STUDY ON ROAD SAFETY SITUATIONS IN DEVELOPING COUNTRIES

FINAL REPORT

SUMMARY

JUNE 2016

JAPAN INTERNATIONAL COOPERATAION AGENCY (JICA)

ALMEC CORPORATION

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1 Introduction

1.1 Background

Traffic crashes kill 1.3 million and injure more than 50 million people per year worldwide. If this trend continues, annual fatalities due to traffic crashes would be 3.6 million and will exceed fatalities caused by the three major deadly diseases (HIV/AIDS, Malaria and Tuberculosis). Moreover, the 85% of total traffic crashes occur in low- and medium-income countries and there is a particular increase of serious traffic crashes by the so-called “transportation poor” such as pedestrians and bicycle users.

This traffic situation has prompted the United Nations to declare the period 2011 to 2020 as “UN Decade of Action for Road Safety 2011-2020 (General Assembly resolution 64/255, hereinafter referred to as “UN - Resolution”)” and campaigns have been organized targeting the reduction of fatalities from 1.9 million to 0.9 million in 2020. And based on this UN Resolution, the World Health Organization developed a “Global Plan” outlining the traffic safety measures.

Japan also has experienced the so-called Traffic War at first phase in 1970s and second phase in 1980s. And with the (i) establishment of Traffic Safety Policies Basic Act, (ii) commitment of traffic safety measures corresponding to the characteristics of the crashes at each phase, and (iii) development of facilities for traffic safety, reduction of the fatalities has been achieved from 16,765 (1970) to 4,113 (2014).

In general, economic growth contributes to motorization, and increase in traffic volume also increases traffic crashes. This phenomenon is largely demonstrated by developing countries. Based on the UN Resolution, each country has implemented various measures but are found to be inadequate. And in the next decade, the number of vehicles in the world will double, with most of the increase coming from developing countries. This is especially true for the number of motorcycles which have been rapidly increasing in the Asia and Africa and have increased the risk of traffic crashes.

JICA implemented the following projects dedicated to traffic safety in Vietnam.

- TRAHUD: The Project for Traffic Safety Human Resource Development in Hanoi (2006 - 2009)
- The Study for Traffic Safety Master Plan (2007 - 2008)
- Northern Vietnam National Roads Traffic Safety Improvement Project (ODA, 2010-2014)

Moreover, the JICA Knowledge Co-Creation Program “Traffic Police Administration (2014 -2016)” had been implemented.

In some urban and transport M/P projects, traffic safety measures had been considered and proposed. And JICA had committed to a lot of road improvements, intersection improvements and signal developments. However, there have been limitations in terms of incorporating traffic crash prevention during the planning and design stages of these projects.

In SDGs (Sustainable Development Goals, 2015), road safety is considered to be an important issue.

<Positioning of Road Safety in the SDGs>
Goal 3: To ensure a healthy life for all people of all ages, and to promote the welfare of people.

- 3.6: To reduce the fatalities and injuries from road traffic crashes in the world by half by 2020.

Goal 11: To achieve inclusive sustainable cities and housing that is safe and resilient

- 11.2: By 2030, the traffic safety will be improved from the expansion of public transport facilities in consideration of the needs of people, women, children, disabilities and elderly persons. This provides all of the people with a sustainable transportation system which can be used safely, cheaply, and easily.

1.2 Objectives

On the basis of this background, JICA held a seminar as part of this project to understand the trend of traffic safety measures and gather knowledge and information regarding traffic safety through discussions with external authorities and advisors.
This study is conducted to formulate a traffic safety implementation plan for the JICA project.

1.3 Project Area

This study covered a survey of Japan’s traffic safety policies and case studies in foreign countries.

1.4 Project Flowchart

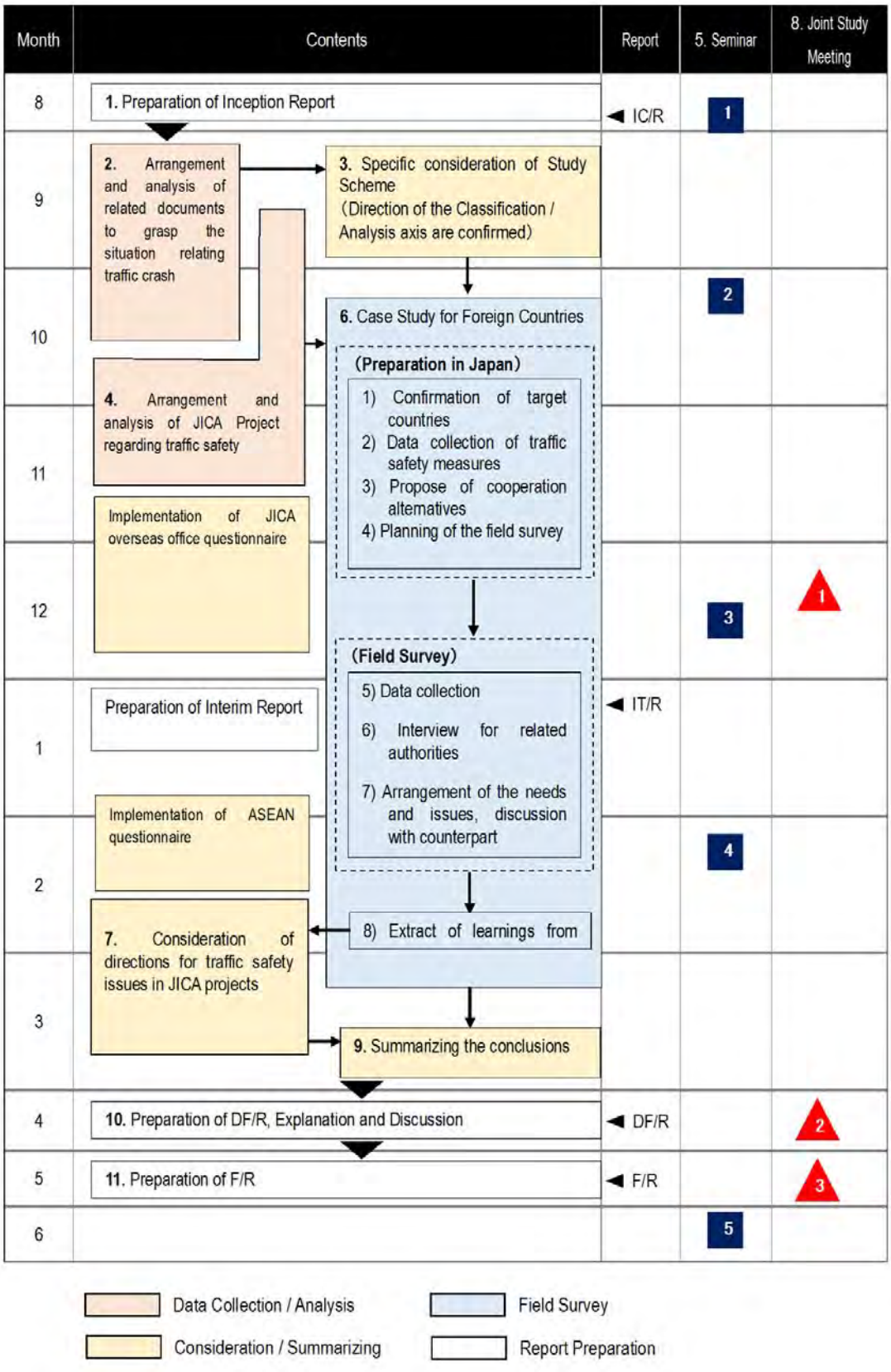


Figure 1.4.1 Overall Project Flowchart

1.5 Implementation System

The implementation system for this study is shown as follows.

Table 1.5.1 Implementation System

Study Committee	Professor Emeritus, The University of Tokyo	Katsutoshi OHTA
	General Manager, Traffic Environment Department, Japan Automobile Federation	Noboru INAGAKI
	Executive Vice President, Japan Automobile Manufacturers Association, Inc.	Masahiko NAITO
	Director, Japan Traffic Safety Association	Kenji OYAMA
	Vice President, Japan Road Traffic Information Center	Takaya FUJUMOTO
	Director General, Japan Traffic Management Technology Association	Shingo NAITOU
	Exectutive Managing Director, Engineering and Consulting Firms Association, Japan	Hisashi TAKANASHI
Secretariat of the Study	Director, Planning and Coordination Division, Infrastructure and Peacebuilding Department, JICA	Kenichi KONYA [predecessor]
	Director, Planning and Coordination Division, Infrastructure and Peacebuilding Department, JICA	Junichi MIURA
	Planning and Coordination Division, Infrastructure and Peacebuilding Department, JICA	Reiko FUNABA
Study Team	Team Leader/Traffic Safety Planning, ALMEC	Michimasa TAKAGI
	Traffic Safety Issues Analysis, ALMEC	Takeshi SAITO
	Traffic Safety Case Study Analysis, ALMEC	Manabu OHNO

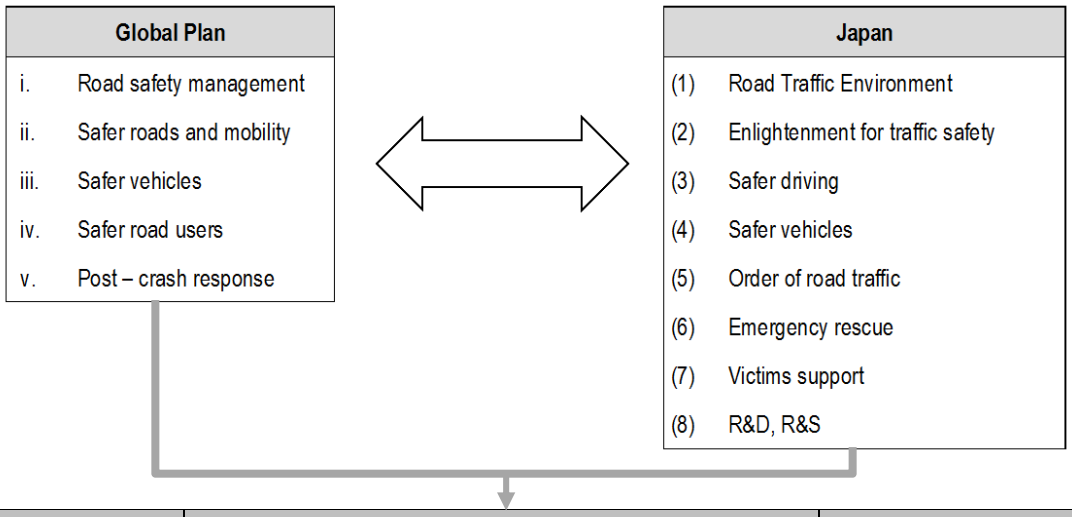
2 Fundamental Policy for the Study

2.1 Classification of Traffic Safety Measure

Based on the Traffic Safety Policies Basic Act established in 1970, Japan focused on three major components of road traffic society: (i) Human, (ii) Road, and (iii) Vehicles. And based on (i) technological surveys and analysis of traffic crash considering correlation of the major three components and (ii) effects of various traffic safety measures, the eight fields of traffic measures have been implemented comprehensively. These eight fields are consistent with the division of roles for implementation bodies, the component authorities (including budget).

The five pillars in Global Plan are also based on the three major components of road traffic society recognized in Japan. Though the interpretations of “human (safer road users)” are slightly different, they are essentially the same concepts.

In this study, based on the Global Plan and on Japanese traffic safety countermeasures, 6 categories of traffic safety countermeasures are proposed.



6 categories of Traffic Safety Measures	Actions	Key Component of Traffic Safety
Organization/Institution	Organization/Institution related to traffic safety, Development of traffic safety plan and implementation, Evaluation of the result, Traffic Safety Policies Basic Act, Review and update of driver's license system, etc.	Human / Road / Vehicles
Road	Development of road, walkway, intersection, safety facilities such as signal system, etc.	Road
Vehicle	Vehicle inspection based on the specific system Maintenance of safety device such as seatbelt, air bags, etc.	Vehicles
Traffic Order	Traffic order such as one way, traffic lane and speed limit. Maintenance of traffic order through enforcement, etc.	Human / Road / Vehicles
Emergency rescue	Expansion of emergency vehicles and Emergency medical facilities	Human
Education	Traffic safety education at schools and local communities, driving lessons with license system, update of drivers' license, etc.	Human

Figure 2.1.1 The 6 Categories of Traffic Safety Countermeasures Proposed in this Study

2.2 Opinions in the Study

As shown in international trend of traffic crashes, people in lower economic levels have higher risks to be in traffic crashes (as discussed more in Section 3.2, Trend of Traffic Crash in the World). However, every life is equal in significance, and the major premise that JICA contributes to traffic safety is to “save life”.

