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**The Cause and Socio-Economic impacts of Road Traffic Accident in  
South-West Ethiopia the case of Jimma Zone**

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**Jimma Ethiopia**



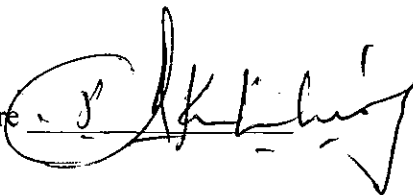
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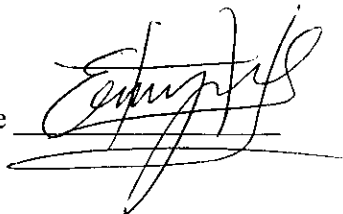
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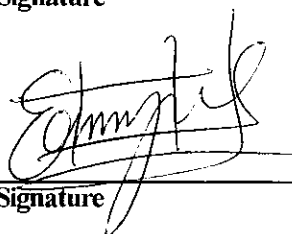
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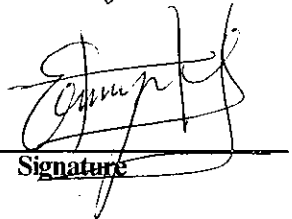
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## ABSTRACT

Jimma Zone has comprehensive road network linking the different parts of the country which is prone to accident; damaging the life and property of the victims.. It highlights that RTAs are a social problem and an equity development issue. The perceived risk of fatal RTAs in Ethiopia exceeds all other risks in the country (Andrews, 2011). The productive age group is mostly affected with more males dying than females. Number of fatalities, injuries, property damage and total economic lose are increasing exponentially. The purpose of the study was to identify the causes of road traffic accidents and assess the impact on socio-economic aspects of the zone, and arrive at hot and effective counter measures that can bring about a behavioral change and upgrading road safety of the area. This study seeks to improve understanding of road traffic accidents (RTAs) on measuring the social and economic cost and their impact as an agenda for governance and development

As for the nature of the title descriptive research design was employed to get both quantitative and qualitative data. It includes collecting data from traffic polices and different stake holders. Questionnaires distributed to drivers and an in-depth interview has done on traffic police, victims and drivers. Later, it was strengthened through field observations, while selection of victim were done using purposive sampling. In the selection procedure, pedestrians, drivers' characteristics age, sex and occupation difference of all interviewees were well thought-out on an active search for informal and formal information about RTAs will be done.

Accurate RTA data collection and recording is needed for designing strategies and understanding RTAs risks. This research should be done to establish knowledge gaps on RTAs.

Keywords: Jimma zone, road, traffic, accident. Combinations of these words were also used.

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## **CHAPTER ONE**

### **1. INTRODUCTION**

#### **1.1 Background of the Study**

Transportation by its nature provides enhanced opportunities but it also imposes a risk to travelers, drivers and pedestrians. In this regard, Mekete (2000) indicated that despite the important positive role urban transport plays in economic, social and political activities of cities and towns, it also generates major social and economic problems through traffic accident. Historically and even now, motor vehicle accidents have been viewed as random events that happen to offer an inevitable outcome of road transport. Road traffic accident is defined as any vehicle accident occurring on a public high way. It includes collisions between vehicles, vehicles and animals, vehicles and pedestrians, or vehicles and fixed obstacles (Rune, 2004).

At all levels, whether at national or international level, road traffic accidents continue to be a growing problem. In connection with this, a World Health Organization (WHO)/ World Bank (WB) report, (2004) stated that, every day around the world, more than 3000 people die from road traffic injury. Low income and middle-income countries account for about 85% of the deaths and for 90% of the annual disability because of road traffic injury (WHO/WB, 2004).

Projections show that between 2000 and 2020, road traffic deaths will decline by about 30% in high- income countries but increase substantially in low-income and middle income countries unless appropriate actions are taken, by 2020, road traffic injuries are predicted to be the third leading contributors to the global burden of diseases and injuries after ischemic heart disease and unipolar major depression.

The Economic cost of road crashes and injuries is estimated to be 1% of the gross national product (GNP) in low-income countries, 1.5% in middle income countries and 2% in high-income countries. The global cost of road traffic accidents (here in after RTA) estimated to be US\$ 528 billion per year for low income & middle-income countries, which accounts for US\$ 65 billion more than they receive in development assistance (WHO, 2001).

Road traffic injuries place a heavy burden not only on global and national economies but also on household economies. Many families are driven deeply in to poverty by the loss of bread winners and the added burden of caring for disabled members because of road traffic injuries. Due to the immensity of the problem, several families have been exposed to pain, grief, loss and sense of waste for victims and family.

The above stated empirical evidences related to traffic accidents also hold true for our country, where more than 1,800 people died and 7,000 or more were crippled or injured in 2003 alone. The death rate would hence be 136 per 10,000 vehicles.

This paper intends to investigate the problem of road traffic accidents in Jimma zone and its impact on the socio-economic aspect of the inhabitants. The depth of the problem in the community, like other parts of the country it is a problem which is not given much emphasis by the public and non government organizations and thus each zones and towns comprises the largest share of road traffic accident of the country. Based on this fact, Jimma zone has been selected for this study with respect to the problem of road traffic accidents.

## **1.2 Statement of the Problem**

Transportation is vital for the economic development of a nation. It fills the gap between the production and consumers and widens the market by facilitating the movement of people, commodities and information from place to place. Many researchers have proved that it plays a major role in the life of an individual and has brought far apart regions more closely to each other. Despite the important role of this sector, it was generating social, economical and environmental problems.

Different factors coupled with un-balanced and inappropriate constructed road networks result in traffic accident. Similarly, Jimma zone is also encountering traffic related problems leading to higher and ever increasing traffic accident and treats road safety.

According to a data showing traffic accident of the past five years, in Jimma zone, around an average of 185 accidents occurred per year resulting death, severe injury and property damage. Though, the data does not show the number of deaths and injuries encountered, it is reported that the property loss is worth more than 5.6 million birr is lost every year in Jimma zone (Jimma Zone Transport Agency, 2014 unpublished).

Though human error, road environment and vehicle factors are reported by the traffic police in general as causes of road traffic accidents (Ibid), the main and frequently occurred and specific causes of traffic accidents and their impacts on the socio-economic aspects like cost and severity of the accident in this zone is not yet identified and assessed.

Therefore, it had become increasingly important to assess and monitor the status of traffic incidents in the Jimma zone, so that coherent protection as well as prevention measures can be devised and implemented in the context of traffic accident management. In order to realize this, information regarding the causes of traffic accidents, major traffic accident areas, and trends of the incidence on the socio economic aspects of the zone are essential for rational planning and adequate management of road traffic accident.

### **1.3 Objective of the Study**

#### **1.3.1 General Objective**

The aim of the study is to identify and investigate the main causes of road traffic accident and to assess its impact on the socio-economic aspect and forward possible remedies.

#### **1.3.2 Specific objectives**

The specific objectives of the study are:-

- a. To show the trend and characteristics of road traffic accident.
- b. To assess the cost of traffic accidents on socio-economic aspects.
- c. To investigate the main causes of road traffic accident.
- d. To create a black spot map of road traffic accidents in the zone.
- e. Suggest counter measures to reduce the problem.

#### **1.3.3 Research Questions**

Based on the above objectives the paper tried to answer the following questions

- Main research question

What are the impacts of RTA on the socio-economic aspects?

- Secondary research questions

- a. What are the trends and characteristics of RTA?
- b. How can we assess the cost of RTA and its impact on the issue of development?
- c. Where are the black spot sites of RTA in Jimma zone?

- d. Which counter measure will be effective to reduce the problem?

#### **1.4 Scope of the Study**

The study were confined to the Oromia administrative region of south west Ethiopia, in Jimma zone. In the study area, there are different factors of accident. Among these are: the human factor (driver, passenger and pedestrian), mechanical factor (vehicle) and environmental factor (climate, road condition etc). The human factor particularly drivers were given full emphasis in the study. But none-motorized vehicles were not given much emphasis, as they were of limited size in the zone.

#### **1.5 Significance of the Study**

As it is stated earlier, road traffic accidents have been increasing from time to time however; no attention is given to identify the root cause of the problem, its solutions, the cost related to lost life, injuries and its social consequences in Jimma zone. So, the findings of this study will help to:

- Practitioners (traffic police) to be aware of the problems, because as a practitioner, they can contribute on their own part in reducing road traffic accidents.
- The study is believed to enrich the existing literature in road traffic accidents.
- To inform the accident related costs and its impact on development.
- To show the existing situation so that readers save their life by taking care of themselves from the severity of the accidents.
- To create or design effective prevention and protection policy, strategy to policymakers, transport authorities, road engineers, and other concerned bodies, to take counter measures and monitor road safety problems. Thus, the researcher believe that this research paper will give a clue to those who are interested in conducting research on traffic accidents.

#### **1.6. Limitations of the Study**

The availability of reliable and up to date information is decisive to accomplish a good research. However, the format used by the traffic police was not fully appropriate to provide accident data as required and characterized in to sex, age, occupation, education level, zone, woreda, kebele etc. Apart to this traffic police data like cities of other developing countries seriously suffers from an underreporting problem and most data remain with a larger share of the “unknown” or

“Other” categories. Lastly but not the least, because of time, capital, information and competence constraint, that were not allow the writer to go more than expected.

### **1.7 Organization of the Thesis Proposal**

The research proposal is organized under three chapters with different sub sections.

The first chapter deals with the introduction part, which includes statement of the problem, Objectives of the study, Research questions, Scope of the study, Significance of the study, limitations, the profile of the study area (Jimma zone) and organization of the study.

Chapter two highlights the review of the literature. The third chapter deals with the research methodology, the fourth chapter with presentation, discussions and analysis and the fifth chapter discussed conclusions and recommendations.

## **CHAPTER TWO**

### **2. REVIEW OF THE LITERATURE**

#### **2.1. Theoretical Framework**

Traffic, traffic congestion and road safety are terms used repeatedly in the assessments of road safety problems. According to (Vanderbilt, 2003) the term traffic, from the point of view of road transport is defined as the flow of vehicles, and animals along a route. The term traffic congestion is also defined as an overgrowing of pedestrians, vehicles and animals along a route. On the other hand 'Road Safety' is defined as the 'safe' movement of pedestrians and vehicles (driver and passengers) along a street over a given area. When the flow of pedestrians and vehicles is not smooth and it is interrupted by accident causalities, most probably triggered by traffic congestion or other factor, then the safe movement will be replaced by traffic accident. Therefore, traffic accident and road safety are said to have an inverse relationship between each other.

Road Safety problems or road traffic accidents have passed through different stages of historical evolution. A comprehensive study of road safety (Treat et al, 1999] found that human error was the sole cause in 57% of all accidents and was a contributing factor in over 90%. In contrast only 2.4% were caused by mechanical fault and only 4.7% were caused by environmental factors. Other studies have also reported similar results. Worldwide around 400,000 people die due to road accident with each death there are also 10 heavy injuries and 30 light injury cases every year (Tesfaye, 1993).

Studies show that motor vehicle crashes have exceeding disadvantages among societies but people did not recognized it for many years and road safety professionals could not bring well distinguished changes either.

Nowadays, the traditional view in road safety is changing and everybody is thriving to control through appropriate interventions. To properly manage, assign a reasonable fund, asses the problem, plan, implement, and monitor; it would be theoretically relevant to observe important road safety models designed by different writers.

##### **2.1.1. The Concept of Haddon Matrix**

One of the first writers, (William Haddon, 1968) had inspired safety professionals when he talked about road transport as an ill-designed, "man-machine" system needing comprehensive systemic treatment and he defined three phases of the time sequence of a crash event (precrash,



crash and post-crash) as well as the epidemiological harmony of human, machine and environment that can interact during each phase of a crash, see Table 2.1

**Table. 2.1.1 The Haddon Matrix**

The Haddon Matrix		Factors		
Phase		Human	Vehicles and equipment	Environment
Pre-crash	Crash prevention	-Information attitudes -Impairment police enforcement	-Road worthiness - Lighting - Braking - Handling -Speed management	-Road design & road layout -Speed limits -Pedestrian Facilities
Crash	Injury prevention during the crash	-Use of restraints	-Occupant restraints & other safety devices -Crash-protective design	Crash-protective roadside objects
Post-crash	Life sustaining	-First aid skill -Access to medics	-Ease of access -Fire risk	-Rescue facilities -Congestion

**Source: World report on road traffic injury prevention: summary, 2004 Geneva**

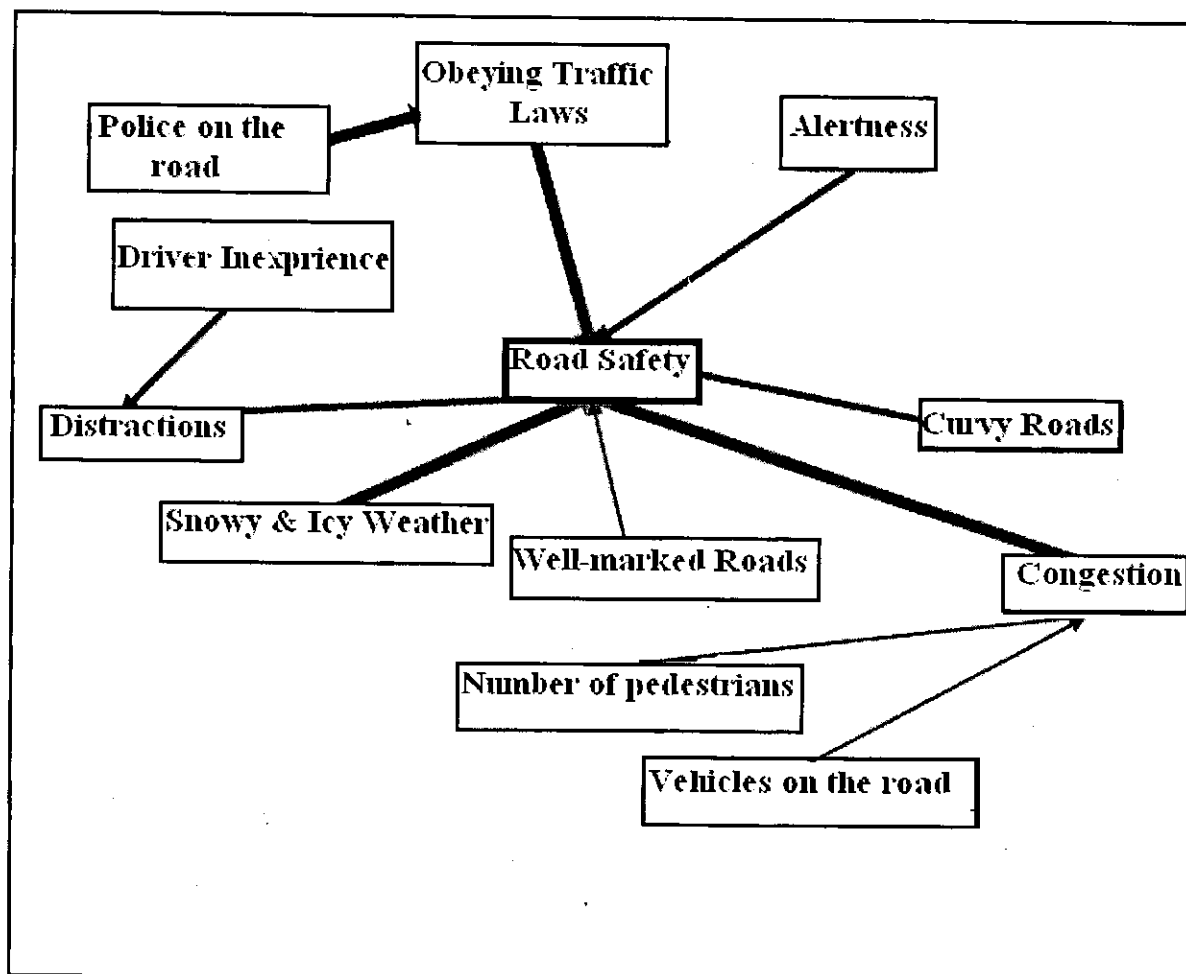
This work led to substantial advances in the understanding of the behavioral, road-related and vehicle-related factors that affect the number and severity of casualties in road traffic. Building on Haddon's insights, the "systems" approach seeks to identify and rectify the major sources of error or design weakness that contribute to fatal and severe injury crashes, as well as to mitigate the severity and consequences of injury by:

- reducing exposure to risk;
- preventing road traffic crashes from occurring;
- reducing the severity of injury in the event of a crash;
- reducing the consequences of injury through improved post-collision care.

