its impact on the dormant territory of the province of kalaa Sraghna

Air pollution can be considered as the sum of the pollutant air emissions from human activities from industry and transport that contribute to the disruption of the natural system, as well as the positive effects of transport on the field of economic and social development and improved living standards; Transport has a range of adverse effects, such as air pollution, caused by the high consumption of petroleum transport (Merenne, 2013). Air pollution kills nearly half a million people annually, 30% of them in industrialized countries (Hemya, 2008) and air pollution leads to various diseases such as cancer, shortness of breath, headache, eye and asthma, and inflation of lungs. It is known that sulfur dioxide damages the tissues of the lungs and causes respiratory canal inflammation (Saber, 2000) in fact the cost of air quality degradation was estimated to 3.6 billion per year, equivalent to about 1.03% of raw internal output (Minister of Energy, Minerals and Water, 2016).

The amount of carbon dioxide emissions from human activities ranges from 6 to 7 billion tons per year (Sema, 2015) and at the national level; transportation contributes 29.6% of CO₂, 48.7% of sulfur oxides, 6% of nitrogen oxide and 1% of methane. Transport is a place in pollution. (Ministry of Energy, Metals and Water, 2016) in addition to air pollution, transportation emits noisy noise (motor sound, alarms, etc.), the car, for example, emits 60 dB and the train 70 dB, the human ear can withstand the noise up to 120 dB, the noise sensation then turns into pain in the ear. Sound intensity must not exceed 60 dB (a), (Saber, 2000) and noise can cause various diseases such as stress, stress, anxiety, rapid respiration rate, high blood pressure, and heart rate disturbance.

Knowledge of the size of pollutants in the field of study remains difficult, as a group of major cities do not have statistics on the size of pollutants, so how can we talk about data in medium cities and village groups? To learn about the level of environmental awareness among heads of household and transport professionals about pollution of transport to the environment, we asked the heads of families and professionals “is pollution of transport the environment?” Environmental awareness means “the degree to which members of society are aware of the importance of the environment and its role in the quality of life, the ways to protect and exploit it in how to ensure its preservation, minimize its degradation, and continue it in the future for future generations (Boufthamiya et al., 2018).”

The majority of the answers were “yes”, 80.82%, the percentage of private transport users (93.1%) is higher, while 19.18% believe that transportation does not pollute the environment, this percentage is higher for clandestine transport professionals and for goods and goods professionals. In general, the impact of pollution in the field of study remains weak due to the small urban area, unlike major cities that suffer the consequences of this phenomenon in a significant way.

4. Strategies for Achieving Sustainable Transportation in the Province of Kalaa Sraghna

The concept of sustainable development first emerged in 1980, by the International Union for the Protection of the Environment (Michaux, 2008), and is intended to continuously strive for the development of the human quality of life, taking into account the capabilities of the ecosystem and not to damage it, which is the way to combine resource development and environmental conservation. Any guarantee and provision of current needs without prejudice to the ability of future generations to meet their needs (Haj Ali & Hazoui, 2006).

Sustainable transport has become urgent and urgent, given the significant evolution of the fleet’s volume caused by rising demand for mobility and the environmental challenges it poses (Jami & Kammas, 2013: p. 150) Sustainable transport cannot be discussed without meeting three key elements, people (social sustainability), planet (environmental sustainability), profit (economic sustainability). Sustainable transport also takes into account environmental conservation, especially air, and then profit-making through the rapid transport of people, goods and goods.

1) Ways to address the problem of traffic accidents

Road safety is the sum of the measures taken to reduce road accidents (pre-risk) or to address their effects, aimed at protecting people and property (transport), (Janati, 2013: p. 561) and at reducing the risk of traffic accidents in the field of study suggest:

- The repair of the road network and the strengthening of road signs;
- Strengthening of road surveillance (security personnel, radar systems);
- Reviewing the method of granting driver licenses (combating bribery, improving configuration programs);
- Static education (banditry, sensitization campaigns, emerging school education on road safety, television, etc.).

2) How to reduce the risk of natural factors

Remains difficult to control natural factors, but risk can be preempted and losses mitigated, in this context we suggest:

- The transport issue should be taken into account in reconstruction documents, especially urban planning schemes, as well as the importance of transport, mobility and mobility in the urban equation.
- Require road construction companies to respect the campaign book.

- Moving from the idea of constructing village tracks that require high material cost, their condition will soon deteriorate due to rain-type landings to the construction of long-life paved roads. Instead of constructing 100 km per year of tracks, it is better to construct 10 kilometers of long-lasting high quality paved roads.
- The integrated measure of public urban facilities for purification, electricity and drinking water; the adoption of a unilateral approach to the maintenance and extension of the canals destroys roads and degrades their quality. The streets and roads in the cities of kalaa Sraghna, Al-Attawiya and the urban centers suffer repeated excavations, hindering traffic and deteriorating road quality, and destroying the drainage system, are soon suffocated during raging rains.
- The rehabilitation of the road stations by providing covered seating areas for passengers, which are constrained by summer heat and cold winter.