The crash situations by country vary depending on level of economic development, progress of motorization, and development of infrastructure. And for traffic measures to succeed, the regional characteristics and respective cultures should be taken into consideration, otherwise they might exacerbate the situation.

Thus, since traffic crashes are caused by varying factors, the measures should be implemented comprehensively. The above mentioned six classifications (Institution/system, Road, Vehicles, Order, Emergency rescue, and Education) should be developed in the right equilibrium.

On the other hand, JICA transportation projects were committed focusing on the development of infrastructures such as road and traffic facilities. However, since emphasis was only on infrastructure, traffic safety management has been sorely lacking.

Based on these issues, the project study is conducted with following views:

- View 1：Focusing on region, community and culture
- View 2：Considering “total balance” of traffic safety measures
- View 3：Considering “management issues” for infrastructure development

In addition, for (i) regions given so-called “horse and buggy age” or take over the culture and (ii) regions where walking has been the major mode from age to age, the basis of infrastructure development is different. Such issues are taken into consideration in the causes of traffic crash. In this project study, Asian countries developed with walking based lifestyles, especially ASEAN regions, are specifically considered.

View 1 : Focusing on region, community and culture

Traffic Safety is to save the live and life of the people. Behaviors of people are based on their nationality and culture. Traffic safety measures without consideration of such basic premises can't be effective as expected.

For example, motorcycles and paratransit have rapidly increased and are major transportation modes in Southeast Asia countries. Such characteristics are not seen in Japan and other developed countries. Social maturity, lifestyles and educational standards also vary by countries.

Analysis of previous reports, document investigation, field survey

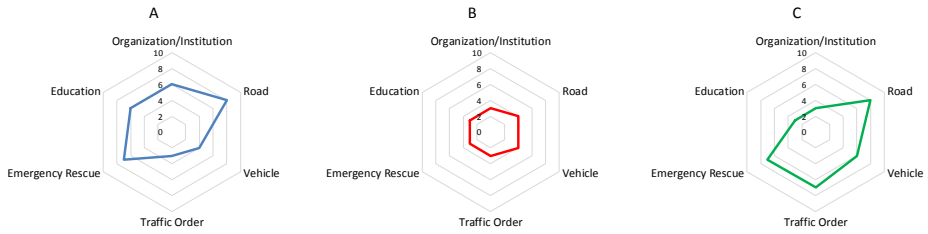
- Including the view of economic values, the issues such as "necessity to save the live and life" and "necessity to invest for the development "are rearranged.
- Nations and Cities are classified (according to economic development stage, regional linkage, historical background). And the classification of traffic safety issues and the directions of the measures are arranged.

Figure 2.2.1 Project Study View 1

Source: Study Team

View 2 : Considering "total balance" of traffic safety measures

For most of developing countries, the traffic safety measures are uneven and have a low level of overall standard.



Analysis of previous reports, document investigation, field survey

For countries / cities with substantial need for traffic safety measures, the direction of the measures are clarified.

Figure 2.2.2 Project Study View 2

Source: Study Team

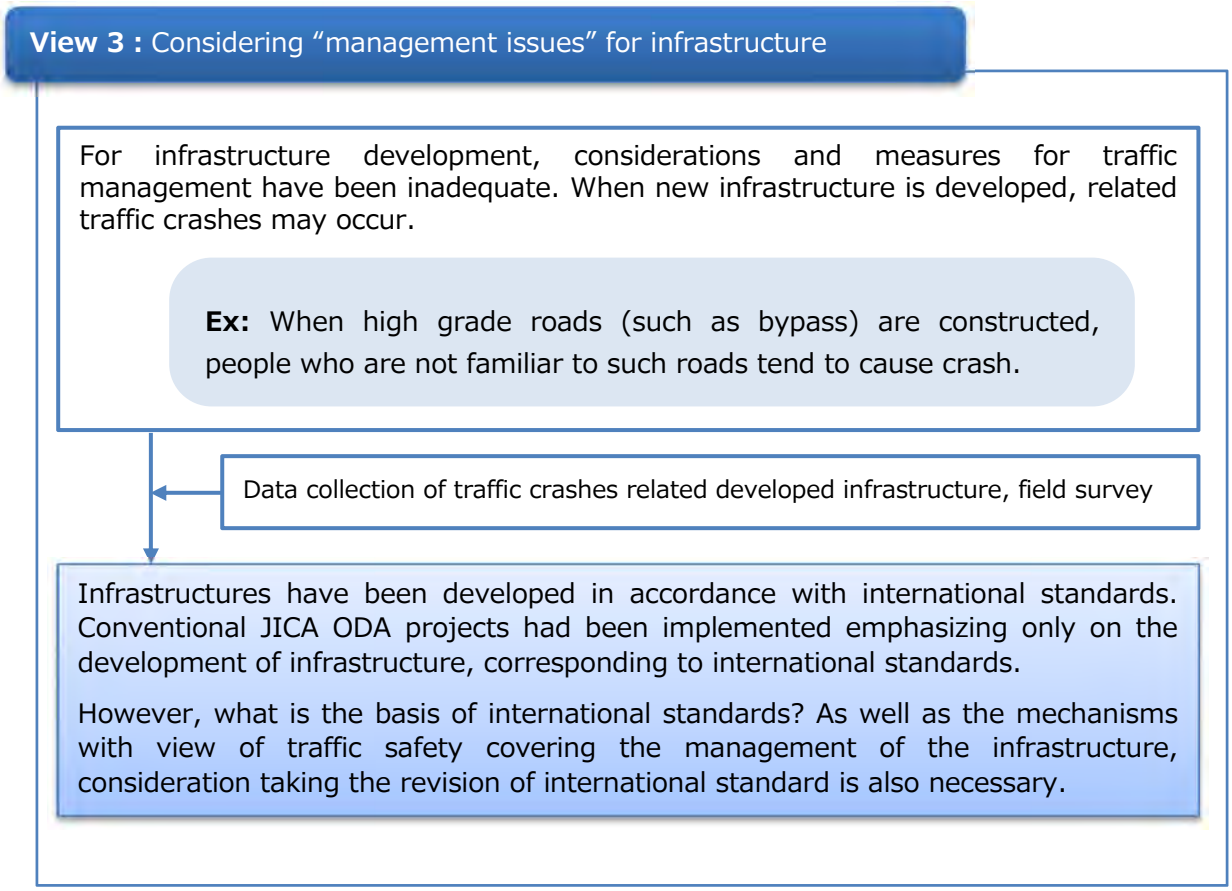


Figure 2.2.3 Project Study View 3

Source: Study Team

3 Overall General Situation Regarding Traffic Safety

3.1 Traffic Safety Measure in Japan

Traffic safety measure in Japan has been promoted based on the Traffic Safety Policies Basic Act enacted in 1970. The trend on the number of traffic crashes and traffic safety measures referred above are shown in Figure 3.1.1 and Table 3.1.1.

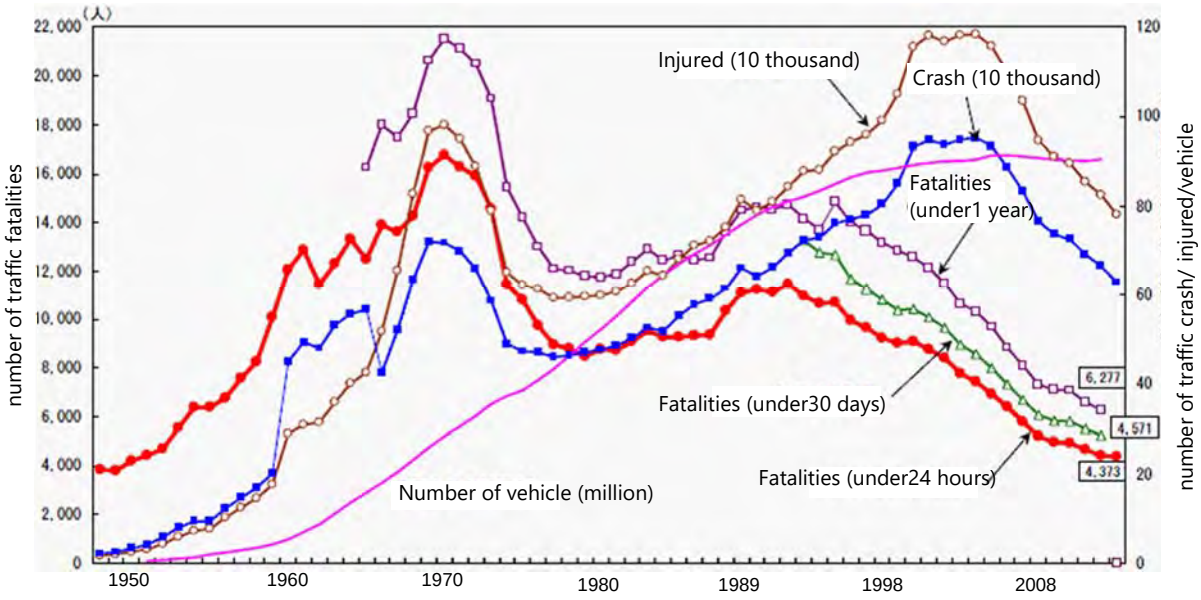


Figure 3.1.1 Trend of the Number of Traffic Crashes

Source: Bureau of Transportation National Police Agency

Table 3.1.1 Overall Situation of Traffic Safety by Phase

High economic growth period	Measures for 1st Traffic war	Stagnation of the effect of traffic safety measures and arrival of 2nd Traffic War	Decrease the number of traffic fatalities by further traffic crash measures
～1970	1971～1980	1981～1990	1991～
・Increase in the number of cars due to rapid motorization ・Increase in the number of traffic crashes and traffic fatalities	・Traffic crashes regarded as social problem ・Implementation of Basic traffic safety measures ・Familiarized traffic safety manner ・Decrease in the number of traffic fatalities	・Rebound of traffic fatalities ・Traffic crashes by specific factor (speeding, elderly driver, young driver, and mixed motorbike and vehicle)	・Implementation of traffic safety measures for specific factor ・Further decrease of traffic crashes since 2000

3.2 World Trend of the Number of Traffic Crashes

3.2.1 World Trend of Traffic Crashes

The trend was almost unchanged from 2009 to 2015. On the other hand, population and the number of vehicles has increased by about 30%. Therefore, the traffic fatality rate per population or per number of vehicle tend to be decreasing. Thus, traffic fatality rate depends on the economic level.