### **2.1.2. Contributory Factors and Their Relationship**

To get more understanding of the problem, it is essential to refer the recent reports from road safety education in Israel that have tried to show the relationship between road safety factors (human, mechanical and environmental) many others that fall on them using a model chart;

**Fig. 2.1.2 Factors That Cause Roads to Be Unsafe**



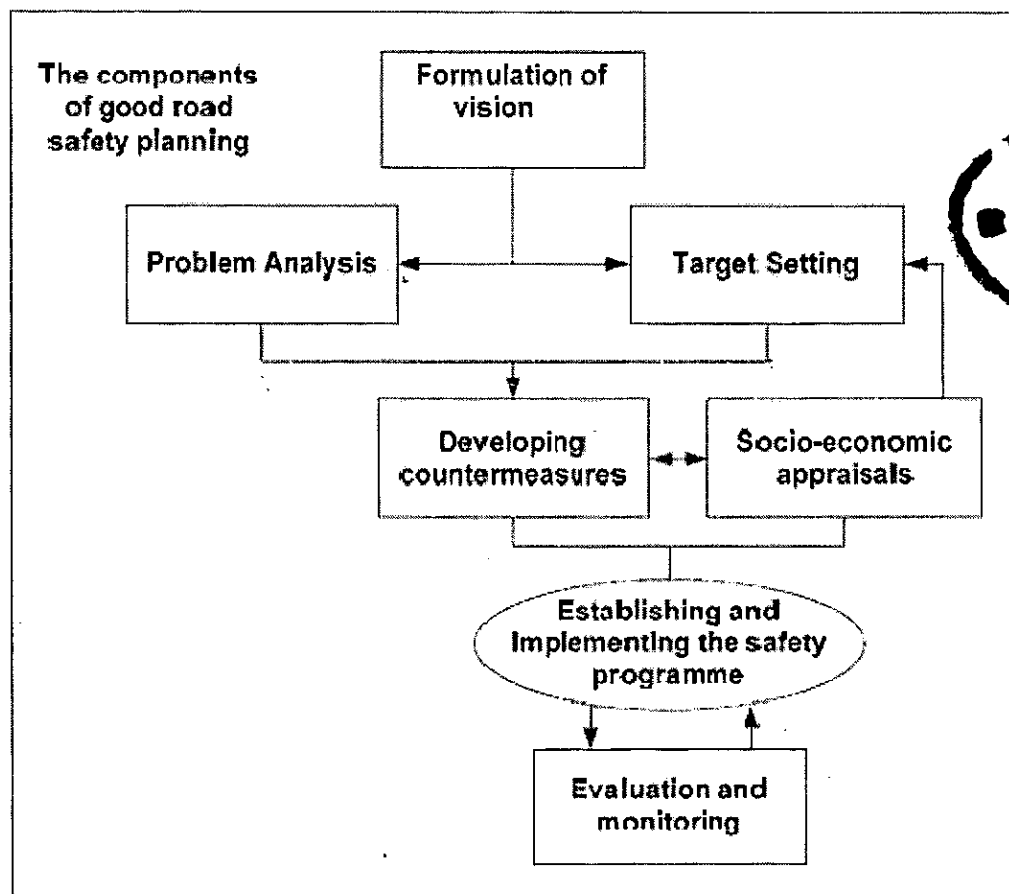
**Source: Intl Education: Seeing Reason Tool: Road Safety, 2006.**

The thickness of arrows on the chart expresses the relationship between the factors. Bold arrow indicates high influence of one factor over the other. This model has helped many planners and practitioners before taking intervention decisions.

### **2.1.3. System-Wide Approach**

In order to achieve better performance in road safety it is necessary to establish more effective road safety management. New road safety management structure has been distinguished by international organizations such as the World Health, (OECD 1994); the World Bank, (Bliss, T. 2004); (OECD, 2002) and (ECMT 2004), see Figure 2.3. It would suffice to use it as a tool while planning and managing the road safety sector.

Figure 2.1.3 Road Safety Management



Source: OECD, 2002.

Evidences from different countries shows that this integrated approach to road safety have helped to plan for a better achievement.

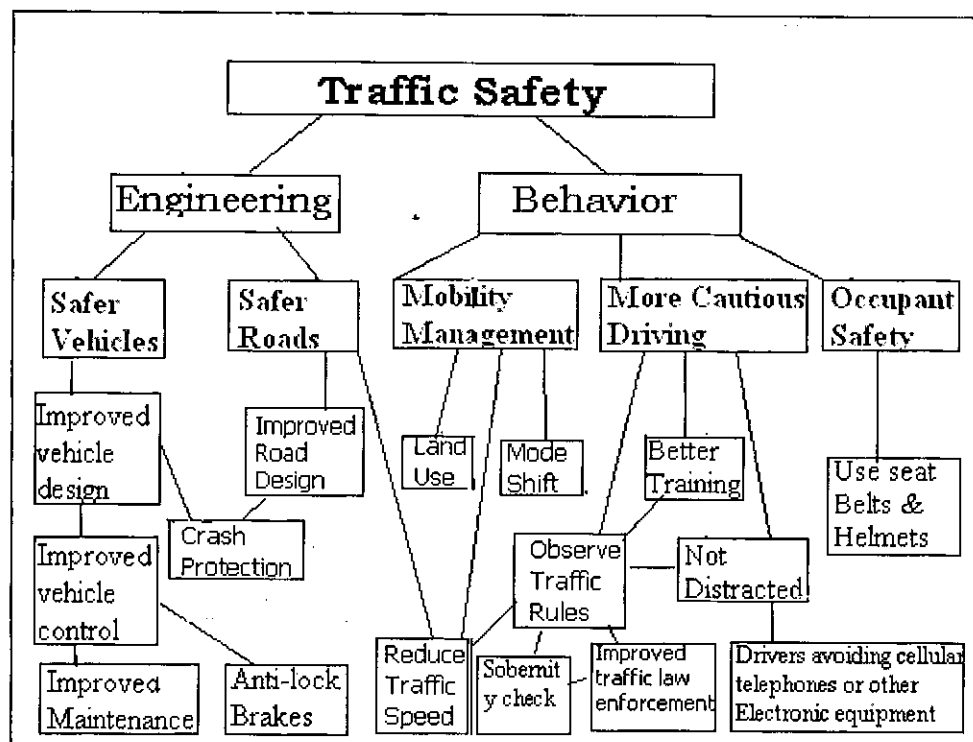
#### 2.1.4. The Road Safety Paradigm Shift

On the other hand, it is very important to know different strategies and their relationship before planning road safety activities. Strategies and their relationships was defined by (Wilson and Lipinski, 2004), see Figure2.4. Wilson and Lipinski describe many of the safety strategies (included on the chart) for improving traffic safety.

The two major categories are *engineering*, which involves safer vehicles and roadways, and *Behavior Changes*, which include mobility management (changes in travel mode, route,

destination, frequency and speed), more cautious driving, and actions by vehicle occupants such as using seat belts, child restraints and helmets, (restraint wearing).

**Figure 2.1.4 Wilson and Lipinski Traffic Safety Strategies**



Source: Eugene M. Wilson and Martin E. Lipinski, 2004.

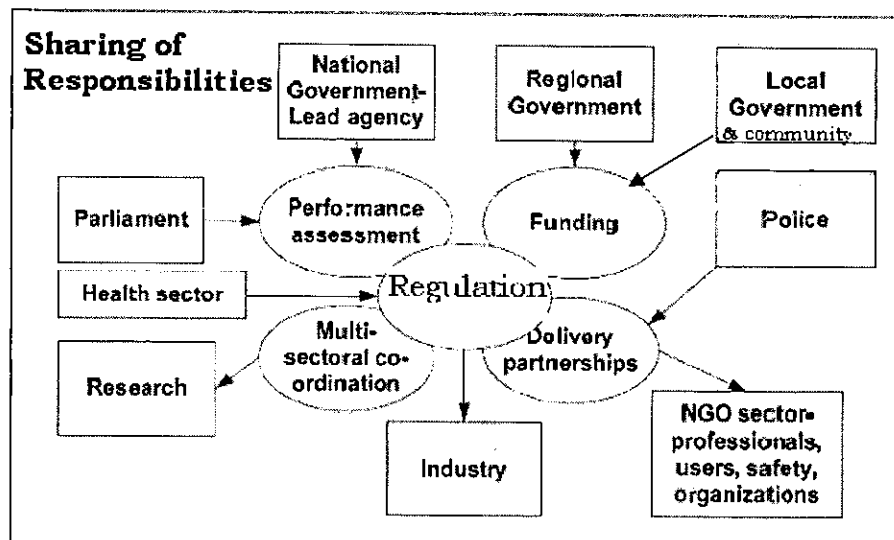
Such model also illustrates ways to take actions which require significant improvements in the relevant sectors viz. better enforcement, better roads and improved public education programs, emergency services, research and evaluation. Other strategies watching the environment: reduce traffic speeds, reduce traffic congestion (tend to reduce the frequency of crashes but can increase the severity of those crashes that do occur), shift travel to none motorized modes, etc.

### **2.1.5. Sharing Responsibility for Implementation**

Road safety is an advance governance issue and a multi-disciplinary, multi-sectoral subject which cannot be delivered by a single agency. In practice, road safety is a shared responsibility national, regional, and local level. It requires government agencies, NGOS and the civil community to foster effective goals. Government leadership and action is decisive to provide adequate funding, set targets, introduce intervention programmers, delivery to partnerships with all key stakeholders and ensure effective implementation and monitoring arrangements. To show

the intervention relationship between different agencies, a structure was devised by the European Road Safety Observatory in the year 2006, see Figure 2.1.5.

**Figure 2.1.5 Responsible Road Safety Stake Holders**



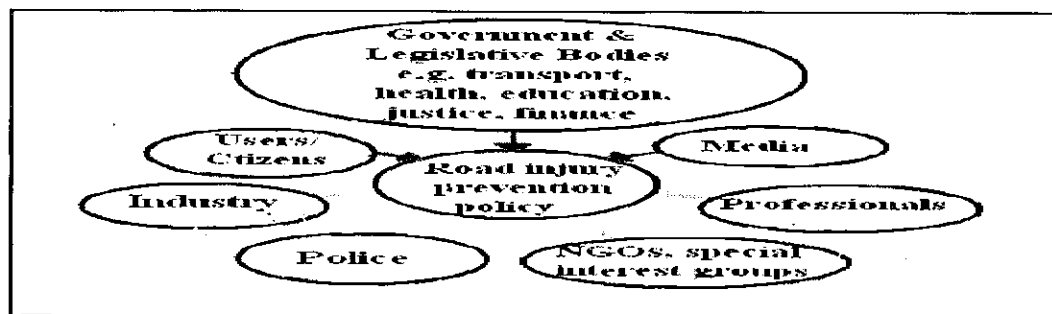
Source: Adopted from European Road Safety Observatory, 2006.

As the chart illustrates, shared responsibility involves the commitment of a wide range of actors who combine to deliver and receive appropriate resource and set up effective partnerships within the framework of the national system wide road safety plan.

### 2.1.6. Policy Development

Road safety laws and regulation are essential to reduce accidents since they govern road users, by limiting their rights and responsibilities. Traffic regulations in turn are guided by the state policy. The development of road safety policy involves a wide range of participants representing a diverse group of interests (see Figure 2.1.6).

**Figure 2.6 Key Organizations Influencing Policy Development**



Source: European Road Safety Observatory, 2006

The above figure illustrates the construction of multi-sectoral institutional capacity, both in the governmental and nongovernmental spheres, is a key to developing road safety, and can only be delivered by a national, political commitment. As (Wesemann, 2000) also observed, there is sufficient evidence to show that free-market mechanisms are no substitute for government intervention when it comes to providing greater safety.

## **2.2 Global View of Road Traffic Accidents**

Road accident is a global tragedy with ever rising trend. The latest report by the World Bank Group on Road safety disclosed that, every year more than 1.17 million people die in road crashes around the world. About seventy percent (70%) of deaths occur in developing countries. Sixty five percent (65%) of deaths involve pedestrians and 35 percent of pedestrian deaths are children.

Over 10 million are crippled or injured each year. In countries such as the USA and Western Europe the figures for deaths from road accidents are falling year by year. Whereas in the developing world it was higher and increase rapidly. The number of road accident deaths in some developing countries is as high as 100 per 10,000 overtaking those caused by common diseases (Jacobs, 1999). The matter is shocking if someone read the report of the World Bank group, (2000:93): 'Although only ten percent of the World's vehicles are registered in the developing world, they account for 70 percent of all deaths in road accidents'.