3) Ways to reduce the risk of air pollution

The State has sought to reduce pollution from transport by means of a variety of measures:

- To renew the 10-year-old road transport of goods in order to reduce emissions of harmful gases;
- Upgrading the system of road monitoring and technical control to more stringent control of emissions to achieve better engine performance;
- Adopting environmentally-friendly transportation systems such as tramway;
- Integrating energy efficiency principles into the training programs of professional drivers for passenger and goods transport;
- The rational measure of the flow of goods at the local level through the improvement of road and road transport, which improved the quality of the commodity in order to reduce the consumption of petroleum materials (Ministry of Energy, Mines, Water and Environment, 2012).

For sustainable transport in particular and in Morocco in general, we suggest that:

- Complete the renewal of the transport fleet: A vehicle with a manufacturing capacity of more than 10 years is ejecting between 5 and 10 times more polluted gases than a new vehicle (Machouri, 2012: p. 18);
- Enforcement of laws: There are many laws on combating air pollution from polluting emissions, including the Air pollution Control Act 03-13, but the application of these laws remains weak, requiring firmness and punishment of violators. Strengthening of public transport: Through the provision of urban transport by bus;
- Control of air quality in the cities of kalaa Sraghna and Al-Attawiya;
- Reduction of transport stoppage time in intersections and traffic signs;
- Large-cargo buses and trucks are directed to the tropical roads that surround the city: To avoid traffic jams, the latter contribute to a decline in economic competitiveness, and “in a study on the impact of traffic jams in European

countries, I concluded that this phenomenon costs 0.5% of the European Community's crude internal output (Dimon, 2012, p. 15)."

- Ensuring the integrity of the technical inspection of vehicles (Haj Ali et al., 2017: p. 182).
- Integrating the concept of smart driving into the composition of drivers: In recent years, the concept of smart driving has emerged through several measures:
 - Avoid driving at high speed: The higher the vehicle speed, the higher the volume of fuel consumed and thus the polluted emissions.
 - Properly inflate the wheels of the vehicle: Reducing the pressure of the caldera threatens the safety of the individual and wastes 2% of the fuel.
 - Closing the vehicle's windows while driving: This operation reduces air resistance which helps improve fuel economy.
 - Avoid keeping the engine running while standing.
 - Economy with air conditioners: Using a/c raises 5% of CO₂ emissions and increases fuel consumption.
- Common use of a personal vehicle in moving toward work. Smart driving measures can be adopted from an economy of 5% to 10% of total fuel consumed, thereby ensuring a sustainable transportation that meets social desire, ensures economic build-up and preserves the environment (Frikaz, 2015).

5. Conclusion

This article treats the problem of transport-related risks in the province of kalaa Sraghna, where the bibliographical study was used to understand the subject well and five field forms were relied on, with 3777 samples from the province of kalaa Sraghna, as well as geographic information systems and statistical programs, and we started from four basic hypotheses. After addressing the problem at hand, it is possible to verify these hypotheses.

- ✓ The first hypothesis was "the high economic and social cost of traffic accidents in the province of kalaa Sraghna", a true hypothesis, in which traffic accidents lead to the death of more than 100 people, the injury of hundreds, the serious economic losses, the compensation of those affected, the loss of transportation and the high cost of repairing them. Road accidents also threaten family connectedness and affect physical and psychological health, as the victim has permanent disabilities and disabilities that accompany his or her life.
- ✓ The second hypothesis was "the transport system in the province of kalaa Sraghna suffers from the impact of floods, which affect the road network and static movements during the period of the excretions", which is a valid proposition, as the frequency of the flood vaccines leads to the interruption of roads and the prevention of static movement. It also creates losses in the road network and leads to the dissolution of village roads during the period of the landing.
- ✓ The third hypothesis is that "air pollution affects human health", which is al-

so true, because it causes respiratory diseases in relation to air pollution, diseases in the hearing system in relation to noise pollution, and transportation is the second cause of pollution in major cities.

- ✓ While the fourth and final hypothesis was that “multiple strategies would reduce transport risks, but require dust vigilance by actors in the kalaa Sraghna province,” a true hypothesis, the strategies are numerous, but require concerted efforts by actors to unify their vision in order to mitigate the risks of the transport system in the province of Kalaa Sraghna.

The principle of integrating risks into public policies is essential. As a result of global climate change and its impact on third-world countries, Morocco is called upon to adopt the principle of risk management in national strategies, especially at the planning level, and the problem of traffic accidents that drain human energies must be reduced. The latter is the fundamental pillar and backbone of any development.