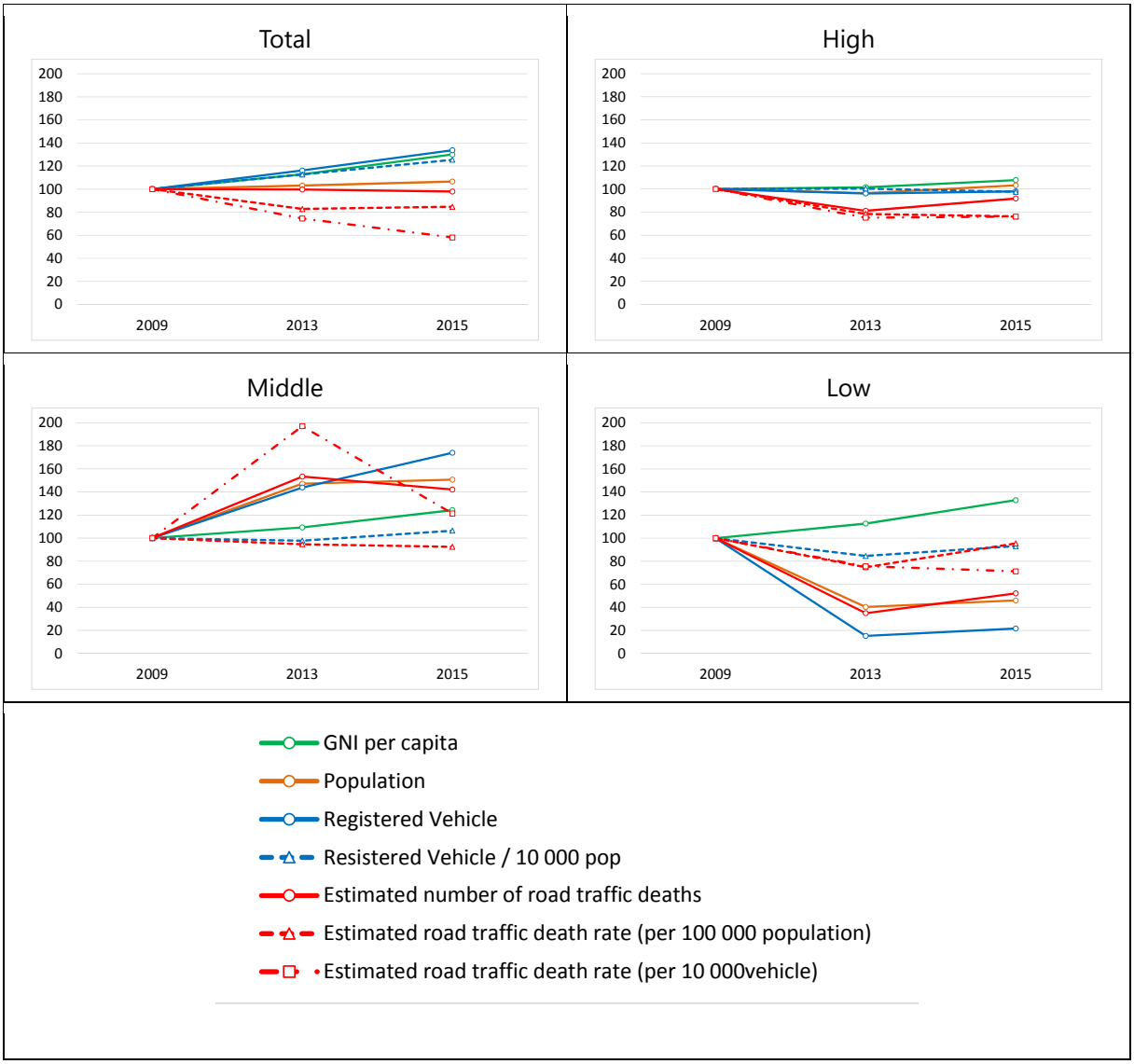


Figure 3.2.1 Relation Between Economic Level and Traffic Crash
(indicator based on 2009 number as 100)

Source: WHO Report 2009, 2013, 2015

3.2.2 Traffic Crashes by Economic Level

Traffic fatality increases as economic level lowers. And this trend is observed per population and per vehicle. Especially, the trend is remarkable in traffic fatality rate per vehicle numbers where there is high level of traffic crashes by pedestrians and bicycles in developing countries since the level of motorization in these countries are still relatively low.

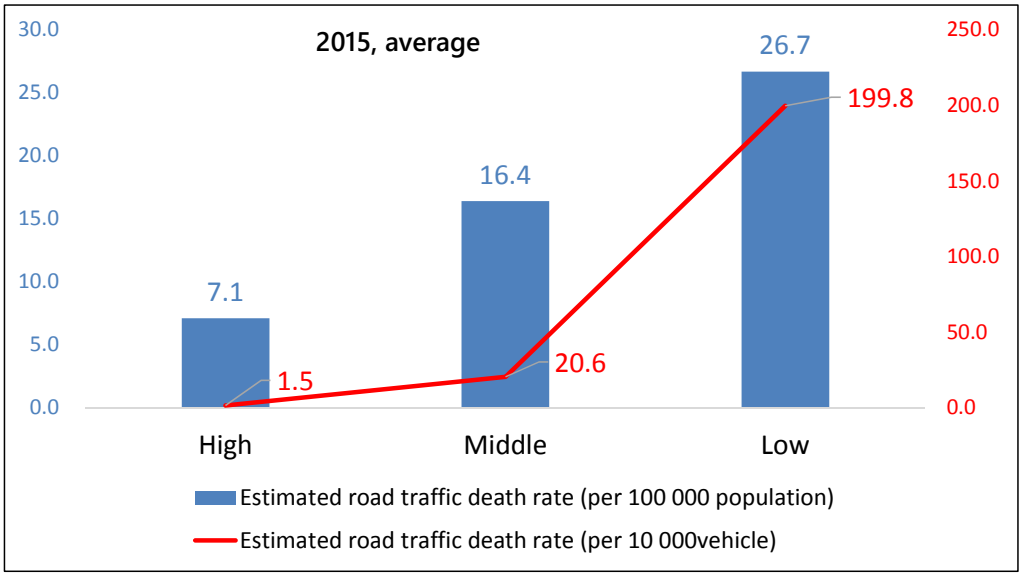


Figure 3.2.2 Relation Between Economic Level and Traffic Crash

Source: WHO Report 2009, 2013, 2015

The rate of vehicle ownership and traffic crash rate, which is number of traffic fatalities per population, is the higher vehicle ownership ratio while the low traffic crash rate is in high income countries. In contrast, middle income countries exhibit the opposite trend. In particular, Thailand, Vietnam, and Malaysia have high traffic crash rate per owned vehicle number. This might be due to high motor bike share.

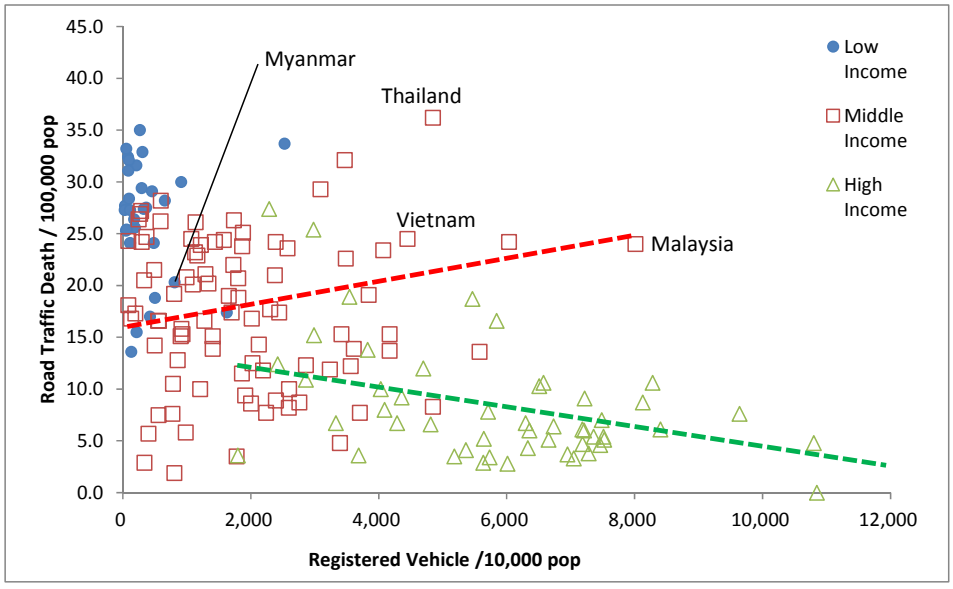


Figure 3.2.3 Relation between Vehicle Ownership Rate and Traffic Crash

Source; WHO Report 2015

3.3 Trend of Traffic Crashes in ASEAN Countries

3.3.1 Trend of Traffic Crashes in ASEAN Countries

In terms of distribution ratio of traffic fatalities, motorcycle and tricycle (mainly motor bike) account for 60 to 70% in Thailand, Cambodia, Malaysia and Lao. The danger of traffic crashes caused by motorbike are shown in Figure 3.3.1. On the other hand, distribution ratio of traffic fatalities is in Myanmar has been varying as the country's rate of motorization is increasing.

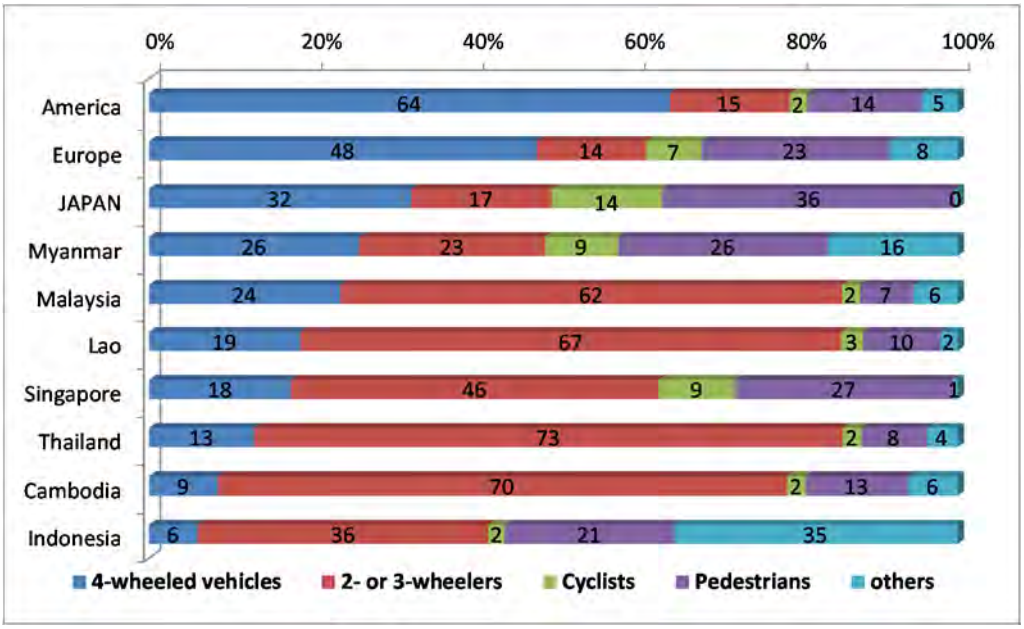


Figure 3.3.1 Distribution Ratio of Traffic Fatalities in ASEAN

Source; WHO Report 2015

Asian countries such as Thailand, Vietnam and Indonesia have followed Japan's model of prioritizing issues, with first, increase in number of traffic fatalities due to motorization; second, decrease of traffic fatalities by traffic safety measures; and lastly, rebound by a stagnation of the effect of traffic safety measures.

In Malaysia, the traffic crashes have increased gradually except for a period of rapid traffic fatalities.

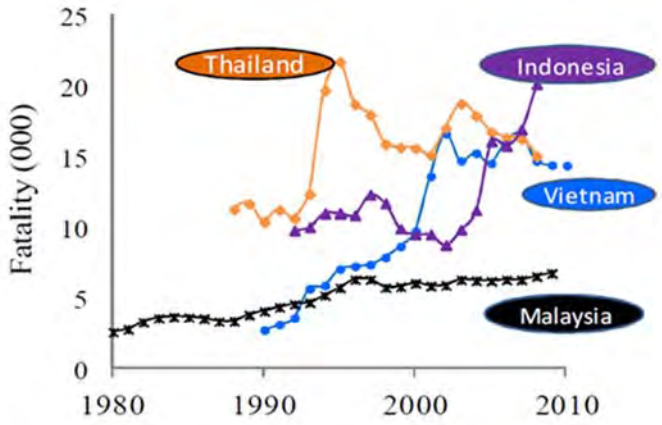


Figure 3.3.2 Trend of Traffic Fatalities

Source: Series of statistical yearbooks of respective countries

4 Implementation of Overseas Study

4.1 Outline of the Overseas Case Study

The overseas study is aimed to gather vital information and analyze the issues to examine the way road safety ought to be through JICA's projects as well as formulation of possible projects including pilot projects and trainings. The study also contributes by collecting necessary materials to extract concrete problems concerning road safety in the countries of study.

The target countries of this study are the ASEAN countries of Myanmar, Malaysia and Thailand.

In Myanmar, along with the economic revitalization of the country in recent years, motorization in society is progressing rapidly. However, with regards to traffic safety, there is insufficient know-how and a lack of institutional capacity to implement comprehensive traffic safety countermeasures. In the future, there will be a large effect when traffic safety countermeasures are considered along with the development of infrastructure.

On the other hand, in Malaysia and Thailand, economic development has already progressed and despite the development of institutions for traffic safety, there is still a high risk from traffic crashes from these countries. From a close investigation of the reasons, it is expected that in the future, effective lessons can be learnt with regards to traffic safety in the ASEAN countries.