It is feared that as the number of vehicles in developing countries rises, the situation may become even more serious unless more effective safety measures are considered. The inadequacies of the control mechanisms especially in the developing countries have left road traffic accidents to become a greater challenge (Jacobs, 1999). It was also found that, 750,000-880,000 people died prematurely in road traffic accident in the world. About 10 percent of global deaths occur in the Sub-Saharan Africa which is slightly less than those for the entire developed world or for all of Latin America, Central America and the Caribbean.

As the number of motor vehicles increase, the exposure of population to traffic accidents also increases. This idea is developed by Garber and Hole (1999) and they indicated that in between 1990 to 1996, with over 500 million cars and trucks in use, more than 500,000 people die each year in motor vehicle accidents and about 15 million are injured.

In social health aspects, road accidents will change its rank in the order of disease burden in a short period of time. While it was number nine in 1998, it is expected to be ranked number 3 in the year 2020.

**Table 2.2: Disease Burden of the World (Daly's Lost) for 10 leading Causes, in 1998 and 2020**

Disease or Injury			
Rank	1998	Rank	2020
1	Lower respiratory infection	1	Ischemic heart disease
2	HIV/AIDS	2	Univocal major depression
3	Prenatal condition	3	<b>Road Traffic accident</b>
4	Diarrhea diseases	4	Cerebra vascular disease
5	Univocal Major depression	5	Chronic obstructive pulmonary
6	Ischemic heart disease infecti	6	Lower respiratory
7	Cerebra vascular disease	7	Tuberculosis
8	Malaria	8	War
9	<b>Road Traffic accident</b>	9	Diarrhea disease
10	Chronic obstructive pulmonary disease	10	HIV/AIDS

Source: A 5 –Year WHO Strategy for Road Traffic Injury Prevention (2001)

### 2.3 The socio economic cost of traffic accident

The total economic costs are also highest when we measure the productivity lost and expenses incurred because of road traffic accidents. (TRL's 2000) crude estimates suggested that the annual cost of road accidents in 1999/2000 was about 1% of the GNP in developing countries, 1.5% in transitional countries, and 2% in highly motorized countries.

#### 2.3.1. Impact of Road Traffic Injuries

The effect of road traffic injuries can be both direct and indirect on individual, families, employers and society at large. It is undoubtedly true that even when only one person is involved in a road crash, the entire household will be affected financially, socially and emotionally. In a recent hospital base study of traumatic brain injuries, it was observed that nearly 30% of patients were leading poor quality of life. Several health problems depending on age, sex, and nature of injuries, availability and accessibility of care influence disability and recovery from injuries. In

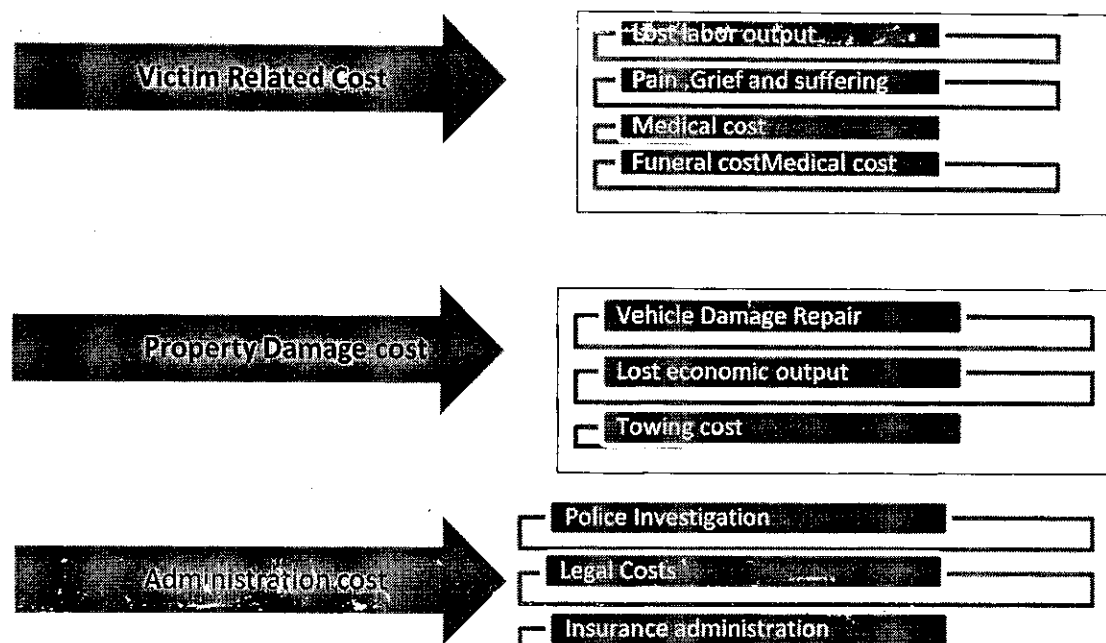
the present survey, nearly 1/3<sup>rd</sup> of the surveying injury members were suffering from post-traumatic problems of depression anxiety, fear suicidal tendencies alcohol problems following injury, which were directly attributed to injury itself apart post injury disabilities. Large number of the children had become orphans or had lost one of their parents, depriving them of psychosocial stability and socioeconomic support due road traffic injuries. The direct economic costs incurred by family are for medical expenses in a major way. Legal expenses along with cost of damaged vehicles and subsequent repairs can be huge and phenomenal. Medical costs include pre hospital, hospital and post hospital expenditure for survivors. In situations where health care is subsidized as in any developing countries. There are difficult to measure due to methodological problems. The out of pocket expenses' very a period of time and are determined by exact and nature of injuries along with availability and accessibility to care. The resulting effect of crash not only includes direct out of pocket expense to the sudden emergency, damage to goods and property and long term rehabilitations costs.

### **2.3.2. Accident Cost Components (The human capital approach)**

To simplify the process of identifying the sources costs, the Human Capital Approach, otherwise known as the Gross Output Method, classifies accident cost into three main components; Victim related costs, Property damage cost and administrative cost. The victim related costs are directly associated with the resources lost of the casualties. To be human and considerate of the social impacts of accidents, a notional sum is also added to quantify the sufferings of the victim's families. Property damage consists of vehicle repair, lost of economic productivity of public utility vehicles and cost of towing services. The first two components make the largest portion of property damage and are given due attention in this paper. The third and last component of accident cost will be the administrative cost which consists of costs associated with police investigation, legal activities and insurance administration. (See figure)



**Figure 2.3.2 Classification of Accident Cost Components**



Source: Journal Eastern Asia Society for Transportation Studies, Vol. 6, pp. 3183 - 3198, 2005 3185

### 2.3.3. Method of Estimation

Accident data used in this study is based on the (2010/11-2014) Jimma zone transport agency and jimma zone traffic police office by using Accident Recording and Analysis System (ARAS) database. Its limitation however is dictated by the diligence of police officers investigating the crash and the limited variables in the report. It is noteworthy that an important fact such as driver/casualty age was disregarded in the new form. Others include the reduced classification of crashes into fatal and non-fatal from the previous four accident severity classifications of fatal, severe injury, slight injury, and property damage only. The change on the form however can be attributed to prioritization on the identification of accident “black spots” around the Jimma zone and to evaluate traffic improvement programs implemented by the agency.

### 2.3.4 Assumptions

For ease of analysis, it is assumed that all casualties are employed and are productive members of the society. It is assumed that income is constant over their productive years and that females have the same economic opportunity as males. It is assumed that minors start work at eighteen (18) years old and all casualties as employees retire at sixty-five (65) years old. It is assumed that the permanently disabled accident victims receive the best and proper medical treatment and

home care until the rest of their lives and that all fatalities are given funeral services and buried. For property damages particularly damaged vehicles, it is assumed that they are repaired as closely as possible to their condition before the accident if not according to manufacturer's specifications. For administration costs on the other hand, it is assumed that a police responded to the incident. Although there are some incidents of under reporting, for purposes of the study, the author will give a cost allowance for the administration of accidents.

**Table 2.3.4 Estimation Method of Cost Components**

<b>Cost Component</b>	<b>Estimation</b>
<b>Lost labor output</b>	Calculated as the average daily wage rate of each person involved in the crash, multiplied by the number of days off work, then added up for all the people involved in the crash. For fatalities and permanent disabilities the calculation is performed over the rest of their expected productive working life and discounted to an equivalent present value
<b>Pain, grief and suffering</b>	Calculated as a percentage of lost output cost
<b>Vehicle damage</b>	Calculated as the average cost of vehicle repairs multiplied by the average number of vehicles involved in the crash
<b>Administration cost</b>	Calculated as a percentage of resource costs in line with recommendations (0.2% for fatal accidents, 4% for serious injury accidents, 14% for minor injury accidents and 10% for property damage-only accidents)

Source: Journal Eastern Asia Society for Transportation Studies, Vol. 6, MMDA and DPWH

Internationally accepted statistics were also used to compensate for the lacking Jimma zone data for casualty figures.

## **2.4 Road Safety in Africa**

A number of studies of road crash worldwide carried out by TRL in recent years have shown that the road safety situation throughout the African continent is one of the worst in the world. With approximately only 4 per cent of the world's motor vehicles, its road fatality share is 2 ½ times greater (10%). In several African countries, a motor vehicle is over a hundred times more likely to be involved in a fatal road crash than in the UK or USA (Williams, 2003).

From the relationship of these aspects; it can be seen that whilst about 10 percent of global road deaths took place in 1999 in Sub-Saharan Africa, only 4 per cent of global vehicles were registered in the region. Conversely it can be seen that 14 per cent of road deaths occurred in the entire developed world (North America, Western Europe, Australasia and Japan) yet these particular regions contain 60 per cent of all globally registered vehicles.

The motorization levels for the year 1996 ranges from as low as 0.7 for Central African Republic, Somalia, Mozambique to as high as 120 for South Africa. Central African Republic, Ethiopia, Somalia and Mozambique are amongst countries with the lowest reported vehicle levels in Africa. The value of Ethiopia was 1.5 (twice that for those countries with the lowest reported vehicle levels).

#### **2.4.1 Road Fatalities in Africa**

A recent Global Road Safety Project (GRSP) study shows that about 10 percent of global road death in 1990 took place in Sub-Saharan Africa where only 4 percent global vehicles are registered. Conversely, in the entire developed world, with 60 percent of all globally registered vehicles, only 14 percent of road deaths occurred. (Jacobs and Aeron, 2000).

However, given the widely recognized problems of under-reporting of road deaths in Africa (like the rest of the developing world); the true figures are likely to much higher, as the police reported road fatalities represent only the tip of the injury pyramid. According to this GRSP study, the adjusted true estimate of total road deaths for all Sub-Saharan African countries for the year 2000, base on the police department's records, ranges between 68,500 and 82,200. However the estimated fatality figure of 190, 191 for Sub-Saharan Africa presented in the 2004 world report, based on health care data, is much higher, and reflected the magnitude of under-reporting in police statistics (WHO 2002).

Two countries, South Africa and Nigeria, account for most of the reported deaths in Sub-Saharan Africa. The South African figure of over 9,000 has been consistent over time, while Nigeria with 6,185 deaths has declined from a high of over 9,200 in the early 1990s (Jacobs and Aeron 2000). Ethiopian, Kenya, Uganda, Tanzania and Ghana are the other countries that experience high numbers of road deaths.

#### **2.4.2 Fatality Rates**

The fatality rates per 10,000 vehicles calculated for the different countries by region. There are wide variations in fatality rates from 270 in Central African Republic to 8 in Chad. The highest rated, all in excess of 100, are reported in Ethiopia, Malawi, Tanzania, Uganda and Ghana. For most of the countries, the rated lie between 40 and 130. These rates are much higher than those reported in developed countries of Western Europe, North America, Australasia and Japan which are in the range of 1.5 to 4 (world bank, 2004).

It should however be noted that the level of motorization/vehicle ownership is lowest in Sub-Saharan Africa. The values range from as low as 0.7 for Central Africa Republic, Somalia, and Mozambique to as high as 120 per 1,000 populations for South Africa. For the majority of countries, the values range from 20 to 60. In contrast, in Western Europe, most countries have 5000 to 7000 vehicles per 1,000 populations, Eastern Europe 100 to 300, while in Latin American the range is 40 to 200 per 1,000 populations. The low level of motorization can partly explain the apparent high fatality rates in relation to the number of registered vehicles, since the reported denominator figure used in the calculation in most African countries is quite small. According to Jacobs and Thomas (2004) in Western Europe and U.S.A the number of deaths is only between 2 and 4 each year 10,000 licensed vehicles. But, in most developing countries the figure is very large and very surprising.

As we can easily understand from the above premises, road accident fatalities are very serious in developing countries. Moreover, Ethiopia is part of developing countries and rank first in road accident fatality problem accounting about 200 people per 10,000 licensed vehicles in each year. On the contrary, in countries such as the U.S.A and Western Europe the figures for deaths from road accidents are very few in numbers.

Comparisons of international accident fatality rates (Expressed as deaths per 10 thousands vehicles licenses) show that, Africa countries particularly Ethiopia, have the highest rate worldwide. For example, Great Britain has about 3500 road deaths each year with some 25 million motor vehicles licensed; conversely in Ethiopia in 1998 there were 1693 reported deaths but with only 120 thousand licensed vehicles, giving a fatality rate about 100 times greater than Great Britain of about 140.

#### **2.4.3 Road Traffic Accident Situation in Ethiopia**

Ethiopia is one of the highest in road accident death rates recorded in the world, over 1700 people being killed annually (Jacobs and Thomas, 2000). Every day, some 5 people have been killed on Ethiopian roads. This death rate has been maintained, and sometimes exceeded since 1963 when official regulation and figure began (Girma, 2000)

This observation is supported by the National police data (2002/03) which shows that the number of road traffic accidents increased from 6063 in 1993/4 to 12423 in 2001/02, an increase of nearly 104 percent.

**Table 2.6: Trends of Road Accidents in Ethiopia, 1993/4-2001/02**

Casualty Class	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	%increase 93/02
Fatal	1077	1254	1335	1314	1313	1263	1274	1261	1327	23.20
Serious injury	1100	1403	1568	1618	1762	1642	1771	1679	1712	55.63
Slight injury	1180	1263	2044	2044	2444	2173	2120			8.63
Property Damage	2706	3279	5553	5553	7783	6560	6666			15.12
Total	6063	7199	10500	10500	13032	11658	11831			8.17

Source: Federal Traffic police (1998, 2002, 2003)

As shown in the above Table, all accidents have increased over the last ten years, which caused a great loss of human and economic resources in Ethiopia. This problem is worsening from year to year at an alarming rate with the rapid increase of population and the number of vehicles (Girma, 2000).