The problem of the risks associated with the transportation system is among the most important and difficult problems, and we have tried through this study to diagnose and highlight the risks of transportation system in the Kalaa Sraghna province. In addition to studying the strategies of the actors in risk management, as well as to remedy the mechanical condition of the transport fleet, all problems that deserve to be addressed, studied and in-depth, with the aim of reducing the risk of road accidents.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- Affevy, A. K., & Fouad, H. N. (2006). Planning Roads, Transport and Traffic in the City. *Journal of Urban Environment, Sustainable Cities Transfer File*, 45-55.
- Ait Hssain, A. (2014). *Natural Hazards. Chapter 6 Lectures on the Geography of Natural Hazards*. Ibn Zoher University, Faculty of Arts and Humanities.
- Azza, A. (2002). Methods to Cope with Natural Disasters. *Police Research Center Journal*, 98-16.
- Boufthamiya, F., Abed, S., & Bouqna, S. (2018). Environmental Awareness and Its Impact on the Quality of Sustainable Urban Transport Services Field Study in Batna. *International Journal of Environment and Water*, 7, 36-54.
- Dimon, C. (2012). *Contributions to the Modelling and Control of Road Traffic Networks*. Ph.D. Thesis, Lille Central School.
- El Mitir, A. N. (2008). *Traffic Accidents in the Arab World: Their Size and Cost Estimate. Toward a Strategy for Planning the Development of the Arab World in Its Local, National and Global Dimensions, Part 2*. Publications of the National Assembly of Moroccan Gans.
- Farraj Al-Sharif, A. (2011). *Traffic Accidents in Ben Ghazi City, Its Causes and Ways of Treating and Preventing It*. Department of Sociology, Faculty of Arts, Ben Ghazi University.
- Frikaz, M. (2015). Are You an Environment-Friendly Driver? *Journal of Urban Environ-*

ment, Sustainable Cities Transfer File, 27-41.

- Habib Rasoul, A. (1986). *Studies in the Geography of Transport*. Dar Al-Nahda Al-Arabi.
- Haj Ali, O., & Hazoui, M. (2006) *Urban Rehabilitation and Its Implications for Dust Development*. Ibn Zohr University, Faculty of Arts and Humanities.
- Haj Ali, O., Hazoui, M., & Ennami, Z. (2017). *Air Pollution Resulting from Transport and Its Contribution to Climate Change in the Marrakech-Safi Region* (pp. 165-186). University Fes-Saiss.
- Hemya, G. (2008). *Environmental Problems of Population Growth in Algeria. 4th Arab Geographical Forum, toward a Strategy for Planning Community Development in the Arab World with Its Local, National and International Dimensions, Coordinated by Al-Assad Mohamed, Part 1*. Publications of the National Assembly of Moroccan Algerians.
- Ibrahim, M. I. (2003). *Land Transport in Sohag Governorate Geographic Study*. Ph.D. Thesis in Geography, University of Southern Valley, Sohag College.
- Jami, J., & Kammas, S. (2013). The Practice of Sustainable Development by Moroccan Road Hauliers (Case of the City of Tangier, Morocco) State of the Art, Environmental Impacts and Recommendations. *European Scientific Journal Edition, 9*, 102-118.
- Janati Idrissi, A. (2013). *Roads and Road Maintenance in Morocco*. Bouregreg Printing Editions.
- Machouri, N. (2012) *The Transport Sector and Sustainable Development in Morocco*. Riad.
- Malouk, M. S. (2015). *Contemporary Transport Geography and Computer Applications*. Yazode Scientific Publishing and Distribution House, Rashad Press.
- Merenne, E. (2013). *Geography of Transport: Constraints and Challenges*. Rennes University Press.
- Michaux, M. (2008). *The Keywords of Geography*. Éditions Eyrolles.
- Ministry of Energy, Metals and Water (2016). *Air Pollution (Ministry Site)*.
- Ministry of Energy, Mines, Water and Environment (2012). *Morocco's Environmental Crisis, Sustainable Development in Morocco, Achievements and Prospects from Rio to Rio+20*.
- Mubarak, T. A. (2009). *Ways and Means to Prevent Traffic Accidents. Scientific Symposium Arab and International Experiences in Traffic Regulation*. Center for Studies and Research, Seminar and Scientific Meetings Department.
- Saber, M. (2000). *Man and the Pollution of the Environment*. King Abdul Aziz City for Science and Technology.
- Sema, E. (2015). *Climate Change. Zeinab Menem Translation* (1st ed.). Omnia Edition.
- Tensift Hydraulic Basin Agency (2003). *Flood Problem in the Atlas Region of Al Haouz Province*.
- Thorez, P., & Emangard, P. H. (2009). *Les échelles et leur articulation. Transport et territoires, enjeux et débats, sous la direction de Madeleine Brocard*. Éditions Ellipses.
- United Nations Agencies, General Assembly (2013). *Global Road Safety Crisis, Fifty-Eighth Session, Agenda Item 162*.