4.1.1 Schedule of the Overseas Study and Destinations

Table 4.1.1 Sample Country/City and Destination

Sample Country/City	Destination
Yangon, Myanmar Mar. 2 (Wed.)—Mar. 10 (Thu.), 2016	a. Traffic police b. Road Transport Administration Department (RTAD) c. Transport Planning Department (TPD) d. Yangon Division Traffic Rules Enforcement Supervisory Committee (TRESC) e. Yangon Division Central Supervisory Committee for Motor vehicle and Vessels (Ma Hta Tha Central) f. Yangon City Development Committee (YCDC)
Kuala Lumpur, Malaysia Mar. 10 (Thu.)—Mar. 17 (Thu.)	a. Ministry of Transport (MOT) b. Malaysia Road Safety Department (JKJR) c. Malaysian Institute of Road Safety Research (MIROS) d. Land Public Transport Commission (SPAD) e. Road Transport Department (JPJ) f. Shell Road Safety Division
Bangkok, Thailand Mar. 17 (Thu.)—Mar. 19 (Sat.)	a. Mr. Teerapong Rodprasert, Deputy Minister, Office of Transport and Traffic Policy and Planning（OPT）, MOT

4.1.2 Major Items to Survey

- **Outline of Countermeasures to Traffic Crashes**
  1) Responsible agencies concerned with countermeasures to Traffic Crashes
  2) Data to be used to formulate countermeasures to traffic crashes
  3) Examples of Implementation of traffic crash countermeasures
- **Traffic Crashes Peculiar to the Target Country and Issues on Countermeasures**
  1) Traffic Crashes Peculiar to the Target Country and Its Reasons in Comparison with the Other Countries
  2) Issues on Countermeasures (What are the concerns?)
- **Video Survey**
  1) Find out the crossings where most traffic crashes happen and observe with videos

4.2 Result of Case Study in Myanmar

4.2.1 Traffic Situation of Yangon City

- Since there is little space to go across the roads safely in the City, many pedestrians walk across the roads in a disorganized manner. It is extremely unsafe that pedestrians, who could not reach the opposite walkway, often stand in the middle of the road.
- Most of the roads have 2 lanes in each direction; however, the lanes next to the walk ways are often occupied by parked vehicles or stopping buses. Passengers and Tuk-tuk vehicles often collide with cars in their attempt to avoid parked vehicles.
- Many buses more frequently stop near the origin and the destination stops, since there is no terminal for the route bus in the City. Hence, it is dangerous that somebody often appears behind a bus. Most route buses often stop to let passenger get off and on anywhere regardless of the locations of the bus stop. This results in passengers about to jump into a bus often being hit by overtaking vehicles. Currently, there are around 3500 buses in Yangon, however, the bus vehicles are old and safety measures for these buses have not been thoroughly considered.
- Due to low quality of vehicles, these easily break down. The study team spotted a few times vehicles that have broken down which are stuck in the middle of the road. While some buses run on CNG gas, however, these vehicles tend to break down easily due to poor quality.
- Crashes and traffic jams are everywhere in Yangon City surrounded by rivers because cars, buses, and motorbikes concentrate at the points of river crossing.
- Few road lights and even fewer lights coming from the buildings on the roadsides make nights of the City pretty dark. That’s why many vehicles cast the headlights highly, causing blinding of other motorists.

Disorganized road crossings by pedestrians

Opposing traffic crossing the centre traffic line

Figure 4.2.1 Traffic Situation of Yangon City

Source: Study Team

4.2.2 Observations from the Overseas Survey

The number of registered vehicles in Myanmar has rapidly increased after 2011 when regulations on importing cars were lifted. Recently, this number reached 770,000 cars and 4,500,000 motorbikes. This increasing trend seems not to continue since the number of vehicles owned per 100 persons is still as low as 100 vehicles including motorbikes. The number of vehicle ownership is expected to increase more as the rate of motorization increases further. Given the regulations upon the use of motorbikes, the number of cars in Yangon outnumber motorbikes dominating 67% of the total number of cars nationwide. This is one of the major causes of the road congestion.

The number of traffic crashes has surged since 2011, registering 4,420 fatalities in 2015 which is 1.5 times more than four years ago. Half of the fatalities were motorcycle riders. The urban areas, except Yangon, are seeing rapid growth. There is also a large number of fatal crashes caused by commercial vehicles such as trucks and buses. They say more than half of the crashes is due to human-related factors caused by ignorance of traffic rules.

The crashes caused by motorbike is relatively low due to the regulations on motorbikes of Yangon City, but the crashes related to pedestrians and buses have frequently occurred. According to the data given by the operator of the route bus, the number of crashes relating to bus increased to 248 cases in 2015, which resulted to 75 fatalities and 600 injuries, making it a serious concern.

The expressway between Yangon and Mandalay that runs North and South of Myanmar has registered quite a high number of traffic crashes where 7 to 22 people are killed, 20 to 86 people are injured, at the rate of 5 to 8 traffic crashes annually. Given the relatively small volume of traffic in the expressway, the danger of traffic crash is considered to be quite high. Furthermore, given the fact that those numbers of crashes came out only within Yangon administrative area, the entire route seems to have a far more serious situation.

In order to take on road safety policy, government established the traffic safety council headed by the Vice President in 2015. The council comprises of the government agencies related to road safety including Ministry of Transport, the police, and some medical entities. The same kind of organizations have been formed in some regional governments. Thus, organized preparation for general measures of

road safety is ongoing. The study team learned that every council is yet to implement concrete countermeasures due to lack of budget through the discussions with the members of the councils. For instance, the police does not have equipment to enforce traffic violations. Emergency medical team does not have enough ambulances, and there is no sufficient budget for road safety.

In contrast, statistics about traffic crash has been well prepared with data by category, region, month, time range, and others. However, the authorities have not reached the point of analyzing their data followed by the formulation of concrete countermeasures and actions. Hence, it's not only the matter of lack of budget, but also the matter of structure to study and implement road safety. Now that the budget is about to deplete, it seems that the government expects private investment to develop public infrastructures, paying little attention on road safety.

4.3 Result of Case Study in Malaysia

4.3.1 Traffic Situation of Kuala Lumpur City

The study team surveyed the traffic situation focusing on the main routes around Kuala Lumpur where a large number of traffic crashes has been reported. However, given the limited time to conduct the survey, the study team based their observations and conclusions on the present situation wherein both the facilities for road safety and the public transportation systems such as monorail and LRT have been developed. These factors eventually led to the sophisticated development of the transportation environment that differentiates the City from the category of developing country. However, despite level of transport development in Kuala Lumpur, the following issues on road safety perspective exist:

- Although the network of the large main roads with more than 2 lanes on each side has been developed, many parts of it are heavily congested. The heavy congestion is mainly caused by a mix of traffic in diverging points, mixture points, and crossing points.

Figure 4.3.1 Traffic Situation of Kuala Lumpur City

Source: Study Team

- While the number of lanes were increased to ease traffic jam, the team however observed that this still failed to resolve traffic jams for the following reasons: (i) lane angling did not consider the diverging and merging traffics, and (ii) increase in number of lanes was only focused on accommodating the volume of traffic and did not consider measures on addressing the increasing rate of motorization.
- One of the major causes of traffic jams is the weaving of traffic from the 3-lane main road with diverging or merging traffic from these additional lanes as short as 100- to 200-meter only.

- To address this, it is important to make the speed of traffic on each lane uniform. To do so, it is essential to adjust the length, angle and intervals of additional lanes at either diverging or merging points.
- Many junctions are controlled by traffic lights which have very long cycles, with some traffic lights having cycle length longer than 200 seconds. This results in a tendency for either vehicles or pedestrians to ignore the traffic lights. It is important for the concerned personnel to have a clear understanding on how to optimize cycle lengths.

4.3.2 Remarks after the Overseas Survey

- The agencies and organizations in charge of road traffic safety in Malaysia are very much defined and provides adequate technical support and expertise to address traffic safety issues and reduce the number of traffic crash victims.
- It was noted that the practice and responsibility of road safety education is not limited to the governmental bodies including the national, municipal, and provincial governments but also involves the private companies. In particular, SHELL regularly conducts road safety education which has resulted in very positive and significant outcomes. SHELL continues its road safety education program as part of its CSR activities and targets drivers of large trucks and other vehicles, handing over some of its outcomes to the national administrative institutes.
- The traffic safety agencies and organizations undertake the collection and analysis of traffic crash data which become the basis for the formulation of proposed countermeasures. These data, analysis and recommendations are incorporated in the road safety master plan which is in turn is the main reference for project planning and implementation.
- The procedures to examine the traffic countermeasures are widely recognized. They also understand and implement a range of procedures including data collection and analysis about road safety, formulation of the countermeasures based on the analysis, planning for road safety, implementing the plan, and monitoring and evaluation of the result.
- However, it was also observed that coordination among agencies is inadequate. This might be due to the very independent nature of each agency in Malaysia. When the study team asked about concrete countermeasures, each agency explained its respective measures which are not comprehensive. The bottleneck may therefore be attributed to this lack of coordination among the many agencies involved in road safety, coupled with how federal government of Malaysia is structured in such a way that the 13 states and 3 federal territories are independent of each other. However, authorities of respective administrative government should realize that critical to road safety is a properly coordinated plan among all authorities of all administrative units.

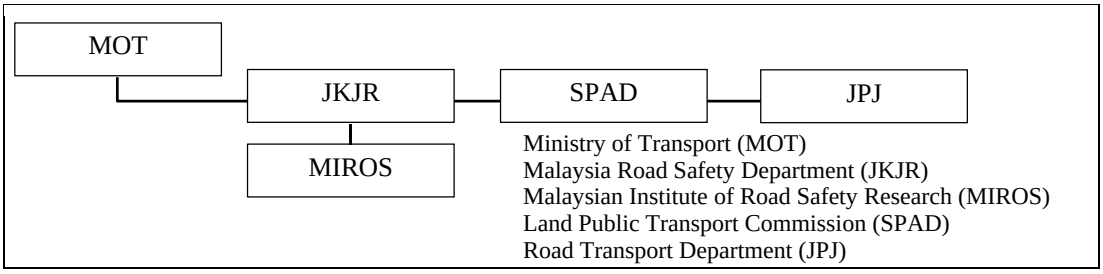


Figure 4.3.2 Organizations Related to Road Safety in Malaysia

Source: Study Team

4.4 Result of Case Study in Thailand

The study team had a meeting with the Office of Transport and Traffic Policy and Planning (OPT) and Mr. Teerapong Rodprasert, Vice Minister of the Ministry of Transport (MOT). The study team heard the trends of road traffic in Thailand and its expected cooperation from Japan.

MOT recognizes that Thailand is ranked as the country with the highest level of fatality per population due to traffic crashes. And it is now targeting to decrease by half the number of fatalities by 2020 consistent with UN－Resolution by implementing traffic countermeasures. The implementation part however is yet to be realized to address the traffic crashes, 70% of which are caused by motorcycles, and 80% of these crashes are caused by human error.

However, MOT's role is limited because road safety is the mandate of the Department of Police under the Ministry of Interior. Although there is an established National Road Safety Committee by the Department of Police, the recent unstable political situation in the country has put traffic safety on the sideline eventually breaking the momentum for the progress on concrete road safety measures.

Since data and information on one traffic crash varies depending on its source such as the police, hospitals, and insurance companies, it is impossible to determine which is the accurate account. In addition, since data analysis is done by traffic institutes which are not directly under any of the administrative body, data analyses are not periodically conducted and results are not properly incorporated for policy making activities. It was also observed that there is no strict enforcement of traffic rules on traffic violators because the agency in charge on road safety is preoccupied with the ongoing political turmoil in the country.

During the meeting, OPT requested for the Japanese side's technical cooperation in the creation of a road safety master plan to address the issues of lack of institutional policy and inadequate road safety administration to curb the increasing number of traffic crashes. However, OPT also recognizes that the Department of Police which is on top of road safety administration may not have the adequate capacity to implement the master plan that will be formulated. With this, the Vice Minister of MOT suggested a more realistic strategy which is to implement safety measures that will target areas that can be controlled by the MOT, as follows:

- Integration of data on traffic crash and its analysis
- Implementation of road safety audits and examination of measures
- Control of safe driving by route bus and cargo vehicles
- Promotion of smart road plan（i.e. ITS-oriented road safety management）
- Review of drivers' licensing system and training institutes to ensure that a driver learns safe driving techniques before he is issued a license.