#### 2.4.4 Trends of Motor Vehicle Growth in Ethiopia

Despite impressive growth (15 percent per year) in recent years, motor vehicle ownership in Ethiopia remains among the lowest in the world, that is, 2 vehicles per 1000 population (TRL, 2000). This suggests a very low base and therefore a huge potential for continuing rapid motorization in the years to come.

Different studies indicated that road accidents in Ethiopia can be taken as the worst example compared that of other countries of the world (Jacob, 1973, 2000; Tadel, 1998; RTA, 1997; Mathewos, 1999; TRL, 1999). All the writers state that Ethiopia has had relatively high accident records in the world within the average fatality rate of 170 per 10000 vehicles for decades.

Ethiopia with a very low vehicle ownership has the highest fatality rates per licensed vehicles. This shows that Ethiopia is on the extreme high side of the international road safety, which indicating the low level of understanding of the man vehicle –road regulation system (Girma, 2000).

The fatality rate per head of population for Ethiopia in figure 2.5, however, is on the extreme low side; the health risk in Ethiopia does not appear as high as in countries with high vehicle ownership (Girma, 2000). This is because some 85 percent of the Ethiopian population is living in rural areas. In fact, most of them are far from the road infrastructure and the majority of the population is hardly exposed to motor traffic.

The distribution of road traffic accidents between the regional states of Ethiopia varies considerably and which is higher in urbanized regions than elsewhere.

**Table 2.7: Regional Road Accidents Distribution of Ethiopia (1997/98-2001/2002)**

No	Region	Year						Total	% share
		1997/98	1998/99	1998/99	1999/00	2000/01	2000/02		
1	Addis Ababa	8,581	7,345	72903	7293	7203	7622	38044	62.37
2	Oromia	2,033	1,785	1951	2,004	1951	2032	9805	16.07
3	Amhara	919	912	1004	1,040	1,004	973	4,840	7.95
4	SNNPR	610	565	502	287	502	646	2610	4.27
5	Tigray	458	436	529	567	529	542	2532	4.15
6	Afar	244	213	149	196	149	173	875	1.60
7	Somali	203	134	209	132	209	179	857	1.41
8	Harari	135	154	103	107	103	100	599	0.98
9	Gambella	51	28	41	84	41	82	286	0.50
10	Dire Dawa	43	58	48	78	48	37	264	0.43
11	Benishongul	25	28	37	43	37	37	170	0.30
<b>Total</b>		<b>13,302</b>	<b>11,658</b>	<b>11,83</b>	<b>1183</b>	<b>11,776</b>	<b>12,423</b>	<b>60,990</b>	<b>100</b>

**Source: Federal Traffic police Office (2002/03)**

As indicated in Table the percentage share of road accidents is concentrated in few of the regions. Five regions, Addis Ababa, Oromia, Amhara, SNNPR and Tigray, account for 95 percent of the total accidents in the country.

## **CHAPTER THREE**

### **3. RESEARCH METHODOLOGY**

The study was conducted in Jimma zone and Jimma Town, south west Ethiopia in April 2006/7. The study was done among a sample of 50 private owned public transport car drivers of bus and minibus who frequently travel in the woredas of Jimma zone. The criteria of selection is based on the data obtained from traffic police office. According to them 85 % of RTA in the study area was caused by private owned commercial vehicles.

#### **3.1 Description of the Study Area**

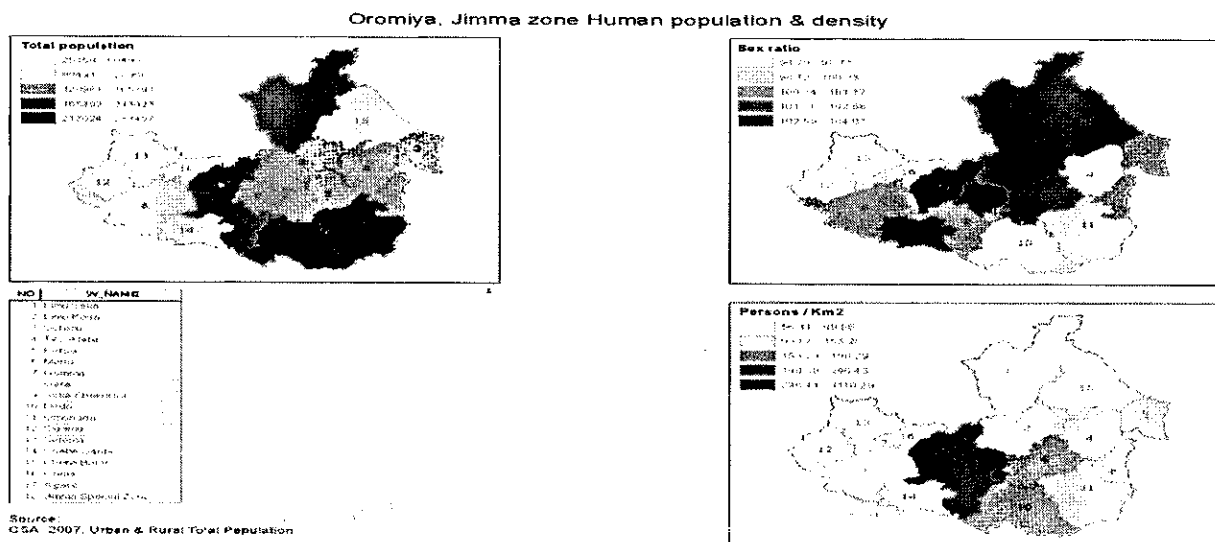
Jimma is one of the zones of the Ethiopian Region of Oromia Jimma town is located 355 km from Addis Ababa, the capital of Ethiopia. Jimma is named for the former Kingdom of Jimma, which was absorbed into the former province of Kaffa in 1932. Jimma zone is bordered on the south by the Southern Nations, Nationalities and Peoples Region, the northwest by Illubabor, on the north by Misraq Welega, and on the northeast by Mirab Shewa; part of the boundary with Misraq Shewa is defined by the Gibe River. The highest point in this zone is Mount Maigudo (2,386 m). Jimma zone have 18 woredas include Sokoru, Omonada, Qarsa, Manna, Gomma, Agarro, Gummay, Sh/sombo, Sekachekorsa, Limmukossa, Limmuseka, Dedo, Gera, Sigo, Sattama, Co/bottor, Nonobenja, Tiroafeta. The town of Jimma was separated from Jimma Zone and is a special zone now.

The Central Statistical Agency (CSA) reported that 26,743 tons of coffee was produced in this zone in the year ending in 2005, based on inspection records from the Ethiopian Coffee and Tea authority. This represents 23.2% of the Region's output and 11.8% of Ethiopia's total output, and makes Jimma one of the three top producers of these goods, along with the Sidama and Gedeo Zones.

Based on the 2007 Census conducted by the CSA, this Zone has a total population of 2,698,021, an increase of 26.76% over the 1994 census, of whom 1,329,494 are men and 1,593,029 women; with an area of 15,568.58 square kilometers, Jimma has a population density of 159.69. While 137,668 or 11.31% are urban inhabitants, a further 858 or 0.03% are pastoralists. A total of 521,506 households were counted in this Zone, which results in an average of 4.77 persons to a household, and 500,374 housing units. The three largest ethnic groups reported in Jimma zone were the Oromo (87.6%), the Amhara (4.05%) and the Yem (3.12%); all other ethnic groups

made up 5.23% of the population. Oromiffa was spoken as a first language by 90.43% and 5.33% spoke Amharic; the remaining 4.24% spoke all other primary languages reported (CSA, 2007).

**Fig 3.1: Physical map of jimma zone**



### 3.2 Research design

In order to respond to the main research question, which is assessing the impacts of RTA on the socio-economic aspects, the study employed a descriptive survey research design because the method relies on primary and secondary sources as a means of collecting data (N. Williams, 2006). It attempts to examine the RTA in order to establish what the norm is and what can be predicted to happen again under the same circumstances. Depending on the type of information sought, questionnaires were distributed to drivers, interview made for victims of RTA and professionals. The observations were written in order that they can be subsequently analyzed. The data so collected are organized and presented in a clear and systematic way, and the analysis can result in valid and accurate conclusions. Therefore, it is useful to show the current situation of road traffic accidents, characteristics and assess the socio-economic impact of road traffic accidents with respect to development issues.

Because of the appropriateness of qualitative and quantitative data from interviewees and questionnaires flexible designs evolved in the study, that is the 'mixed approach' because, the mixed method will be suitable for social research. A problem of qualitative research alone is that it is done chiefly with words than with numbers. Words are fatter than numbers and usually have



multiple meanings. This make them hard to move alone than mixed approach (Miles and Hubermann, 1994). To express widely this study needs a mixed approach.

### **The Sources of Data**

The main sources of data for this study were primary and secondary data.

To identify the magnitude of traffic accident and its effects, primary data were collected from drivers (who continuously travel on the selected woredas), victims of the road traffic accident and professionals with the help of close ended and open ended questionnaires prepared for drivers and structured and standardized interview for victims and professionals. In order to gather data about the road safety problems of the area, policemen and other officials were also consulted.

Secondary data were obtained from Jimma zone and Jimma Town Traffic Police, Jimma zone and Jimma special Road Transport Authority, Jimma district Road Authority, Jimma zone Health Bureau, Jimma hospital, Insurance Companies, Transport Association's officials, and from other responsible authorities in the area. Moreover, different books, proceeding reports, Journals of OAU, UN and the World Bank publications were also consulted. Furthermore, so as to get a general picture of road safety problems, a good closure were made with internet Web sites.

### **3.3 Study Population**

The study population consists of drivers, professionals and victims of the accident. Dixon (1987) suggests that for social research and homogeneous population, at least thirty cases are required. Since they are drivers most likely they are homogeneous population. Because of the homogeneity and Dixons suggestion, the sampling size was 50 respondents from drivers among whom questionnaire is distributed, 10 respondents from victim of the accident and the same amount of professionals (traffic police and different officials) with whom in-depth interviews are conducted.

### **3.4 Sampling design**

The sampling selection was made through a non-probability sampling which is based on selection by non-random means.

The questionnaires were distributed to drivers through accidental (haphazard) or convenience sampling. The researcher provides the broad and focused questionnaire by sharpening a question. So, both open ended and close ended questions are very appropriate (Kathari,C.R.(2001)). It is

more of the outcome of the nature of the respondents than due to money and resources, it is appropriate to use convenience sampling technique to drivers; here there are many drivers travel through the zone but the study focused on the public commercial drivers of buses and minibuses who have the lion share of the accident on the study area and who travels continuously within the selected woredas of the zone.

Purposive sampling was used for victims and professionals (Transport Authority Officials, Transport Associations, Health Bureaus officials), and this is because the researcher selects what he thinks is a 'typical' sample based on specialist knowledge or selection criteria, hence key informants were gather appropriate data from relevant bodies and stakeholders (N. Williams, 2006). Structured interviews are the preferred mode of descriptive research and such an interview schedule is equally applicable to gathering data by face to face or telephonic interview ((Kathari,C.R.(2001)). Therefore, before conducting interviews the researcher select the respondents by purposive sampling.

### **3.5 Methods and Tools of Data Collection**

In this study, there are primary and secondary data. Primary data collecting instruments like surveys, key informant interviews and observation were conducted to perform this study.

**3.5.1 Survey method:** Questionnaires consisting of both open-ended and close-ended items were prepared as a tool of data collection and distributed to drivers. The questionnaires were pilot tested to five drivers who continuously travel to at least one of the woredas (Sekoru). Necessary amendments were made to the questionnaires.

The questionnaire consists of seven sections demographic characteristics, drivers experience, traffic regulation, accident conditions, treatment condition and interventions.

The respondents replied all the questions in a diligent manner through face to face contact and the researcher administered it coherently. Questionnaires were needed to drivers because, it were manageable and allow respondents to give clear and reliable information including confidential, and reliabilities issues if any and also they have no spare time to fill and discuss with the researcher so they took the questioner, fill at home and return in one week time.

**3.5.2 Structured interviews** were conducted for victims of the accidents and professionals (Jimma zone Transport Authority, Traffic police and officials). Because it was stabilized the data gained from other respondents. And it allowed to discuss diversified aspect of cause and impacts

of road traffic accidents. In addition, since the interviewees are few it will be manageable to do so.

Victim's interview was conducted on Jimma university specialized hospital who were admitted because of high injuries (work place who faced light injuries on RTA were conducted on face to face interview).

Professionals and victims also interviewed in their office and informal discussions also conducted to get humble information from different stake holders.

**3.5.3. Observation:** Another instrument that the researcher used in this researcher was observation. Primary data that include geographic coordinates of each black spot areas of road traffic accidents were collected at well known road junctions and corners of the selected Woredas (Sekoru, Jimma Town and Agaro) by using the previous accident repetition. The areas are selected based on the quality of the road (asphalt road) The researcher has also tried to identify and develop the black spot map of the study area.

**3.5.4 Documentary sources:** Moreover documentary sources also play a vital role in this research. Documents are so important not only in business and personal matters but also in research of most kind certainly in social science (Kathari,C.R.(2001)). In addition to collecting primary data the study also used all other necessary documents obtained from the traffic police, hospitals, insurances, ERA Jimma district, regional and federal Bureaus and libraries. This method was very much helpful in collecting data related to road accident patterns with in the past five years time in the study area. It was also supplementary data for the research gathered from available public and official documents such as published books, reports, topographic maps of the zone, proclamations and other similar records. This stabilizes data collected from the primary sources and also provides additional information that is not accessed from them.

### **3.6 Methods of Data analysis**

The researcher believes that doing research is not a tidy process where every step is completed before moving on to the next step. In fact, especially if someone is doing it for the first time, you need to go back and reconsider previous decisions or adjust and elaborate on work as you gain more knowledge and acquire more skills. In order to address the research questions. The study employed both qualitative and quantitative or mixed method approach to come up with reliable findings.

The qualitative research method were appropriate to explore the behavior and attitudes of the drivers, professionals and victims; while the quantitative research methodology was appropriate to generate the road accident statistics from the drivers.