5 Examination of the Future Trends of Traffic Safety with Regards to JICA Projects

5.1 Japan's Efforts at Traffic Safety

When formulating a traffic safety plan, the most important tasks are the collection of the current traffic situation, data analysis, formulation of appropriate counter measures, and implementation, monitoring and modification of countermeasures (if necessary).

For the appropriate traffic conditions, it is indispensable that the countermeasures respond to changes in the traffic problems that are caused by changes in social conditions as well as changes brought by the times. During the process of examination, the most important is to identify the traffic conditions that are caused by changes in social conditions and those brought about by the changes in time. Upon understanding the various factors contributing to traffic conditions, the countermeasures should be examined.

In the case of Japan's efforts on traffic safety, even with very little changes over time, no matter what the era is, the same procedures were implemented. For understanding the history and contents of these efforts in traffic safety, the background of road traffic for each era and the traffic problems that occurred during each era were studied and the countermeasures that were applied were presented.

Figure 5.1.1 shows the trend of the number of traffic crashes, fatalities and injuries caused by traffic crashes from 1950-2013. This figure shows that the highest number of fatalities due to traffic crashes was recorded at 16,765 fatalities in 1970 and this was referred to as the "1st Traffic War". The following years saw a temporary declining trend which was then followed by another spike in 1988 where 10,344 fatalities were recorded. This period was then referred to as the "2nd Traffic War".
The term of "Traffic War" was coined due to the fact that the number of fatalities from traffic crashes in 1959 (over 10,000) and the following year of 1960 (over 10,000) exceeded the number of fatalities from the Sino-Japanese War of 1894-1895.

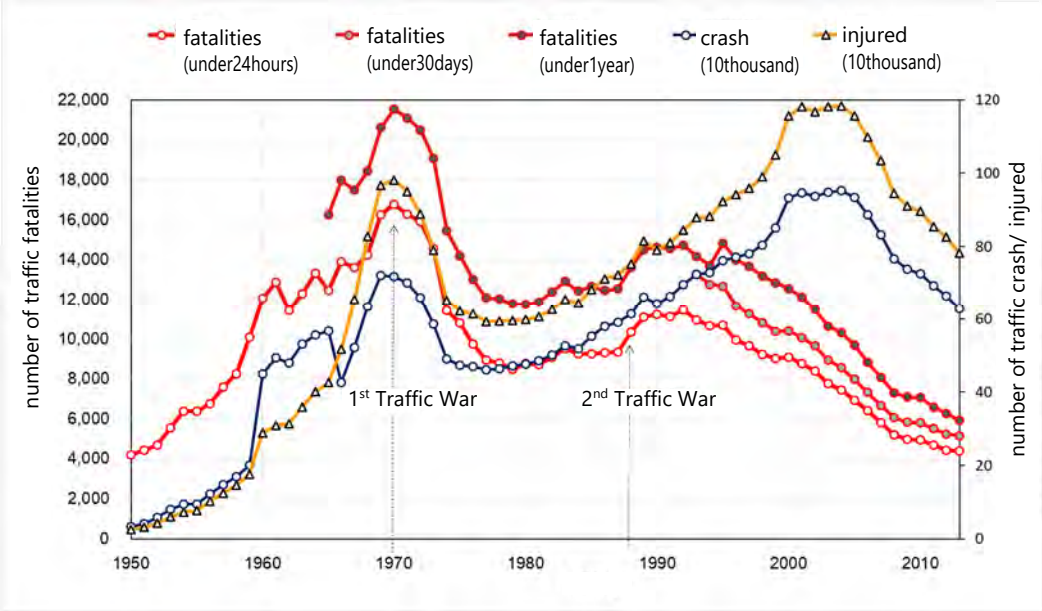


Figure 5.1.1 Change in the Number of Traffic Crashes, Fatalities and Injuries in Japan
Source: White Paper on Traffic Safety 2015

To identify the primary cause of this trend, it was necessary to examine all elements related to traffic crashes. Examples are shown as follows.

Figure 5.1.2 shows the trend of the number of vehicles in Japan from 1956-2003 and the proportion of the composition of vehicle types. According to the figure, during the "1st Traffic War" in 1970 and 7-15 years before (1956-1963), it is notable that proportion of the composition of "motorcycles" and "motorized two-wheeled vehicles" increased. Also, in 1988 during the "2nd Traffic War" and 10 years before it, the proportion of the composition of "passenger cars" increased and it is evident that approximately 5 years before, the proportion of "motorized two-wheeled vehicles" increased. Furthermore, investigating the background in this era where these vehicle types had increased in numbers is an important first step in the formulation of traffic safety countermeasures.

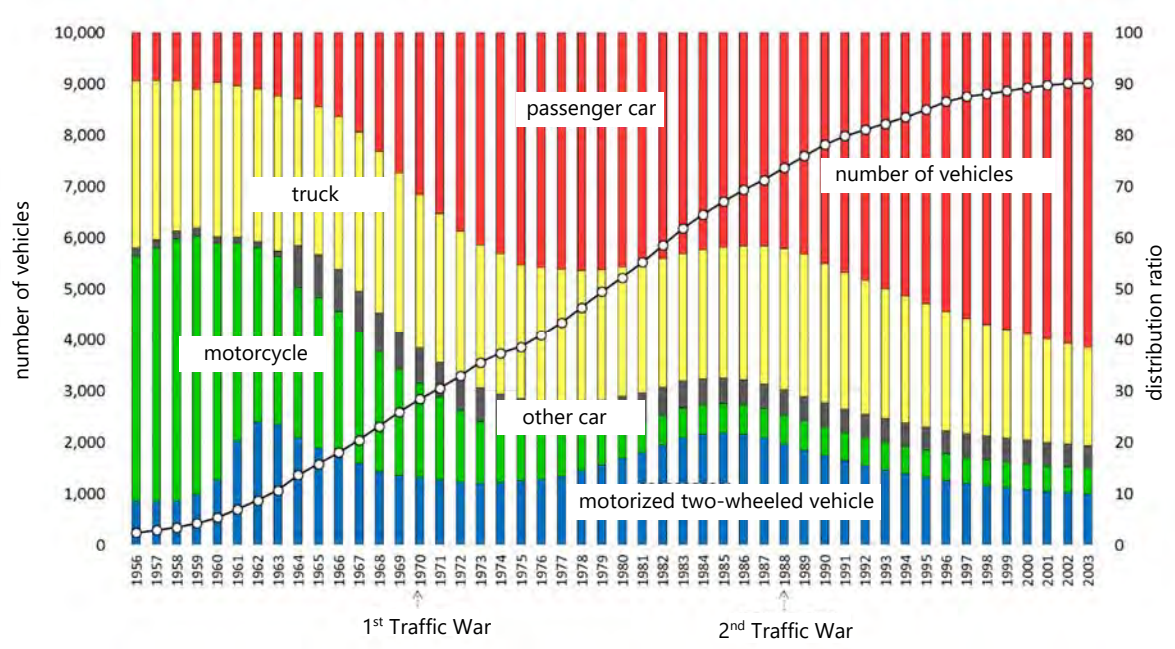


Figure 5.1.2 Change in the Vehicle Ownership by Type and the Composition of Vehicle Types in Japan
Source: White Paper on Police 2005

Figure 5.1.3 shows the trend of fatalities by different conditions from 1956-2013. Figure 5.1.4 shows the composition of the fatalities by different conditions in the same period.

Up to and before the "1st Traffic War" in 1970, it was remarkable that there was an increasing trend in the number of fatalities from "pedestrians", "car passengers" and "passengers on motorized two-wheeled vehicles". Also, during the period from the "1st Traffic War" to the "2nd Traffic War", every time there was a decrease in the number of fatalities, there was the trend of increasing fatalities again. After the "2nd Traffic War", the number of fatalities from "car passengers" increased remarkably and by 1993, the number of fatalities reached 4,835. Afterwards, for every situation, there was a change where it was always followed by a decreasing trend in the number of fatalities. In 2013, the number of fatalities from "pedestrians" and "car passengers" reached 1,584 and 1,415 respectively.

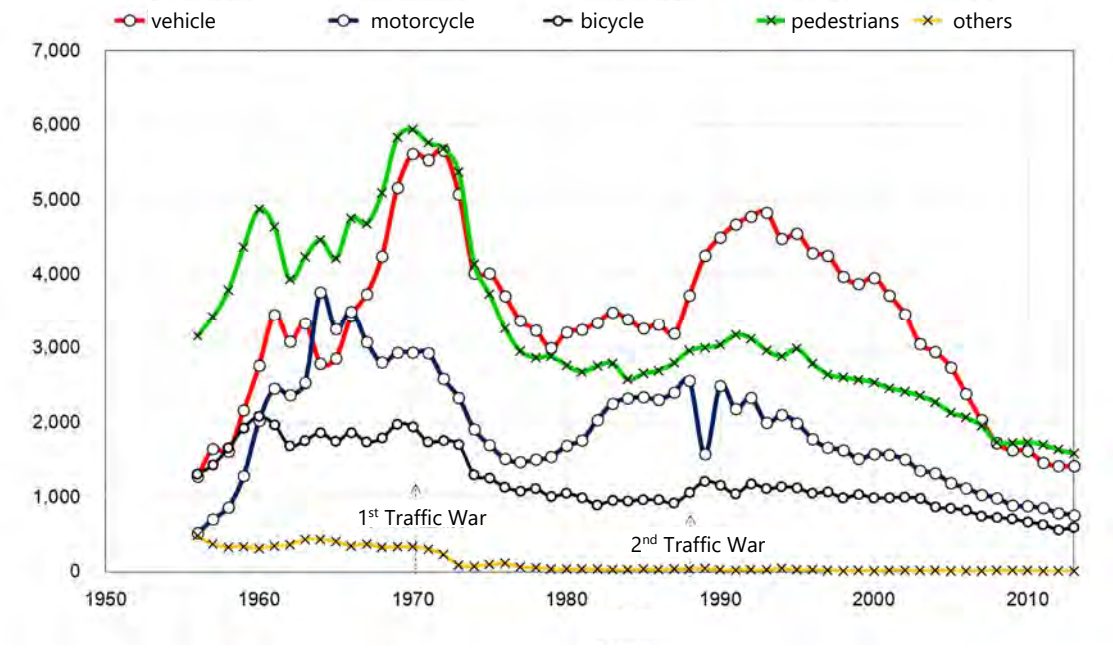


Figure 5.1.3 Change in the Number of Fatalities by Condition

Source: Traffic statistics 2013

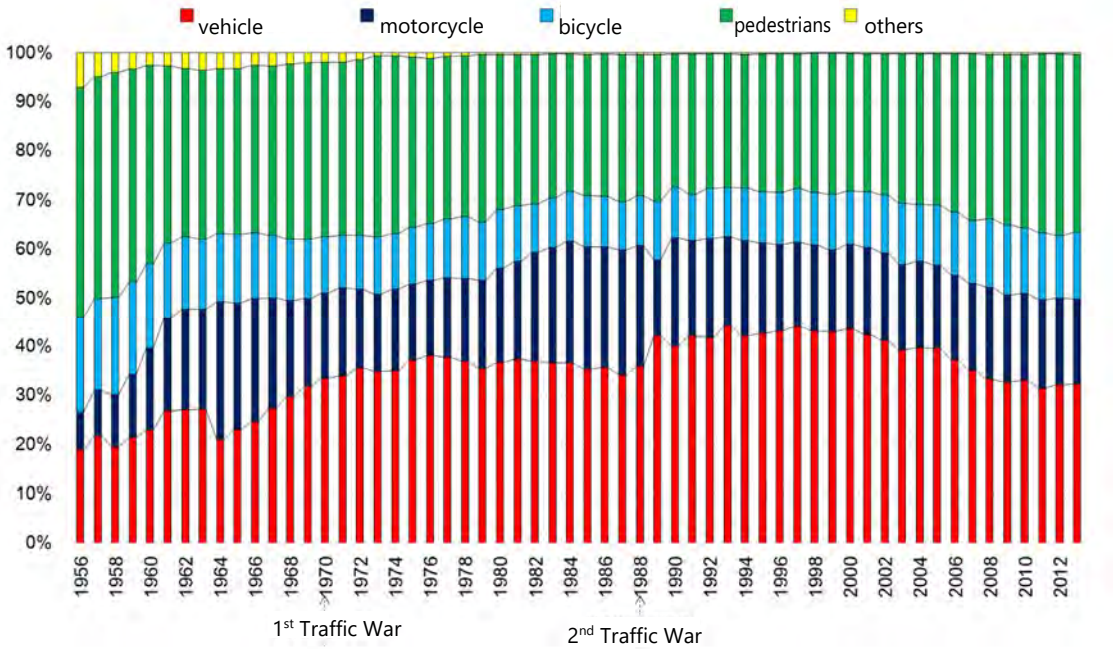


Figure 5.1.4 Change in the Composition Rate by Condition

Source: Traffic statistics 2013

Figure 5.1.5 shows the change in fatalities and injuries from traffic crashes based on the number of drivers' licenses, vehicle ownership and vehicle-km for the period of 1960-2013.

During the time of the "1st Traffic War" in 1970, the "number of fatalities and injuries" reached its peak. It is remarkable that there was an increasing trend on "vehicle-km" and the "vehicle ownership". This was followed by a temporary decreasing trend but by the period referred to as the "2nd Traffic War", there was again a remarkable increase in trend of the "vehicle-km" and the "vehicle ownership".

This was followed by the number of fatalities and injuries reaching the highest recorded number of around 1,191,000 in 2004 which then changed to a decreasing trend after. Also at the same time, the

"vehicle-km" also reached its peak in 2004 but then changed to a decreasing trend. Looking at this trends, it can be seen that there is a relationship between the vehicle ownership and vehicle-km and fatalities and injuries from traffic crashes.

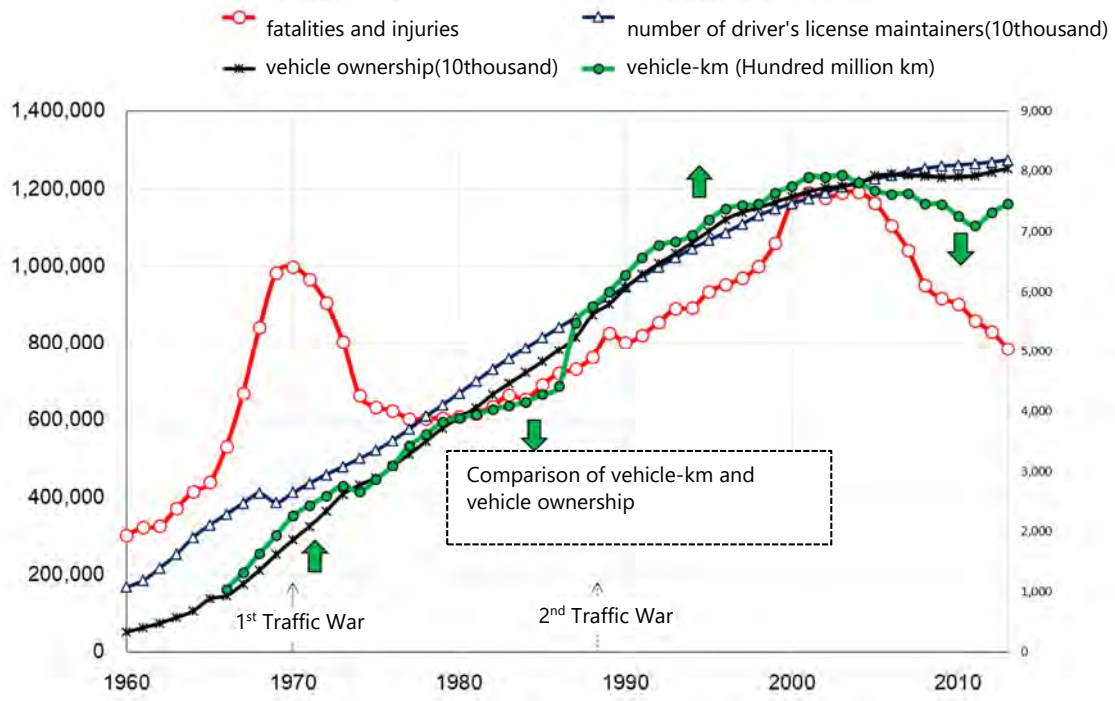


Figure 5.1.5 Change in Fatalities and Injuries and Vehicle-km from Traffic Crashes
Source: White Paper on Traffic Safety 2015

Figure 5.1.6 shows the change in the fatalities and injuries per 100,000 persons, fatalities and injuries per 10,000 vehicles and fatalities and injuries per 100,000,000 vehicle-km for the period of 1967-2013.

The highest number of "fatalities and injuries per 100,000 persons" was recorded in 1970 and overlapped with the "1st Traffic War". However, for "fatalities and injuries per 10,000 vehicles" and "fatalities and injuries per 100,000,000 vehicle-km", the highest recorded number was in 1968.

Also, looking at the "2nd Traffic War" in 1988, the "fatalities and injuries per 100,000 persons" showed an increasing trend. However, the "fatalities and injuries per 10,000 vehicles" and the "fatalities and injuries per 100,000,000 vehicle-km" did not show an increasing trend; instead, these two indicators showed a decreasing trend. In addition, for "fatalities and injuries per 100,000 persons", the highest number recorded was from 2001-2004. However, there was a constantly decreasing trend recorded for "fatalities and injuries per 10,000 vehicles" and "fatalities and injuries per 100,000,000 vehicle-km".

What does this mean? It can be an important characteristic to examine the traffic countermeasures. In other words, the characteristic of fatalities and injuries from traffic crashes can be clarified not by looking at "…per vehicle ownership" or "… per vehicle-km", but by looking at the "…per population" figure. This means that the same number of fatalities per 100,000 persons can have different breakdown vis-à-vis the period these were recorded.

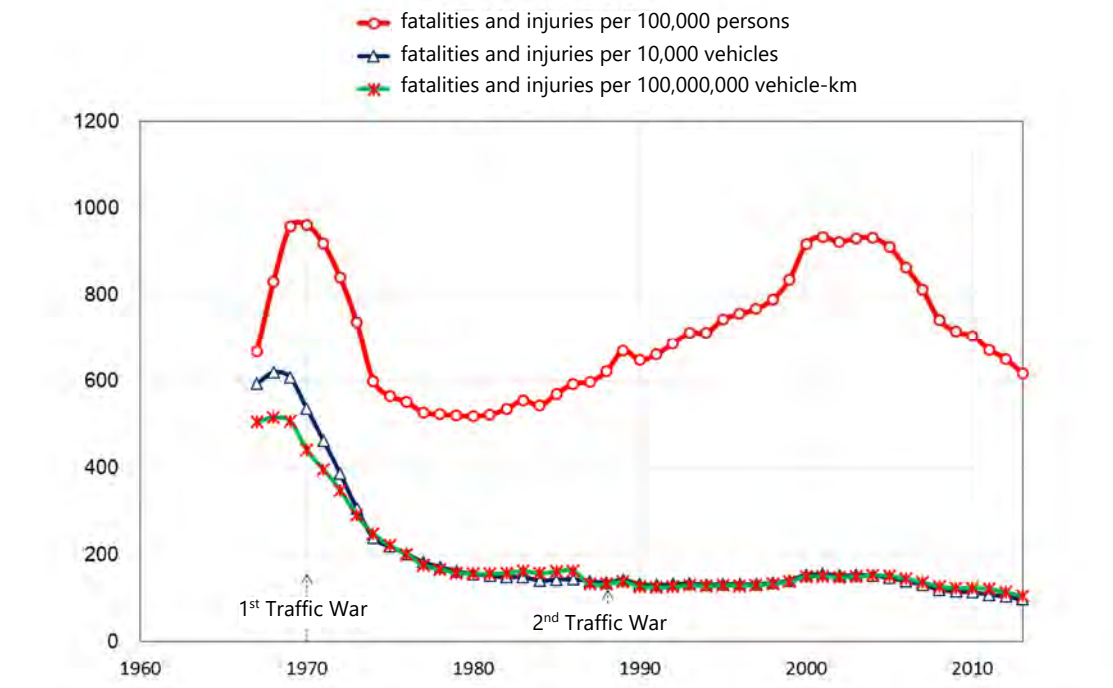
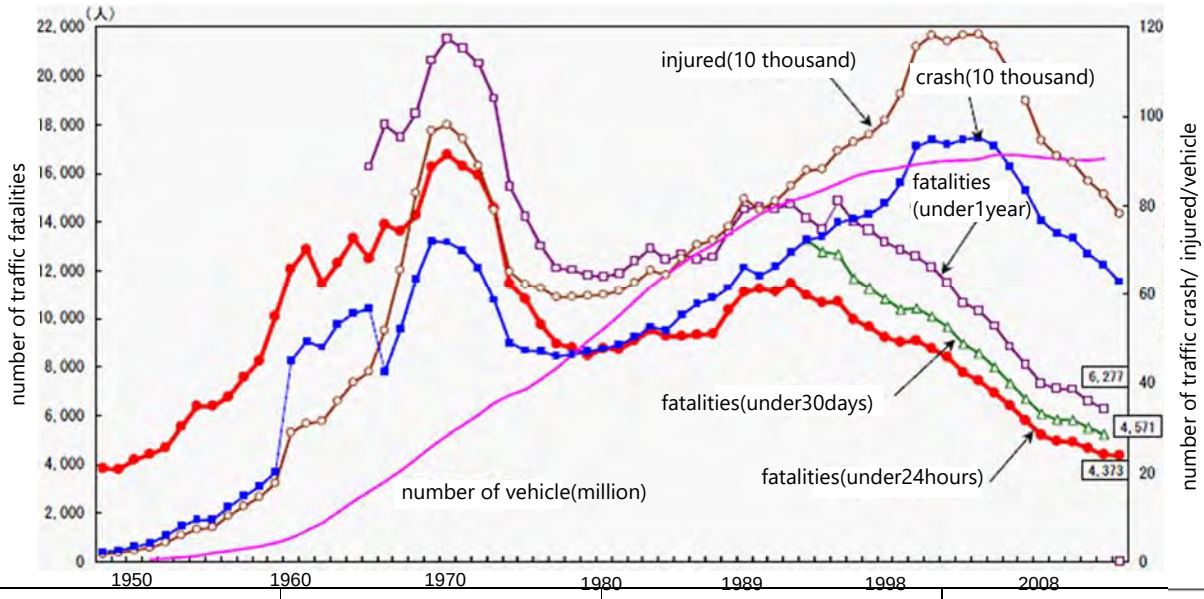


Figure 5.1.6 Change in the Number of Fatalities and Injuries per 100,000 persons/10,000 vehicles/100,000,000 vehicle-km

Source: White Paper on Traffic Safety 2015

From the changes in traffic crashes and motorization that is related to traffic safety, Japan put efforts into countermeasures and summarized as follows:



High Economic Growth Period	Measures for The 1st Traffic War	Stagnation of Traffic Safety Measures and The 2nd Traffic War	Reduction of Traffic Fatalities by More Effective Countermeasures
～1970	1971～1980	1981～1990	1991～
・ Increasing the number of vehicles by rapid motorization ・ Increasing number of traffic crashes and fatalities	・ Traffic crashes becoming one of the social problem ・ Implementation of basic measures for traffic safety ・ Spread traffic safety manners ・ Decrease the number of fatalities	・ Rebound the number of fatalities ・ Increase traffic crashes by speed violations and motor vehicles and the aged and the young drivers	・ Traffic countermeasures for specific factors ・ Decrease more the number of traffic crashes since 2000