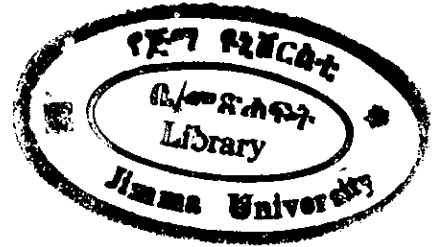
The raw data collected from the field were tallied, structured, organized and framed. The data which were gained from the questionnaires were also categorized, analyzed and interpreted, through percentages, other modes, and of course, using tables followed by graphs, charts to indicate the existing trends and prospects using time-series analysis method, regression analysis and etc... which the researcher thought are capable of prevailing important issues that were relevant to this study and make the research more descriptive and expressed quantitatively. Last but not the least the social cost was analyzed by human capital approach of accident costing and traffic accident maps (black spot maps) will be prepared based on the above analysis.

### **3.7 Ethical consideration**

Ethics are the rules of conduct in research. There are two perspectives from which the researcher can view the ethical issues in research;

- The values of honesty and frankness and personal integrity.
- Ethical responsibilities to the subjects of research, such as consent, confidentiality and courtesy. (N. Williams, 2006)

Names of the key informants from the drivers were not mentioned in relation to the specific information they might provide in questionnaire. The same holds true to the participants in the interview respondents from the victims and professionals. The volunteer permission of all respondents was also asked and withdrawals guaranteed at any time. Ethical clearance from JU and other relevant institutions were also fulfilled before collecting the data from respondents.



## CHAPTER FOUR

### 4. Result, Discussion, Presentation and Analysis

#### I. Characteristics of Road Traffic Accident

Over the last five years, the rate of increase of Gross Domestic Product (GDP) of Ethiopia has shown steady growth rate ranging from 8 to 11.5% annually on average basis. Such economic growth leads to a rise in the number of vehicles used in the country in general and Jimma zone in particular (CSA, 2007).

Similarly, in recent decades the population of Ethiopia has also increased. The unpublished data of Jimma zone Traffic Police Control and Investigation Office, indicates an increasing trend in terms of population size and number of motor vehicles. Population increased by 5.44 percent from 2010/11-2014/15 on average till the end of the study period. Within the study period of five years the number of motor vehicles brought a change of 2.58 percent. Likewise, motorization level has also changed. (JZTPR, 2014/15)

#### 4.1 Accident Severity

This method attempts to compare the road accident situation in the study area using different indicating parameters like severity index, accident fatality rate, accident fatality risk and accident risk.

**4.1.1 Accident fatality rate:** accident fatality rate is defined as the number of deaths per 10,000 vehicles. Table 4.1 presents the fatality rates in Jimma zone and Jimma town during the period 2010/11 – 2014/15. There was an increase in fatality rate from nearly 56 in 2010/11 to 73 in 2014/15.

From 2011-2015 numbers of vehicles expanded from 6428 to 6594. Though, accident deaths in the study area shows much progress, fatality rate has increased dramatically, and throughout the study period there was an average annual fatality rate of 99 per 10000 vehicles on the average.

**Table 4.1 Accident fatality rates (number of deaths/10,000 vehicles)**

Year	Total number of deaths	Total number of motor vehicles	Accident fatality rate (col.2x10,000/col3)
2010/11	56	6428	87.1
2011/12	62	6441	96.3
2012/13	63	6460	97.5
2013/14	67	6575	101.9
2014/15	73	6594	110.7
Yearly Average	64.2	6499.6	98.7

**Source:** Jimma zone and Jimma special Road and Transport office, (unpublished)

**4.1.2 Accident fatality risk:** The accident fatality risk, defined as the number of deaths per 100,000 people, it shows an increasing trend in Jimma zone and Jimma town. From Table 4.2 it is seen that fatality risk has increased from 2.4 in 2003 to 2.8 in Feb 2015. It is regularly used to compare the road safety records of developing countries.

**Table 4.2 Accident fatality risk (number of deaths per 100,000 population)**

Year	Road accident deaths	Estimated yearly population	Accident fatality risk (col.2x100,000/col3)
2010/11	56	2379871	2.4
2011/12	62	2444639	2.5
2012/13	63	2509407	2.51
2013/14	67	2574175	2.6
2014/15	73	2638943	2.8
Yearly Average	64.2	2509407	2.56

**Source:** Traffic Police Control and Investigation Department, (unpublished data)

**4.1.3 Accident risk:** It is the number of accidents per 100,000 people. Accident risk has increased from 2002/3-2006/7. As indicated in table 4.3 the accident risk grew from 210 on 2002/3 to 345 on 2006/7 (38 percent). An increasing trend of the accident risk result a gradual increase of the non-fatal accidents, making the people more vulnerable to the non-fatal type of accidents.

**Table 4.3 Accident risk (number of road accidents per 100,000 population)**

Year	Total number of accident	Estimated yearly population	Accident risk (col.2x100,000/col3)
2010/11	210	2379871	7.7
2011/12	386	2444639	15.7
2012/13	263	2509407	10.5
2013/14	245	2574175	9.5
2014/15	345	2638943	13.1
Yearly Average	289.8	2509407	11.3

**Source:** Jimma zone and Jimma town Traffic Police office, (unpublished data)

**4.1.4 Accident Severity Index:** This index measures the seriousness of an accident. It is, therefore, defined as the number of persons killed per 100 accidents; see Table 4.4. Accident severity index has dramatically decreased from 26.7 in 2010/11 to 16.1 in 2011/12 and gradually increased to 27.3 in 2013/14. It decreased to 21.2 in Feb 2015. It is observed that in 2006, there was a sudden rise of fatal accidents resulting in the increase of the accident severity index.

**Table 4.4 Accident Severity Index (number of persons killed per 100 accidents)**

Year	Total number of Persons killed	Total number of road accident	Accident severity index (col.2x100/col3)
2010/11	56	210	26.7
2011/12	62	386	16.1
2012/13	63	263	24
2013/14	67	245	27.3
2014/15	73	345	21.2
Yearly Average	64.2	289.8	23.04

**Source:** Jimma zone and Jimma Town Traffic Police office, (unpublished data)

#### **4.2 Economic and Social costs**

Road traffic accident appears to be a social and economic problem in Jimma zone and Jimma town. The statistics of traffic police investigation office revealed that, on the average, there were 64.2 fatalities per 10,000 vehicles and 117.4 injuries within the stated 5 year period. Though, the study area was known for the lowest number of vehicle, but, it is the highest fatality rate and accident risk. Over 99 deaths per 10,000 motor vehicles and more than 12 accidents/100,000 people were registered annually.

Vehicle accidents and deaths in Jimma zone and Jimma town have respectively increased from 210 and 56 in 2010/11 to 345 and 73 in Feb 2015. The total number of accidents has continued to grow after a slight decline in 2013/14.

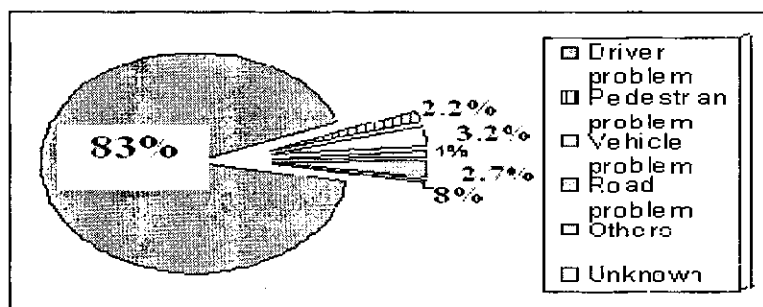
Road crash causes a serious economic loss to the community. Together with the social impact in terms of pain, grief and suffering, there is also a serious economic burden both regionally and at the national level.

In economic terms, road crash injuries cost low-income countries an average of 1% of their gross national product (GNP) versus 1.5% for middle-income countries and 2% for high income countries, (Jacobs et al, 2000). In the year 2013, the total (GNP) of Ethiopia was 47.53 billion US dollars and accident severity total was 18911(FTPCID, 2006). Total accident share of Jimma zone and Jimma town, on the same year was calculated as 1 percent of (GNP) is applied, the total annual economic losses of the country could reach 9,506,000,000 birr and the share of the Jimma zone and Jimma town was 199,630,000 birr which was 2.1% of the countries GNP. This is an unaffordable annual loss and a waste to the nation in general and to the region in particular.

#### 4.3 Accident characteristics

The nature and the characteristics of the accident data that was gathered by the traffic Police Department of Jimma zone and Jimma town varied in time, road users (driver, pedestrian), vehicles and road type. Such relationship (with focus on road users) will be discussed as follows. In order to find out, which factor contributes how much, accident data of the study period (2010/11- 2014/15) was classified by road user, vehicle problem and road problem, (see figure 4.1).

**Figure 4.1 Accidents and Contributory Factors**



Source: Federal Traffic Police Control and Investigation Department, (2013)



Figure 4.1 revealed that among all of the accidents caused from 2010/11 to 2014/15, drivers were responsible for the larger part (83%), while pedestrians accounted for about 2%, vehicle problems for 3% and road conditions were also responsible for about 1% of the accidents. About 11% of the accidents were left unidentified. In this case more than 85% of all accidents in the study period were attributed to human factor.

#### **4.3.1 Driver characteristics**

Many people were subjected to death, injury and encountered loss of property as a result of the faults made by drivers.

According to the surveyed data, almost 60% of all casualties were attributed by drivers between the age group ranging from 18-30 years and 30 percent between the age group of 31-50 years.

#### **4.3.2 Vehicle characteristics**

Regarding accidents by the type of vehicles involved in the area the public transport vehicles such as buses and minibuses registered high rate of accident constituting higher casualty in car crashes in the study area.

Looking at a vehicle crash involvement rate by ownership type, private vehicle owners take the lion share of nearly 87 percent.

## II. Results and Discussions

### 4.4 Socio- Demographic data

The tendency to comply with the traffic laws and, the propensity to commit traffic violations among road users exhibits differences on the basis of biological characteristics. Among drivers, men are more vulnerable to car accident than women. With regard to age, young people are more exposed to car accidents than old people. Besides the above mentioned factors, other social characteristics such as family size, educational status, marital status, etc also influences road users' vulnerability to road accidents. This has helped to get ample information from different people with different characteristics.

#### Drivers' Residential Background

As field survey depicts close to 100 % of the respondents live in Jimma zone and Jimma town.

Regarding the sex structure of the surveyed respondents, the size of male participants outnumbers the females because the number of female commercial vehicle drivers is extremely lower.

The survey data depicts that a large proportion (about 57 percent) of the respondents were married and about 27 percent were not. Among the driver respondents about 58% of drivers 60% professional respondents and 40% of victims are married, the rest are unmarried. Heavy burdens of household responsibilities like income generating activities, housework and childcare fall on the shoulder of a single family head and may encourage inattentiveness of road users while being passenger, or driving. See table 4.5

**Table 4.5 Respondents' Marital Status**

Marital status	Drivers		Traffic polices		Victims	
	#	%	#	%	#	%
Married	29	58	6	60	4	40
Never married	15	30	2	20	2	20
Widowed	2	4	-	-	2	20
Divorced	2	4	2	20	-	-
Have fiancée	2	4	-	-	2	20
Total	50	100	10	100	10	100

Source: Field survey

#### Respondents' length of stay

**Table: 4.6 Numbers of Years Stayed in Jimma**

Profile	Drivers		Traffic polices		Victims		Total
	No	%	No	%	No	%	
< 10 years	11	22	8	80	2	20	21
10-20 years	15	30	2	20	5	50	22
21-30 years	7	14	-	-	2	20	9
31-40 years	13	26	-	--	-	-	13
41-50 years	4	8	-	-	1	10	5
Total	50	100	10	100	10	100	70

**Source:** Field survey

Table 4.6 shows the number of years that respondents lived in Jimma zone and Jimma town until the date of the interview. Therefore, among the number of respondents approximately 22% drivers, 80% professionals and 20% victims who stayed less than 10 years in the study area respectively. On the other hand 78% drivers, 20% professionals and 80% victims who lived more than 10 years in the study area respectively

#### **Educational Status**

The educational status is most often used in the analysis of a given population knowledge and skill.

The knowledge and skill obtained through education determine the type of skill an individual have. This qualification in turn indicates that how far a person is likely to view the content of traffic laws.

Educational status	Drivers		Traffic polices		Victims	
	#	%	#	%	#	%
< Junior	7	14	-	-	4	40
Secondary	32	64	5	50	2	20
Certificate	5	10	2	20	2	20
Diploma	6	12	3	30	-	-
Degree and above	-	-	-	-	2	20
Total	50	100	10	100	10	100

**Table: 4.7 Respondents' Educational Status**

**Source:** Field survey “# ” Number

As Table 4.7 clearly shows that many of the respondents, which accounted nearly 64 percent of the drivers, 50% of traffic police and 20% victims had attained secondary school education. About 20% of the victims were diploma and degree/above holders. As the data indicates none of the drivers, traffic polices and victims were illiterate among the participants.

### Household Size and Number of Dependant Members

House hold size	Drivers		Traffic polices		Victims	
	#	%	#	%	#	%
Non	15	30	1	10	-	-
1-2	8	16	3	30	2	20
3-4	11	22	2	20	2	20
5-6	3	6	3	30	4	40
7-8	5	10	1	10	2	20
>8	8	16	-	-	-	-
Total	50	100	10	100	10	100

**Table 4.8 Household Size and Number of Dependant Members**

Source: Field survey “#” Number

Regarding the average number of household members of the total interviewed respondents, about 16%, 30% and 20% of drivers polices and victims were household supporters in a family between 1 and 2 members. About 22 percent of the drivers, 20% of traffic police and victims respectively were in household constituting 3 to 4 family members. According to the surveyed data 32% of drivers were heads of household having 5 family members.

The economic status of any person or a household may indicate the level of income, the potential and/or actual dwelling they live in and their potential to use different social service (including transport) available in and around the city.

With regard to the issue of occupation, the respondents were asked to explain their specific occupations at the time of the survey. Their responses indicates that approximately 60 percent of the victim respondents were either retired, unable to work or do not have any alternative to be hired. The rest about 40% were working in different places.

**Table: 4.9 Respondents Average Monthly Income by Income Group**

House hold size	Drivers		Traffic polices		Victims	
	#	%	#	%	#	%
Non	-	-	-	-	1	10
200-499	-	-	-	-	2	20
500-999	-	-	-	-	2	20
1000-2000	16	32	5	50	3	30
2000-2999	10	20	2	20	2	20
>3000	24	48	3	30	-	-
Total	50	100	10	100	10	100

Source: Field survey

As it is shown in table 4.9, the highest percentage of the surveyed drivers households about 48% earn more that 3000 birr income per month respectively.