～1960	1961～1970	1971～1980	1981～1990	1991～
47 Enactment of the law for regulating road traffic 48 National traffic safety campaign 50 Enactment of the law on road traffic signs 51 Enacting the Road Transport Vehicle Act 52 Establishment of the Road Traffic Act 53 Enforcement order for regulating road traffic 54 Road-related tax revenue system 55 Establishment of Traffic Crash Prevention Headquarters 56 Automobile Crash Compensation Security Act 57 National Expressway Law 58 Enactment of Road Structure Ordinance 59 Coming up the School Crossing Warden ・Starting parking meter operation 60 Establishment of Traffic Crash Prevention Headquarters ・the Road Traffic Law ・No Drunk driving ・Speed Regulation	61 Provide guardrails and overhead walkways 62 Traffic Violation Ticket System 63 Improving the laws on road traffic signs 64 Specification of school zones ・Approval cabinet order on vehicle restriction ・Nationwide Traffic Enforcement 65-Supervisor System for Safe Driving 66-First Project for Maintenance Service of Traffic Safety Facilities ・Formalization of providing traffic signals and road markings 67-Formulation of the Original Table for Traffic Crash Statistics ・Drivers' retraining system at driver's license renewal time 68-Administrative deposition system for drivers flagrantly violating the law 69-Point system for the traffic violations 70-Formation of Basic Law on Road Traffic Safety ・Pedestrian precinct on Sundays ・Central Traffic Safety Counter - Measurement Council	71 The First Master Plan for Road Traffic Safety ・Formulate the Teaching instruction for Traffic Rules ・First action for traffic pollution ・Starting the operation of traffic control center 72 Starting school zone operation for students ・Obligation to wear the helmet for riding on a two-wheeled vehicle 73 Traffic signal system for giving priority to buses 74 Comprehensive traffic control for whole city ・Countermeasures for reducing the overall amount of vehicles 76 The 2nd Master Plan for Road Traffic Safety 77 Introduction of "Safe Driving Self-Diagnosis" for the lecture renewing driver's license 79 Countermeasures for heavy vehicle's crash happened at left-turning 80 Promulgation of law for promoting safety use of bicycles	81 The 3rd Master Plan for Road Traffic Safety ・Start traffic signal operation in long tunnels 83 Establishment of the revitalization special grant for traffic safety measures 85 Seat Belt Wearing Imposition 86 The 4th Master Plan for Road Traffic Safety ・Start training system for inexperienced drivers ・Obligation to wear the helmet for riding on Mopeds 87 Start parking tickets system operation 89 Start the system for inexperienced driver's duration 90 Countermeasures for illegally parked vehicles ・Newly establishment of promotion committee members for local traffic safety	91 The 5th Master Plan for Road Traffic Safety 93 Start new system to extend the term of driver's license validity periods for excellent drivers 96 The 6th Master Plan for Road Traffic Safety 97 Start new training system for older drivers 99 Prohibition for using cellular phone during driving 00 Mandatory for using child - seat 01 The 7th Master Plan for Road Traffic Safety ・Change the target age for older driver training system 05 Revise Road Traffic Act (Reinforcements of penalties for using cellular phone during driving and drunk-driving) 06 The 8th Master Plan for Road Traffic Safety 11 The 9th Master Plan for Road Traffic Safety 16 The 10th Master Plan for Road Traffic Safety

Figure 5.1.7　Traffic Safety Countermeasures in Japan

Source: Study Team

5.1.1 The 1st Traffic War after the High Growth Economic Period: Before 1980

In the high growth economic period, the rate of increase of the traffic volume increased steadily and since there was no sufficient stock of road infrastructure and traffic safety facilities and insufficient financial resources, construction of such facilities progressed very slowly. In 1954, the road specific budget system was started and from 1957, construction of the expressway system for the 1964 Tokyo Olympics progressed (included funding from the World Bank). However, there weren't any extra funds for the construction of traffic safety facilities.

As a result, after 1950, along with the dramatic rise in motorization, the number of fatalities from traffic crashes rapidly increased and by 1970, Japan recorded the highest number of fatalities from traffic crashes at 16,765.

Under these conditions, there was a societal request to reduce the number of traffic crashes and government administrations that were operating independently of each other along with the police and road management organizations started to cooperate with each other. From the second half of 1960's, Japan promoted the "Establishment of a System for Traffic Safety Countermeasures through Cooperation and the Traffic Safety Plan".

1959	Deployment of the School Crossing Warden	In order to keep school children safe, there were aunties who were referred to as "School Crossing Warden" at intersections and other positions.
1966	Emergency Measures Law for the Improvement of Traffic Safety Facilities	The basic law which approved the use of road funding sources for traffic safety facilities.
1968	Traffic ticket (Revision of the Road Traffic Law)	Paying the penalty based on the notification by administrative organ in the case of not vicious violations It is possible to train drivers based on their actual driving behaviours by using administrative disposition with point system
1970	Traffic Safety Policies Basic Act	Based on the Act, to formulate the Traffic Safety Master Plan every 5 years, and to set the numerical target based on traffic situation, and to implement the activities achieving goals.
1970～	Revenue sources' generation for traffic safety facility	The number of traffic signals is increased by about 4 times for 10 years from 1970. The total budget for traffic safety measures for traffic police and road administrator increased 1,350 billion yen in 1980 from 640 billion yen at 1970.
1972	Starting school zone operation for students	To ensure traffic safety of school children through the adoption of school-zone regulation which means a no-vehicle zone.

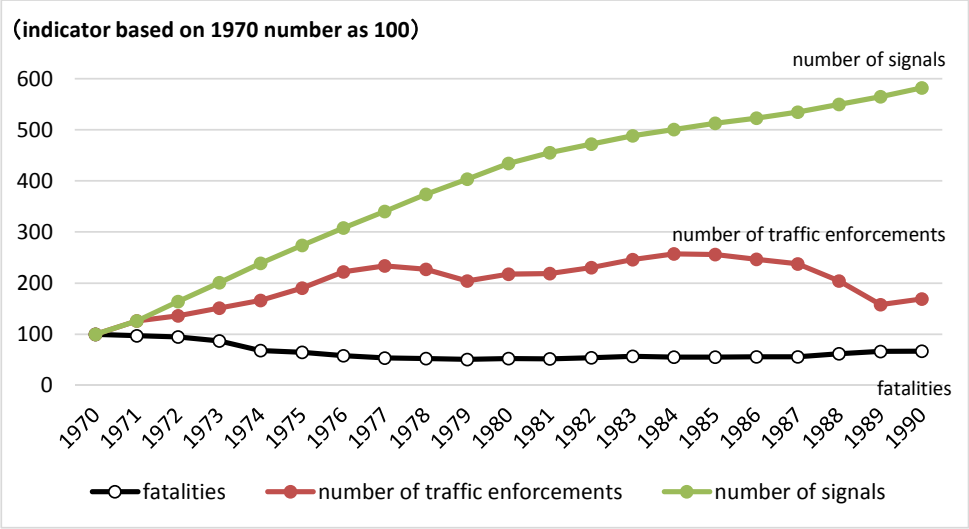


Figure 5.1.8 Change in the Number of Traffic Violations and Traffic Signals and Traffic Crash Fatalities

Source: Study Team

5.1.2 From the 2nd Traffic War to the Current: After 1980

Based on the formulation of the Traffic Safety Basic Plan (from 1970), an integrated approach for traffic safety countermeasures between government and private organizations was implemented. The Plan targeted to accomplish positive impact within 5 years. By 1979, the traffic crash fatalities were decreased by half from a high of 16,765 to a little over 8,000.

On the contrary, during that year, there was a valley for the number of traffic crash fatalities which soon after saw the increase again in the number of fatalities. In 1988, the number of fatalities again breached the 10,000 mark and increased until 1992. However, after 1992, there was a decreasing trend in the traffic crash fatalities and by 2014, the number of traffic crash fatalities decreased to 4,100.

The reasons for the decrease in traffic crash fatalities in recent years is due to the following factors: road traffic environment, consciousness about traffic safety, securing of safe driving, improvement of vehicle safety, maintenance of road traffic order, and rescue and emergency activities.

1985	Mandatory Wearing of Seat Belt	The Revised Road Traffic Act of the 1985 mandated the wearing of seat belt for front passengers when driving at expressway and/or motor highway. This was made mandatory for all roads from 1986.
2002	More Severe Penalties for drunk-driving and traffic crash due to drunk-driving, Stage 1	A tragic traffic crash in 1999 involving a truck with a drunk driver that resulted in the death of two children raised public's awareness and clamour for stronger penalties for drunk driving. This resulted in the revision of the Road Traffic Law in 2002 which added the charges for dangerous driving resulting in deaths and injuries with heavier penalty than before.
2007	More Severe Penalties for drunk-driving and traffic crash due to drunk-driving, Stage 2	The Road Traffic Law was revised in 2007 to penalize not only the drunk-driver but also the persons that are with the driver now become subject to punishment.

2009	Safety walking area	Identification of areas that required the implementation of traffic safety countermeasures for pedestrian and bicycles. Comprehensive and entire regional traffic safety measures were implemented by all related sectors such as road management agency and traffic police.

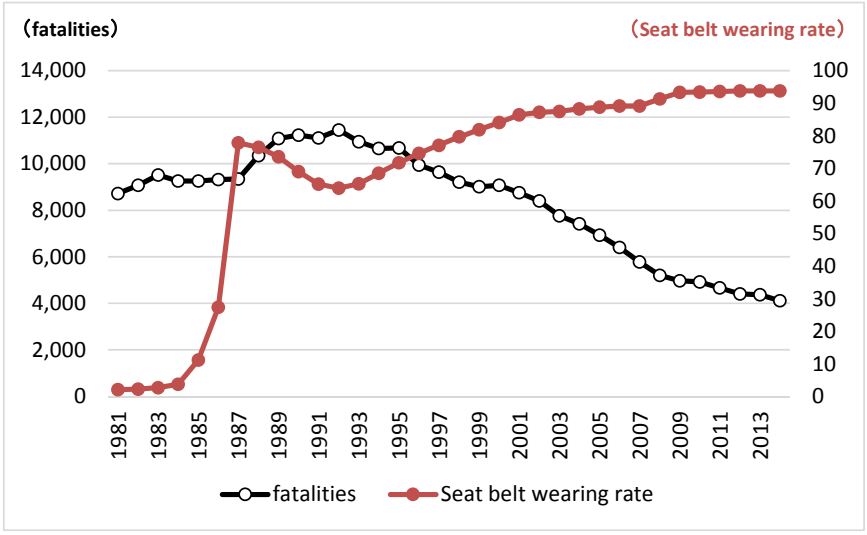


Figure 5.1.9 Change in the Rate of Seat Belt Wearing and Traffic Crash Fatalities

Source: Study Team

5.2 Traffic Crash Conditions and Economic Level of ASEAN and Japan

During the time that Japan was experiencing a period of high economic growth, it was also the same time that the 1st Traffic War was observed at the beginning of the 1970s due to the rapid increase in motorization when the traffic crash fatalities reached its peak. Based on the WHO report, Japan was of middle income economic level during this period.

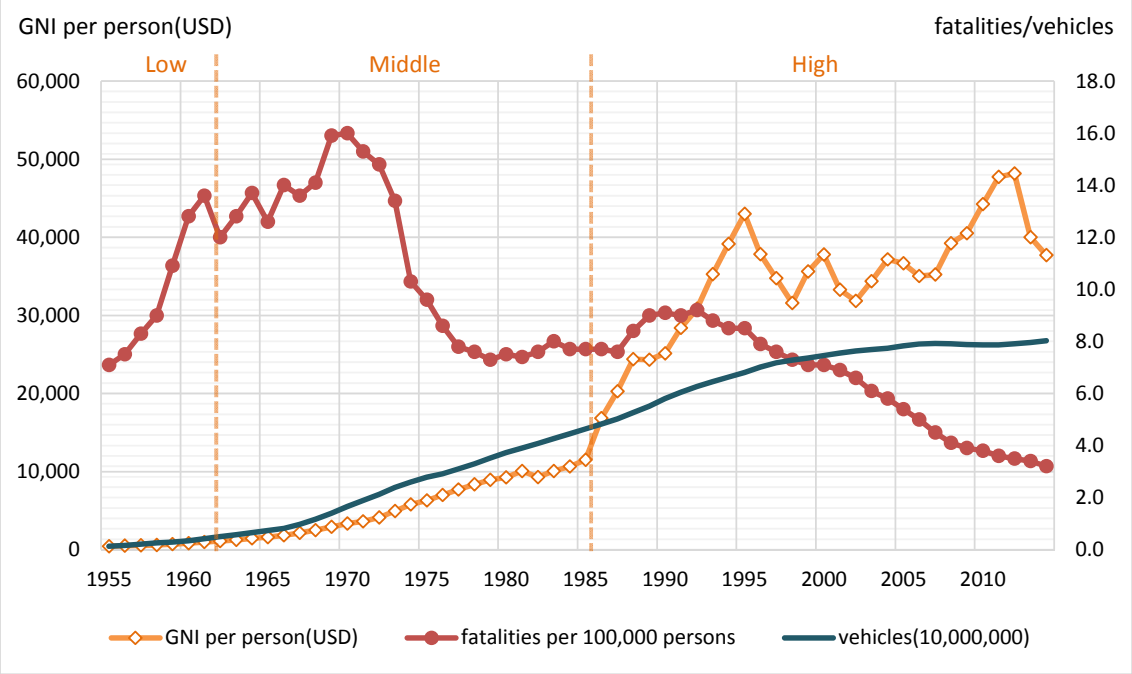


Figure 5.2.1 Change in the Economic Level of Japan and Traffic Crashes

Source: Study Team

Table 5.2.1 shows the relationship between the progress of motorization and the economic level of the ASEAN countries. The lower the economic level, the higher the rate of vehicle ownership (indicator is set at 100 for 2009). Looking at the countries in the following table and looking at the economic level and the rate of vehicle ownership, the countries could be categorized into 3 groups.