#### 4.5 Socio-economic impacts of road traffic accidents

Assessing traffic accidents using only traffic police database (secondary data) in any region is not sufficient. Therefore, it would be decisive to complement it with other necessary surveys. In this regard, different questionnaire and interview surveys were employed to find primary data. Among the respondents of the survey were drivers, victims and traffic polices. Findings of each category will be discussed in the following part.

##### Pre-crash preparedness

Accident risk in drivers begins with the lack of pre injury preparedness. Therefore, driver respondents were asked the following questions to find out about their opinion regarding road accidents. Respondents were asked if they have a life insurance, vehicle inspection or insurance, or have a first aid kit. Close to 84 % of them had vehicle insurance, only 52% had life insurance, about 68% of them have had first aid kit in their vehicles. About 100% of the drivers have done vehicle inspection for the current year and about 52% of them could not request whether insurance payment of injury and death are certain enough. see Table 4.10

**Table 4.10 Number of drivers that maintain pre-crash preparedness**

Performance	Vehicle insurance		Life insurance		Insurance payment		First aid kit		Vehicle inspection	
	#	%	#	%	#	%	#	%	#	%
Yes	42	84	26	52	24	48	34	68	50	100
No	8	16	24	48	26	52	16	32	-	-

Source: Field Survey

Respondents were asked a question about pre-trip inspection (weather they have checked their vehicle on the morning of the interview date), those who responded yes to this question were asked to write the part checked. About 91% have checked their vehicle, while the remaining, 9% did not check their car. Break oil, tire and engine oil were some of the items checked by most of the respondents.

With regards to safety, almost 82 % always wear seat belt, about 18% sometimes wear seat belt mostly when they see traffic polices on the roads.

The respondents who wear safety belt occasionally mentioned not being accustomed and lack of comfort as the primary reasons for their actions.

Driver respondents were asked if they drink any alcohol while driving. Almost 74% of the total driver respondents have said 'yes' and the rest 24% said 'No'. Respondents were also asked how often they drive after having one or more alcoholic drinks. Among drivers who had a drinking habit only 8% admitted that they drove very often and 32% admitted they drink and drive occasionally. The rest never drive after drinking alcohol.

Analysis of casualty statistics for 2002/3-2006/7 (TPCID, unpublished), has shown excessive speed to be a contributory factor in about 84% accidents in the stated 5 year time. Therefore, it was essential to raise the level of increased compliance with speed limits arising from the number of related accidents and to ensure the speed limit system enjoys popular credibility and support.

Respondents were asked to respond how often they drive more than the speed limit. While 46% admitted they often drive more than the speed limit, 54% said they occasionally drive more than the speed limit. While responding to this question, some proudly said they enjoyed driving fast. While, about 47% said they only drive more than the speed limit, when the passengers are in a hurry they were driving above the posted speed limit.

The use of a mobile phone while driving distracts drivers reducing their capacity of assessing accident risks. In order to look into the problem of using mobile phones while driving, 5 questions were forwarded.

About 100% of all respondents had a mobile phone. About 40% of those who had a mobile phone accepted that they dial while driving, while 30% of them stop their vehicle temporarily and the rest said, they pull-it-over. The other question was whether they answer calls, while driving, about 78% admitted they respond to the call when driving, while the rest replied otherwise. About 50% of those who answer the call confirm that they do it always. Among those who have mobile phones, only 8% use earphones and about 93% accepted they hold it with their hand rather than earphones.

The other critical factor contributing to motor vehicle accident is drowsiness/sleepiness. Feeling tired or fatigue may happen if sleep has been interfered with the length of duty or long distant driving. Drivers who come from long distance to Jimma zone are most affected by this problem. Fatigue/sleepiness reduces attention to road events and the driving task. However, many people overlook this and very little is known about the actual alternatives employed to remain alert while driving.

According to the respondents, there is a custom among the drivers whereby, the owner of the vehicle is expected a minimum of 1000 birr per whole night and day with fatigue.

As the finding indicates, about 60% replied that they take drugs like 'chat' and 'shisha' to prevent their fatigue and 20% refused to respond.

The research question is forwarded to understand traffic rules violations. Surprisingly, about 100% of respondents were stopped by a traffic police at some point. While asked for what kind of traffic violations they were caught by the traffic police. They stated that overloading passengers, incomplete vehicle parts like lights, wipers etc. For such offences, the respondents said they were given warning, ticket and arrest or driving ban. Accordingly, about 98% were given charges (tickets), while the rest 2% were given warning.

When asked if the measures though them or correct them, about 10% of the driver respondents said more often, 40% said less often and 50% said they show no change at all.

#### **4.6 Causing Factors of Traffic Accident**

To understand if there are additional contributing factor, speeding, fatigue and road design deficiency were the first three leading errors mentioned by nearly 62%, 26% and 12% of the driver respondents, respectively.

Unsafe driving behaviors are all serious risk factors for accident involvement. They also become a threat for other innocent road user vehicles. The most common mentioned drivers' bad behavior included tailgate, improper passing, speeding, etc. If drivers are annoyed by such aggressive actions their driving confidence is easily degraded and they will be exposed to traffic accident.

#### **Accident, treatment condition & socio- economic impact of injur**

This part deals with respondents view with respect to accident occurrence, treatment condition and economic impact of injuries. In this regard they were asked if they had traffic accident. About 68% of the drivers respondents said they never had road accident while, 32% of the drivers said they had traffic accident. As the result of the accident, about 70% were injured while driving and 30% faced the accident while being a passenger.

After the accident, about 60% of the respondents were treated in emergency rooms of Jimma hospital. Among those who were treated in the hospital, nearly, 60% of the drivers said they were treated well, while about 40% of them said they did not properly treated.

Regarding the severity of the accidents, most of the victim respondents commented that the impacts of the accidents lasted longer and were unable to pursue their regular life including walking, playing football, running, drawing picture and so on. On top of this, 80% of the victims also said that, the accident hampers their life in work, social gatherings and 20% said don't suffers as a result of the accident and the rest did not reply.

Victims were also said they were unable to get due attention from their families, friends and other relatives some 70% of the victims also said that they don't get due care or visit from their family, friends, and the rest said they had due care after they were injured, more over almost 60% of the victims said, they were frequently visited by their children, friends and family. The victims commented that financial, material, moral, medical support from all families, friend's government and nongovernmental institutions. In addition, almost all of the victims said that they expect love, respect, companionship and other necessary supports to survive the impacts of the accident.

The support is necessary because it appears that the support victims receive from family, friends and relatives was not sufficient for the victims to survive the accident. Nearly 40% of the victims said that the support they were given was not good, 30% said it was average, 20% said it was good, the remaining 10% remain silent. On top of this, victims were also asked on how the communities view them as they get injured. About 40% said they were disrespected, 30% said otherwise and the rest were not able to respond. About 40% of the respondents agree that people view them as a burden and an obstacle to production. About 50% opposed to the idea of people viewing them as a burden, the rest said they don't know. Furthermore, almost 30% of the victims said that they have good social interactions and acceptance from the community. Nearly 20% average and almost 40% said they do not feel good about the social interaction and acceptance from the community.

Regarding loses encountered due to the car accident, about 30% said it limited their income, nearly 40% of the respondents said it limited their access to education, 10% and 20% said it limited extra work and social relationship respectively. Regarding the income difference before and after the accident, 40% said that significant difference is observed, 50% said that it is fair and the rest said there is a slight difference

Regarding to the current victim situation, 30% of the respondents are not engaged in paid jobs, the rest are engaged in income generating activities. Outof those who are not engaged, 40%



spent their time in looking after children, 30% spent on doing housework, 20% on visiting friends and families, and 20% spend their time in religious institutions. Furthermore, 50% of the victims feel depressed after facing the accident- while the rest are not depressed.

They were also asked to list the main causes of road traffic accidents, almost 60% of them said high speed, fail to give priority both to pedestrians and vehicles and poor learning and testing are the major cause of traffic accident.

Finally, respondents were also asked to suggest some possible mitigating measures to reduce traffic accidents. In their view, people should get education about traffic rules, strict law and enforcement, safe pedestrian roads, reducing speed, visible and sufficient traffic signs and signals could be possible mitigating factors.

Again the financial cost to the study area (directly and indirectly) is a 199,630,000 birr (only in the year 2013) which highly affect Ethiopia's GDP.

In addition to the economic loss, the pain, grief and shattered hope and dream of dependants of road accident victims will be quantified on the next work of the researcher. Medical and funeral expenses will also be the next concern

#### **4.7 Respondent views on existing interventions & traffic regulation**

With respect to traffic regulations, different questions were raised to drivers and professional respondents. The first question was how they would describe the traffic laws and regulations of Jimma zone and Jimma town, specify. About 4% of the drivers said it is very good, and about 30% said it is good while, 38% said it is fair and 28% said it is unsatisfactory. The factor pointed by drivers as bottlenecks of the existing laws and regulations were said traffic police hurry to write a charge than teaching or giving advice. But, Professional respondents said it was outdated, lacks transparency and suggested for its revision. Some of the visible gaps pointed were: nearly 30% said there was no record-based penalty and 20% yearn for acts that ask drivers who failed to respect station and parking service workers.

Other more specific regulatory questions were forwarded to driver respondents; about corruption with regard to existing law enforcing bodies. 84% of the driver respondents admitted that there were high level of corruption on traffic polices and other law enforcement bodies. About 4% refuses to say anything and 12% said there is no corruption at all. Regarding testing and training, nearly 58% of the respondents do not favour it. Speed limits used in the area 'it is right' by 70% of the driver respondents. Problems tied with the present testing and training were also specified.

Therefore, about 70% of the respondents reported testing was poorly maintained or it was done by bribe. About 116% of them also said training was short. Finally, about 96% of driver respondents have called responsible authorities to review all stated difficulties.

In the case of driver respondents more than 66% of the respondents favor for the amendment of the law containing the above raised issues. Similarly, among the professional respondents, more than 80% of them believe that all issues must be enacted as new traffic laws.

Respondents were asked a question in connection with different intervention initiatives to be considered so as to avoid or minimize the risk of accidents. About 80% of the driver respondents favored publicity campaign and opted for educational initiatives. On the contrary, about 80% of the professional respondents opted for educational initiative and 2ndly giving more information and publicity campaign were supported to be strongly effective in bringing safe behavior of drivers. With regard to the measures to be taken to control speed, on the basis of key informant interview 90% of the professional respondents favored for measuring average driving speed of vehicle using radar. Civil officers and traffic officers to be positioned at relevant places were also suggested by them as solution.

In addition About 90% of the professional respondents support that education is important to drive safely, while motorway driving test before driving on the street and large scale publicity were also favored.

Some of the additional alternatives suggested by professional respondents were: further improvement on publicity campaigns even film shows using screens should be carried in different areas where many people can get exposure, publication of road safety books also need emphasis.

Professional respondents were also reluctant to add other media types. Among these: 'education in religious institutions, market areas and "Idirs"'.

#### **4.8 Stakeholders view on Road Safety Intervention and its challenges and Prospects**

##### **I. Interventions**

##### **A. Policy and Legislation**

Policy is a mechanism, which governments adopt in order to achieve their goals and objectives. Though, in our country policy is set at two main levels (federal and regional), so far there is no specific government policy stated on road safety responsibility.

The only safety responsibilities were in a Health and Safety Unit, which was primarily concerned with safety of workplaces. In spite of this, most responsible authorities are working on road safety activities by setting targets and objectives. To facilitate this, laws and regulations were proclaimed by both the central government and the Oromia region. Accordingly, road transport and traffic operations in the country are regulated with the following rules and laws.

1. Transport proclamation- Amendment [468/1997)
2. Road traffic regulations of the oromia 12/2004)

#### **B. Ministry of Education**

Education bureau of the Jimma zone and Jimma town had continued its interest and recently in cooperation with the Road Safety coordination office and other none government agencies, it had published road safety issues as integrated curriculum and distributed to schools beginning from Kindergarten up to grade 8.

#### **C. The Jimma Roads Construction Authority**

Roads are scarce and narrow to accommodate the increasing number of vehicles and dwellers in the city. The Authority though has reconstructed the existing roads, repaired deteriorating ones and tried to increase the width of some narrow roads. The magnitude of road maintenance compared with the existing road problems in the area is insignificant.

Many design difficulty roads (horizontal curves), particularly around the Sekoru woreda, are still left as they are because of the shortage of finance needed.

#### **D. Radio and Television Department**

Prior to 1995, there was only a 15 minuets program sent once a week. It was monitored by the Federal Transport Authority and put into the air by the Ethiopian Radio organization. To increase public awareness, different programs have been used, both television and radio programs. Radio programs include FM jimma government and social radio stations. Among the programs that were working up to the end of 2005/06 include: the Jimma Police commission– Traffic Police Authority, Ethiopian Radio, Oromiya TV.

Excluding other Regional States' Media, there was a total of about 200 minutes radio and TV programs that were access to the people of the area, every week.

#### **E. Non government Organizations (NGOs)**

There are some non government organizations that were on the side of agencies working for road safety interventions. Among these were: WHO (World Health Organization) Save Norway-

Ethiopia, Shelli Ethiopia limited, International Road Safety Academy, the Ethiopian Insurance Company, Ethiopian Transport Associations and Private Transport Associations were some of them.

#### **F. Student Traffic Police Clubs in Schools**

Student Traffic Police Clubs are organized, monitored and trained by traffic policemen and their material needs are supplied to some extent by the Save Norway-Ethiopia. Their main task is to help traffic police and protect children from road accidents. Their activities are limited only around schools. Until the end of 2005/06 there were more than 1500 student traffic police organized in about 105 school clubs.

#### **II. Challenges and Prospects of road safety**

Responsible authorities have been trying to bring about possible changes in the road safety of the area; but still there are many problems. Some of the challenges noted by respondents and observed by the investigator include

**Budgetary constraints:** The existing bodies responsible for road safety issues were facing problems of budgetary constraints, which will continue to affect the progress of road safety activities. The Jimma district Roads Authority was one of them. Such Authority is widening the previous roads, opening new ones and constructing more facilities like fences, signs road markings in order to restrict drivers conflict with drivers, which will encourage traffic facilitation there by reducing congestions and accident risks.

Traffic police is another department that expects better budgetary allocation. This department works in enforcing laws, investigating traffic accidents and train student traffic police. They don't have alcohol tester, radar and their human resources are mostly lack of education (poor performance). These were some of the challenges stated by the department. The lack of adequately qualified and trained staff in the regulatory agencies is often a major constraint on removing institutional bottlenecks to more effective regulation.

**Lack of proper enforcement:** Though, existing laws and regulations were not complete, it was observed that many regulations were not properly implemented by the responsible bodies.

**Impaired road use testing problems:** Impaired road use due to alcohol and/or drugs (chat), is accepted as a major problem in the area, but the response to the reporting system has been varied and poorly documented. A driver, even a bicyclist, must not be so intoxicated by alcohol that he or she cannot drive a vehicle safely.

Breathalyzers test were considered to provide reliable and valid estimates of actual blood alcohol concentrations. But they do not work properly for injured people coming after 10 hours and below 50 mm blood level of alcohol. Therefore, breathalyzer tests carried below 50 mm alcohol level and testing after 10 hours of injury time would be all nearly false (negatives). Such gap can be corrected using blood testing method.

**Driver training and testing problem:** License issuance is carried by government institutions and private schools. As stated by the professional respondents, driving schools do not work in quality and thought they were working with a corruption (bribe or tip). Apart of this monitoring and evaluation carried by government authorities was not that much.

**Vehicle inspection:** Vehicle Inspection program: this may require annual inspections by government, roadside inspections by police, or inspections by government certified. Two things are not encouraging practices: in the first place inspection time is very long and in the second place roadside police inspection is not usually practiced (except sometimes during the inspectors need tips or the like).

**Illegal Street Trade:** Many street pavements that are meant for pedestrian movement are mostly occupied by informal street vendors. When pedestrian path ways are occupied by illegal traders (on market days) and religious institutions in the surroundings, pedestrians will be pushed into streets, raising conflicts with vehicles occupants. Such problem is more serious around 22 sub cities of the woredas in the study area are also exposed for such problems.

**Lack of engineering work:** The safety of the vulnerable road users must also be sufficiently provided with safe and sufficient infrastructure. Though construction of new roads is one and best solution expected, the safety standard problem of already existing roads was not treated best. There are some environmentally dangerous roads that increase accident risks of road users. Vulnerable road users are much more exposed to accidents in these roads when vehicle speeds are high and can even suffer fatal injuries in accidents with motor vehicles at moderate speeds.

More over most of the high accident risks were obtained because of the deficiency in road infrastructure from the beginning, results on overturning and collusion (head, pedestrian, animals, other pedestrian etc...) frequently on specific site which costs much more than the reconstruction cost of the road.

**Legislation problem and its effects:** Though there is no a specific road safety policy in the country and even in the region, there are laws or regulations promulgated by the nation in order

to govern road users and enforcing bodies. The first transport proclamation dates back to the 1940s. Further different amending proclamations were published. Among these 279/63 and 256/67 were very important in which the police uses them for work. In general, existing regulations are suffering from different back falls. It is not regularly updated. Ethiopian traffic regulation is said to be one of the oldest regulation among all African countries for a long period, (TRL, 1998). But now it is changed equally with the development of the society. As a result it include mobile, seat belts, driver testing regulation, 3rd party insurance, etc that are enacted in many countries. Even some amendments are made, (as some closer authorities said it), they were not properly supported by penalty acts. Other legal loopholes also include: there is no regulation that will empower the police to penalize illegal pedestrians. Control of corruption also needs a due attention in the study area.

#### 4.9 Jimma district Black spot Area

Efforts to improve safety along roads include identifying locations where the risk of collision is higher and where additional safety counter measures are most warranted.

These high risk locations are referred as Black spots.

Although little has been done recently in identifying the locations of black spots on Jimma zone and Jimma special asphalt roads, it is obvious from the frequency and severity of accidents occurring that there are some black spot along the roads of the study area.

The following listed areas are identified by the investigator, and the researcher collect the data through GLM(Geographical location measurement Positioning System i.e latitude and longitude) and distance from Addis in KM. On top of this it is conducted field observation in each place and consult professionals and finally develop a black spot map as follows.

**Table 4.11 Black spot area of Jimma district (Asphalt road)**

Woreda	Kebele	Special name	Distance from Addis in KM	To-date accident frequency	Required measure
Sekoru	Gibe	Gibe bereha	194.6	15	-Widening the curve -Message board
Sekoru	Adami	Bedoy	201	8	-Re-allignment
Sekoru	Kumbi	Kumbi	207	6	-Zebra crossing
Sekoru	Dobi	Dobi	221	5	-Steel guard rail -Removing objects
Sekoru	Menko	Doma	231.4	4	-Zebra crossing

Sekoru	Simini	Simini Bridge	246.9	5	-Relocating the bridge site
Sekoru	Daka	Gibe HEP office	258	3	-Zebra crossing
Sekoru	Gangalata	Wuha limat	262	3	-Zebra crossing
Sekoru	Walmera	Deneba river	264	6	-Relocating the bridge
Sekoru	Deneba	School area	260	11	-Steel guard rail
Sekoru	Liban bore	Village area	275	7	-Zebra crossing
Jimma	Badabuna	Badabuna	348	13	-Re-alignment

#### **4.10. Discussions**

##### ***A. Accident situation***

Over the last five years, the rate of increase of gross domestic product (GDP) of the country has consistently been growing at a rate ranging from 8 to 11% and decline to 7% annually on the average. Such economic growth on 2003/4 has encouraged an increment in the number of vehicles used and the proportion population in Jimma zone and Jimma town. From 2002/3 to 2006/7 number of vehicles, population and level of accident changed by about 18.2%, 29% and 64.3%, respectively. Similarly, accident risks and fatalities started to increase. Though, such number of vehicle was insignificant when compared with cities of other countries, over 99 deaths per 10,000 motor vehicles and more than an average of 290 accidents/100,000 people were registered annually. This placed the area as one of the highest fatality rates and accident risks. Fatality still has an increasing trend and it was growing by 30.4 percent every year. This brings a serious economic burden in which the total crash cost, as stated at the beginning, has reached an average of 199,630,000 birr per year.

##### ***B. Accident Involvement***

Among the total accident victims that were reported from the Jimma zone and Jimma special traffic police during the period 2002/03 to 2006/07, 75% were male and about 25% were female, (3:1 ratio). The possible reason for the predominance of male causalities could be due to the fact that females lead a less active life and mostly remain indoors.

Based on the data of the traffic police, the highest number of victims was from 18-30 years of age followed by the age group 31-50 years. This shows that people from the most active and productive age groups were more involved in traffic accidents. This causes a serious economic loss to the country.

It was also noticed that below the age of 18 and above the age of 50 years, there is a decrease in accident cases, though the age group 7-13 shows a slight increase. The reason for this may be that children are taken care of by elders and are less likely to use vehicles.

Furthermore, it was observed that among traffic victims from 2002/03-2006/07, and private enterprise workers hold the highest incidents and it was followed by government workers and students. They faced collisions while going to or coming from Addis or near town. On the contrary, drivers were seen to hold the lowest proportion among all victims. This is because he is the first in taking safety measure as soon as he knows the accident is to likely happen.

### ***C. Factors of Accident***

#### **Road users' Characteristics**

The current survey revealed that road accident in the study area was a challenging problem, in which all of the drivers, the victims and professional respondents expressed it as either difficult or the most difficult problem.

Among the list of factors given (assumed to worsen traffic accident); driver respondents reported that Speeding, road design difficulty and drivers behavior were the three leading factors that played the most important role in aggravating traffic accident in the area. Each was respectively confirmed in the first category. For victim respondents; driver behavior, unregulated street trade and poor road conditions were the leading three factors that played the most important role in worsening traffic accident in the area. 90% of Traffic police said that Drivers behavior, pedestrian behavior, road conditions were the leading three factors that played the most important role in causing and aggravating traffic accidents in the area. It was surprising to state that, drivers' problem was seen by themselves that they placed it as number 3; while victims and professionals put it as number one. So, drivers were less likely open to state about themselves than to state about others.

Assessment of Traffic police data indicated that, among all accidents caused in the country, drivers were responsible for the larger part (83%), while pedestrians accounted for about 2%, vehicle problem for 3% and road condition was responsible for 1% of the accidents. About 11% of the accidents were remaining unknown. In this case a lion's share (>85%) of all the accidents in the study period were attributed to human factor.

Unsafe driving behaviors are all serious risk factors for accident involvement. According to evidences from the traffic police, among the recognized faults of drivers and their casualties



most were caused by drivers who do not yield the vehicle right of way, not giving priority to other vehicles and following too closely respectively.

As found from the current survey, speed, fatigue and using mobile phone were reported as the leading mistakes of drivers respectively.

Although, most casualties were attributed by drivers between the age group 18-30 years and least between the age group 31-50 years. The reason why the young drivers were registering much causality was; lack of experience capabilities and not giving much attention to practice accident free driving method.

The study also found that all casualties were caused by male drivers. In this study, bus and minibus ('Abadula') with an involvement rate of about 27 and 65 percent respectively, were heavily involved in casualty crashes in the area.

The number of accidents caused as a result of vehicle defects in the study area within the study period (year 2002/03-2006/07) was insignificant, but more accidents were caused by vehicles with no defect at all. Had it been properly investigated the number of accidents tied with vehicle defect could have been more than what is reported.

According to the traffic police data, about 93% of the accidents happened in a better air condition. Among all air condition only cold air condition had a little role in causing incidents. Therefore, weather condition of the city has not much effect rather than the faults of road users. As mentioned in the study, about 99% of the accidents were caused on roads with a Speeding and Deficiency in Design (i.e. Steep Descent Reverse Curve). The reason would be roads with sharp and horizontal curves are thought as hazard-less areas. Road users think vehicles from opposite direction will not touch them at all. When such roads are not full of signs and markings, many road users do not have enough time to trace all before deciding what to do next. Therefore, such types of roads are not hazard-less as expected.

From the current study, it is evident that different of vehicle collisions (side-side, front-rear, front-side, pedestrian and animal involved) respectively were the leading problems. Side-side collisions were tied with turning problems (priority cases); front-rear collisions were tied with speed problem, while front-side collisions were the result of both stated problems.

#### ***D. Causes of Accident***

A number of causes that affect road traffic accident risks were identified in the study, which finally can help to improve the intervention system.

Accident risk in drivers begins with the lack of pre injury preparedness. In order to prevent accidents drivers have to check their vehicles every morning, perform vehicle inspection, having life and vehicle insurance, etc. About 84% of them had vehicle insurance, only 52% had life insurance, about 68% of them have had first aid kit and only 48% of the respondents agreed on the current insurance payment are fair enough. About 100% of the drivers have done vehicle inspection of the year. And all the respondents have checked (from 1 to >3 items of) their vehicle before they start journey at the time of interview. The more items drivers have checked every morning the less risky their trip it would be.

All the drivers admitted that they offence traffic signs, signals, control devices and other traffic regulations.

There are also different types of safety restraints that help vehicle occupants to reduce injury risks, if they practice them while driving. For instance seat-belts, at the time of vehicle crash or roll-over, protects the occupant of a car by preventing ejection and reducing the frequency and severity of occupant contact with the interior of the vehicle and other occupants. Similar result was reported by another author, (SWOV, 2003),

Fatality-reduction effectiveness of front seat-belts has been estimated to be 40% and 30% for rear seat-belts. In the study, it was found that about 56% wear seat belts always, about 44% wear sometimes when they see the traffic police, because it is not accustomed or not comfortable to them.

With respect to alcohol problem, casualty statistics for 2001/02-2005/06 (TPCID, unpublished), as stated somewhere in the statistics analysis part, driving being drunk or after taking drugs has shown to be a contributory factor in only 15 accidents/year on the average and yet survey studies in low-income and middle income countries found that blood alcohol was present in 33–69% of fatally injured drivers and in 8–29% of drivers involved in crashes but not fatally injured, (Odero WO, Zwi AB., 1995).

Among driver respondents who had a drinking habit only 12% accepted that they drove very often and the same figure admitted they drink and drive occasionally after taking alcohol.

Surprisingly, 85% of the driver respondents admitted that chewing chat give them strength from sleepiness and fatigue problems. Despite the reported drug-driving behavior, a vast majority of the driving public was much concerned about drug driving and supports the introduction of new and better enforcement initiatives to be practiced. Response from respondents confirms this; where over 96% and stated they would be a lot in favor of sovereignty check points and saturation patrols, respectively.

Analysis of casualty statistics for 2002/03-2006/07 (TPCID, unpublished) as stated before, has shown excessive speed to be a contributory factor in about 84% of accidents per year in the stated 5 year time. While most of them accepted that they were driving above the posted speed occasionally, least of the respondents admitted driving above the posted speed very often and some said they enjoyed driving fast.

The use of a mobile phone when driving can be an additional task which leads drivers to distracted driving, reducing the driver's capacity for assessing accident risks. There is also similar result from other authors. (Violanti and Marshall, 1996) reported that mobile phone use while driving increases the probability of collision by up to 500 percent.

In order to check such problem drivers were asked 5 questions in relation to mobile phone.

All the respondents had personal mobile phone. About half of those who had a mobile phone accepted that they dial when driving, while 30% them stop their vehicle temporarily and the rest said they pull-it-over and totally stop it while driving. Another question was also forwarded to those who had mobile phones was, how often do you answer the call? About 78% accepted they respond the call when driving, while the rest did not accept this. Among those who have mobile phones, only 8% use ear phones and about 92% accepted they hold it with their hand rather than ear phones.

Fatigue/sleepiness reduces attention to road events and the driving task. However, many people overlook this and very little is known about the actual alternatives used to protect it and employed to remain alert while driving. According to the observation, 85% of the driver respondents' prefer taking chat/drug as their first choice than rest/sleep which preferred by only 10% as their first choice.

Overall result indicates that about 92% of the driver respondents have witnessed other drivers were using unsafe alternatives to cope drossiness. Particularly, combining chat, shisha and alcohol has a more severe effect on driving performance than either chat or alcohol in isolation.

## CHAPTER FIVE

### 5. Conclusion and Recommendations

#### 5.1 Conclusion

To some extent transport has facilitated the overall activities in the Jimma zone and Jimma town but, it was also the cause for the ever increasing traffic accident in the zone and the nation at large, damaging the life and property of many people. The main reason why traffic accidents have become a very serious problem in the area is due to the inappropriate road users' behavior, lack of law enforcement, insufficient structural improvement and poor traffic management, corruption in combination with the deteriorating road conditions and weak public awareness.

Road accidents were found closely associated with the behavior of road users. Nonetheless, drivers, particularly the young (above all minibus and other commercial vehicle drivers), did not bring an important behavioral change yet. They see things easily controlled and drive recklessly creating risk to others. Many pedestrians also lack awareness and do not take care while walking & crossing roads. Some of them even create an environment that encourages more accidents. They are seen jumping fences of steel and some participate in illegal street trading.

Responsible bodies like the Ethiopian Roads Authority Jimma district and the Traffic Police Control and Investigation Department and other offices need to investing reasonable amount of capital on crash prevention activities which helps practitioners to work using recent technologies in minimizing the gap between controlled safety and traffic accident.

Road safety intervention participation of none governmental organizations and even the civil society is very limited. This influences the available amount of fund and expected outputs from the community participation at times of the implementation period.

Institutional connection between government offices and other important organizations is not that much efficient. For instance, between transport authorities and private transport organizations, transport & traffic police with Health Bureau or universities are some to be mentioned. Though there is a lack of well defined policy and updating problem of road safety legislations, inefficient implementation of already available traffic laws and regulations was a factor that worsens road safety in the study area.

Important measures are not taken to improve protection of road users (both drivers and pedestrians). Improvements of dangerous road sections, through re-engineering, is not that much encouraging. Many roads are narrow and not facilitated to the best with necessary devices.

## 5.2 Recommendations

Transportation service is vital for the Jimma zone and Jimma special, which is serving as a cash crop area and the station of three regions, the centre of one of the big universities in East Africa. Even though it is contributing a lot to the economy of the area, transport sector is not safe and still has been a reason for both social and economic damages. Therefore, in order to reduce accidents and keep sustainability of road safety in the area, the following alternative intervention ideas are suggested to be implemented by responsible authorities, pedestrians, and drivers.

**5.2.1. Formulating adequate laws and regulations:** Laws and regulations will become enabling, when only they are regularly updated and adequately made to cover all necessary acts that bring a change in road users behavior and vehicle safety, it has to be simple for road users and implementing agencies. Therefore, road safety policy should be well specified and existing laws and regulations should be immediately updated and revised as far as it would be consistent with the international standard.

### 5.2.2. Education/publicity measures

- **Apply regular road safety school curricula:** A planned curriculum on all aspects of road safety is important to empower road users/students to travel as lawfully and safely.
- **Efficient driver training and testing:** Enhanced training is essential for new drivers' examinations and practical test have to be effective and free from unnecessary prejudices. Instructors especially on private schools have to have driving experience, clean from criminal and driving offence records. Therefore, these schools and their instructors must be regularly evaluated and monitored by the government. Apart from regular tests and courses it is also necessary to provide drivers accident free driving courses.
- **Publicity:** It can be a fundamental factor for influencing behavioral change among road users. It would be also important if responsible authorities use standing billboards, posters, plasma screens, films (including cartoons), theater shows, panel discussions, peer to peer lessons and teaching using victims in religious institutions, market areas, and "Idirs" is also essential.

### 5.2.3. Apply Proper Enforcement:

Traffic police have to practice consistent and well-oriented enforcement with respect of all road users. Above all, traffic policemen have to apply violator directed patrol against few higher risky

drivers. Visible enforcement against few risky drivers would mean educating others who see what is happening, from breaking the same laws. Transport Bureau was also blamed that penalty did not go more than finance, even if any driver registers many offences and criminal faults.

**Strengthening road side check points-** Strengthening of road side checking of drivers' license and vehicle inspection, which is decisive and needs less expense in preventing dangerous driving and unsafe streets, should be regular enough rather than being limited.

**5.2.4 Enhancing accident prevention measures:** Some road sections or sites might be places where accident occurs frequently (Black Spots) and might lack proper design and infrastructural facilities. For both problems conflict avoiding measures (conflict between road users) can be considered. Some of these measures are noted below.

- **Apply engineering work:** Roads that are registering accidents repeatedly might have some sort of design problems. Some might have narrow shoulders, narrow bridges, or may lack accurate vehicles passing-ways, etc. Therefore, roads with design problems should be corrected through reengineering works, thinking on the eyes of road users. Today, curve roads are one of the uncontrollable areas and costing human live in the area. So, preventive reengineering works should be practiced in such places.
- **Vehicle Inspection program:** As stated earlier, this may require annual inspections by the government, roadside inspections by the police, or government certified organization like insurance and motor vehicle importing companies. There are many challenges linked with such program. It will be a matter of the responsible body to check and regulate them through day to day evaluation and monitoring schemes and if not to suspend institutions who fail to practice according to the undersigned agreement with the government. With the Vehicle inspection time, it would be advisable to make it many times a year than once a year.

## Annex I

### 1. Budget Breakdown

No	Items	Quantity	Unit price	Total
1.	Personnel cost Equipments and supplies Transportation , etc Stationary			
2.	USB Drivers			
3	Data collection Primary data Secondary data			
4	Mobile card			
5	Arrangement			
6	Recruitment			
7	Piloting			
8	PD for data collectors			
9	transport cost			
10	Days spent			
11	Supervision			
12	Interviews			
13	paper for questioners			
14	Observation			
15	Contingencies			
	Total			



## Annex II

### Jimma University College of Governance and law Questionnaire For Driver

This questionnaire is prepared by a student of the Jimma University, graduate program. The aim of this questionnaire is to examine the existing condition of road accident in Jimma zone from the perspective of road users and traffic regulations. Your cooperation in filling the questionnaire is honestly appreciated. The data collected will remain confidential, and will be used only for research purpose.

#### Section 1. Demographic characteristics

- Q1. How old are you? \_\_\_\_\_ years old.
- Q2 Gender Male.....1 Female.....2
- Q3 Do you live in Jimma zone? Yes 11 No 12
- Q4 For how many years \_\_\_\_\_ Months \_\_\_\_\_?
- Q5 If you do not live in of Jimma zone write your Region/State \_\_\_\_\_ and Town/City \_\_\_\_\_
- Q6. Including yourself, how many members are living in your household?
- Q7 Marital status ?
- Married.....1
  - Divorced.....2
  - Widowed.....3
  - Separated.....4
  - Never been married.....5
  - A member of an unmarried couple.....6
- Q8. What is the highest grade or year of school you completed?
- 4th grade or less.....1
  - 6th grade.....2
  - 8th grade.....3
  - 10th grade.....4
  - 12th grade/GED.....5
  - Some college.....6
  - College graduate or higher.....7
  - Illiterate.....8
- Q9. Which of the following categories best describes your total household income? (Includes the income of all persons in the household) Was your total household income-
- Less than 200 birr.....1
  - 200 to 499 birr.....2
  - 500 to 999 birr.....3
  - 1000 to 1499 birr.....4
  - 1,500 to 1,999 birr.....5
  - 2,000 to 2,999 birr.....6
  - 3,000 birr or more.....7
- Q10 Have you got first aid training? Yes 11 No 12
- Q11 Is your vehicle insured? Yes 11 No 12
- Q12 Do you have life insurance? Yes 11 No 12

#### Section 2: Driver's Experience

- Q1. How long have you held a driving license? \_\_\_\_\_ years \_\_\_\_\_ months
- Q2. How often do you drive a motor vehicle?

Almost every day/every day.....1  
Few days a week.....2  
Few days a month.....3  
Few days a year.....4  
Never.....5  
Other (specify).....

Q3. What kind of vehicle did you LAST drive?

Automobile .....1  
Bus or minibus.....2  
Motorcycle.....3  
Truck or Lorry.....4  
Utility vehicle (Pick up/Jeep/Explorer/Trooper/etc).....5  
Other (specify .....)

Q4. Have you checked your vehicle this morning? Yes.....1 No.....2

Please tell what you check? 1.....

Q5. How often do you wear a seat belt when you drive?

Always .....1  
Most of the time .....2  
Sometimes .....3  
Never .....4  
When I see the traffic police .....5

Q6. If your answer is 'Never wear it' what is the reason?

It isn't comfortable.....1  
I always miss it.....2  
I don't know how to wear it.....3

Other..... 4 (Specify).....

Q7. When you are driving with children under age 9, how often would you say that they are in a child car seat or use seat belt or at the back?

All of the time.....1  
Most of the time.....2  
Some of the time.....3  
Rarely.....4  
Never.....5

Q9. Do you drink any alcoholic beverages?

Yes.....1  
No.....2

Q10. How often do you drive within an hour of having one or more alcoholic drinks?

Very often .....1  
Occasionally.....2  
Seldom.....3  
Never .....4

Q11. How often do you drive more than the posted speed?

Very often .....1  
Seldom.....2  
Occasionally.....3  
Never.....4

Q12. If you tend to dial the phone, how do you tend to dial it?

While driving.....1  
When temporarily stopped.....2  
Pull over and stop.....3

Q13. When you get a call on the phone while you are driving, how often do you answer the call?

- Always.....1
- Usually.....2
- Seldom.....3
- Never.....4

Q14. When you are talking on the phone while driving, do you tend to hold the phone with your hand?

- Yes.....1
- No.....2

Q15 If the answer of Q14 is No, what other method do you use?

(State it please) \_\_\_\_\_

Q16. Have you ever been stopped by traffic police for any kind of violation?

- Yes.....1
- No.....2

Q17. If 'Yes', for what kind of violation? (State the first three, in order, in the space provided below and tick the boxes as many as applies.)

Warning Ticket Arrest Driving ban

11 12 13 14

Q18. After you received the (punishment/warning), did you start to correct them?

- More often.....1
- Less often.....2
- No change .....3

Q19. Did you chew a chat during driving?

- Yes..... 1
- No .....2

Q20. Which time or shift did you favored to drive.

- Morning ..... 1
- Afternoon ..... 2
- Night ..... 3
- Always .....4

### Section 3: In relation to other Contributors

Q1. How long have you been driving long distance ? \_\_\_\_\_ Years \_\_\_\_\_ Months

Q2. How do you describe road accident in the word?

- Most terrible.....1
- Terrible.....2
- Less terrible.....3
- Not terrible.....4

Q3. What are the most frequent causes of traffic accident in the word?

- Driver's fault ..... 1
- Road infrastructure .....2
- The commitment of law enforcement bodies ..... 3
- Technical failure of the vehicle ..... 4
- Other .....5

Q4. If your answer on Q3 is driver's fault which one?

- Over speed driving .....1
- Taking drugs and alcohol ..... 2
- Lack of appropriate knowledge .....3
- Using cellphone during driving .....4
- Other .....5

### Section 4: Traffic Regulation

Q1. How would you describe the traffic laws and regulations of the city? It is:

- Excellent.....1

Very Good.....2  
 Good.....3  
 Fair.....4  
 Unsatisfactory .....5

Q2. If your answer for the above Q is very good, good, fair and unsatisfactory can you Specify the bottlenecks you think. (State them below).

Q3. How do you describe the commitment of law enforcement bodies?

Most committed ..... 1  
 Committed ..... 2  
 Less committed ..... 3  
 Corrupted .....4

Q4. If your answer on Q3 is corrupted , describe the level of corruption?

Highly corrupted .....1  
 Often corrupted .....2

Q5. Do you favor the present testing and training of drivers?

Most favorable.....1  
 Favorable.....2  
 Less favorable.....3  
 Not favorable.....4

Q6. If do not positively favor the existing testing and training method of drivers, can you specify the improvements you expect? (State them below).

Q7. Do you give any bribe to have your driving license?

Yes .....1  
 No .....2

Q8. Have you done this year's vehicle annual inspection? Yes....1 No.....2 When? (State the date)

Q9. How do you feel about laws that require stopping using cell phone while driving? Do you:

Favor a lot.....1  
 Favor some.....2  
 Not favor at all.....3

Q10.Do you favor road side check points? It provides law enforcement to monitor and check drivers' licenses, vehicle registration, vehicle equipment etc.

Favor a lot.....1  
 Favor some.....2  
 Not favor at all.....3

Q11.Do you favor sobriety check points? These are points where law enforcement officials evaluate drivers for signs of alcohol or drug impairment at certain points on the roadway.

Favor a lot.....1  
 Favor some.....2  
 Not favor at all.....3

## Section5.Accident Condition

Q1 Have you ever been injured in a motor vehicle accident while driving? Only count injuries that required medical attention.

Yes.....1  
No.....2

Q2 How many times has this happened to you? \_\_\_\_\_ times \_\_\_\_\_ not at all

Q4 What were you in that accident?

Passenger.....1  
Pedestrian.....2  
Bicyclist.....3  
Driver .....4

#### Section 6. Treatment condition

Q1 At which of the following were you treated for your injuries? Were you treated at :

(a) A hospital emergency room.....1  
(b) A doctor's office.....2  
(c) A clinic.....3  
(d) The accident scene.....4  
(e) SOMEWHERE ELSE (SPECIFY)...5

Q2 Were you transported from the accident scene by ambulance , other car or people?

Yes, ambulance (or rescue vehicle).....1  
Yes, by human labor.....2  
No, neither..... 3

Q3 Were you hospitalized? Yes.....1

No.....2

#### Section 7 Intervention interview checklists

Q1 Please indicate which, if any, of the driver types you think would respond positively (i.e. drive more safely) in response to the following 'Information' interventions? (Please put a tick in each box that you think could drivers be deterred by the following intervention-- tick as many as applies?)

(1) Most effective (2) more effective (3) Effective (4) less effect (5)not effective

Vehicle signs and signals ..... 1 1 2 3 4 5

Reduce speed limits ..... 1 1 2 3 4 5

Display of the speed of vehicles entering the street..... 1 1 2 3 4 5

Stop using emotive messaging (insults to stakeholders)..... 1 1 2 3 4 5

Giving information that is factual and to the point..... 1 1 2 3 4 5

Q2 Please indicate which, if any, of the driver types you think would respond positively (i.e. drive more safely) in response to the following 'enforcement' interventions? (Please put a tick in each box that you think could drivers be deterred by the following intervention-- tick as many as applies?)

Measuring average driving speed.....1 1 2 3 4 5

Traffic police positioned at relevant points on the Road.....1 1 2 3 4 5

Civil Officers positioned at relevant points on the Road.....1 1 2 3 4 5

Q3 Based on your knowledge which of the following types of the following education / publicity interventions would you think are favorable to change the behavior of drivers (i.e. drive more safely)? (Please tick as apply for each intervention).

Educating the importance of driving safely ..... 1 1 2 3 4

A large scale publicity campaign..... 1 1 2 3 4

A motor way driving test before driving on the street ..... 1 1 2 3 4

Ensuring all drivers re-sit a driving test every five years.....1 1 2 3 4

A large scale publicity campaigns..... 1 1 2 3 4

Q4 For higher risk drivers, which of the following interventions do you think would be the most successful? (Please put a tick in the box next to one intervention only)

Enforcement ..... 1 1 2 3 4 5

Giving drivers more information to drivers..... 1 1 2 3 4 5

Education 11 12 13 14 15

Publicity campaigns 11 12 13 14 15

Q5 Do you have any other comments about improving road safety. (Please write in)

**That completes the interview.  
Thank you very much for your cooperation!**

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