Table 5.2.1 Relationship between Motorization and Economic Level in ASEAN

category	Country	Resistered Vehicle / 10 000 pop			indicator based on 2009 number as 100			GNI(USD)	Economic level
		2009	2013	2015	2009	2013	2015	2015	
1	Cambodia	107	1,169	1,624	100	1,093	1,519	950	Low
	Myanmar	214	485	809	100	226	378	1,169	Middle
	Lao	1,094	1,627	2,126	100	149	194	1,450	Middle
	Viet Nam	2,624	3,775	4,449	100	144	170	1,740	Middle
2	Philippines	627	711	782	100	113	125	3,270	Middle
	Indonesia	2,734	3,031	4,171	100	111	153	3,580	Middle
	Thailand	4,010	4,121	4,847	100	103	121	5,340	Middle
	Malaysia	6,332	7,108	8,015	100	112	127	10,430	Middle
3	Japan	6,189	6,155	6,255	100	99	101	46,330	High
	Singapore	1,919	1,860	1,800	100	97	94	54,040	High

Source: WHO Report 2009, 2013, 2015

In the 3 groups, the relationship between economic growth and traffic crash rate in the ASEAN countries can be applied. Furthermore, in the 2nd group, from the economic level and crash rate, the countries of Thailand, Malaysia, Indonesia and the Philippines can be further categorized into 2 groups.

category 1 In low income countries like Myanmar, Cambodia and Vietnam, motorization is starting from motorcycles and is rapidly progressing, at the same time, the proportion of traffic crashes is increasing.

category 2-1 In middle income countries like Malaysia and Thailand, the level of standard for income among ASEAN countries is high and even with organizations and research dedicated to traffic safety and traffic safety facilities, the number of traffic crashes is at a high level although in recent years, it remained flat.

category 2-2 The countries of Indonesia and the Philippines is somewhere between 1 and 2.

category	Country	2009		2013		2015	
		GNI	death rate	GNI	Estimated road traffic death rate (per 100 000 population)	GNI	Estimated road traffic death rate (per 100 000 population)
1	Cambodia	540	12.1	750	17.2	950	17.4
	Myanmar	641	23.4	1110	15	1169	20.3
	Lao	580	18.3	1010	20.4	1450	14.3
	Viet Nam	790	16.1	1160	24.7	1740	24.5
2	Philippines	1620	20.0	2060	9.1	3270	10.5
	Indonesia	1650	16.2	2500	17.7	3580	15.3
	Thailand	3400	19.6	4150	38.1	5340	36.2
	Malaysia	6540	23.6	7760	25	10430	24
3	Japan	37670	5.0	42050	5.2	46330	4.7
	Singapore	32470	4.8	39410	5.1	54040	3.6

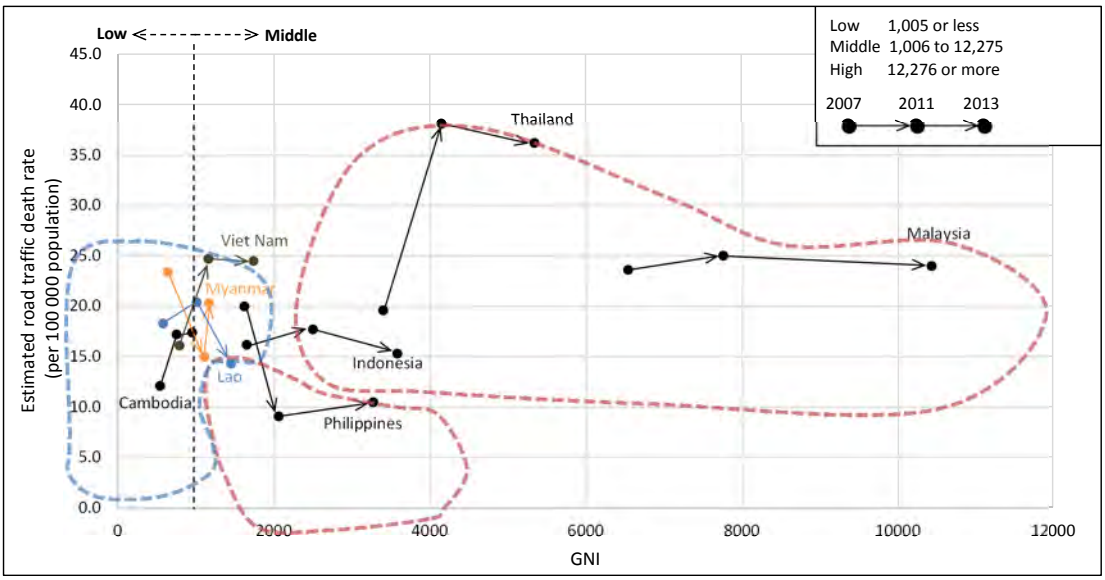


Figure 5.2.2 GNI and Ratio of Traffic Crash Fatalities in ASEAN (per population)

Source: WHO Report 2009, 2013, 2015

*except for Japan and Singapore

Based on the WHO report and the results of the survey implemented for this Study for ASEAN countries, the balance in the traffic safety countermeasures for each ASEAN country is evaluated. (Refer to the next page)

- Group 1 (Low income countries): Overall the standard level of effort is low (in the figure, the area of the hexagon is small). Among the 6 countermeasures, there are many countries where the standard is low for “Organizational Structure”
- Group 2 (Middle income countries): Overall the standard level of effort is increasing (in the figure, the area of the hexagon is increasing). However, among the 6 countermeasures, either of the countermeasures have deficiencies.
- Group 3 (High income countries): There is a high and good level in the balance between traffic safety and countermeasures.

Furthermore, for the evaluation of the balance, the WHO report and a summary of the results of the survey for ASEAN countries are presented below.

WHO Report

Based on the Statistical Annex in the WHO report (see the following table), traffic safety countermeasures are broken down into 5 categories (there is no data for the "Education" category so there are only 5). The data from these categories were tabulated and rated.

Countermeasure Category	Contents which includes the data
Organization/Institution	Traffic safety organizations, national policies
Road	Vehicles, pedestrians, vehicle type, road maintenance
Vehicle	Seatbelt installation, child seat installation
Traffic Order	Regulation and enforcement of speed, drinking and driving and wearing of helmets
Emergency Rescue	Medical emergency training, registration system
Education	No related data

The method of rating is as follows: (i) For laws and regulations: 2 points if there were completely, 1 point if some exist and 0 point if there were none at all and (ii) based on the category, scoring was done on a 10 point scale. Summing up the points from (i) and (ii), the maximum score would be 10.

Furthermore, data did not cover all of the contents from the countermeasure categories. (For example, with regards to "vehicles", whether or not there were regulations with regards to the installation of seat belts and child seats, indicators for the vehicle maintenance and inspection, these data were not included.)

ASEAN Survey

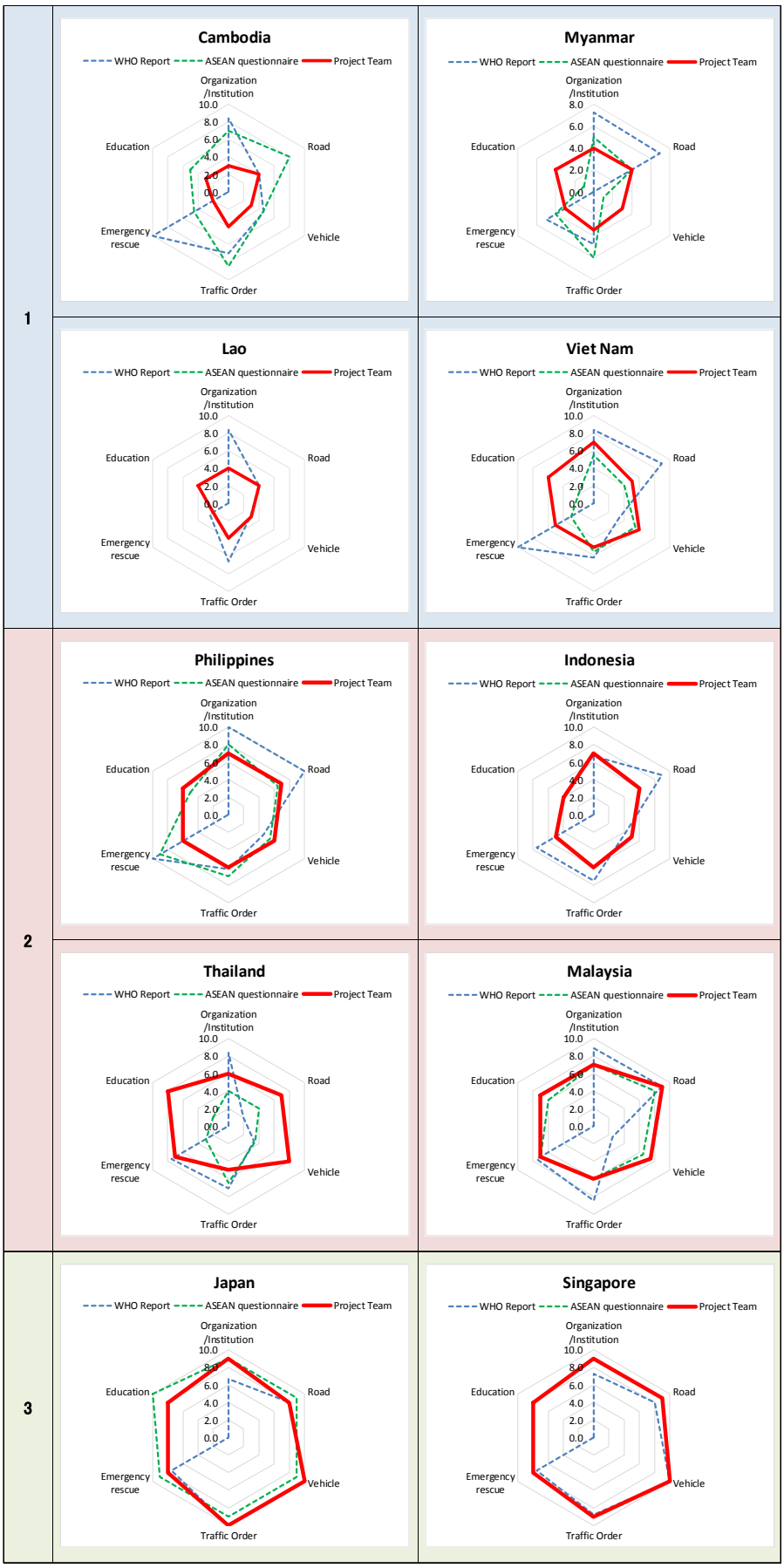
In order to investigate the present conditions of traffic safety in the ASEAN countries, a questionnaire survey with regards to the 6 categories of traffic safety countermeasures was carried out.

With regards to the responses to the ASEAN survey for 6 countries (Myanmar, Vietnam, Thailand, Malaysia, Philippines), traffic safety countermeasures were divided into 6 categories, whether or not there is an organization for traffic safety and related plans and a self-evaluation of the current conditions and these indicators were quantified.

The results of the questionnaire survey were obtained by interviewing persons related to transport planning in the ASEAN countries.
The answers from the questionnaire survey were subjective answers so it is necessary to be aware that this is not a comparative assessment of the ASEAN countries but rather an absolute evaluation by each country.

Conjecture from the Study Team

Referencing the WHO report and the ASEAN survey, and based on the local survey with concerned officials in the ASEAN countries of Myanmar, Malaysia and Thailand, the study team rated the ASEAN countries by using a comparative assessment.



* There is no data for the "Education" category in the WHO Report

Figure 5.2.3 Characteristics of Traffic Safety Countermeasures in the ASEAN Countries

Source: Compiled from WHO Report and ASEAN questionnaire

5.3 Proposal Related to the Direction of JICA Projects on Traffic Safety in the Future

5.3.1 Required Activity Processes for Traffic Safety

Based on the experiences of and efforts towards traffic safety in Japan, these are extremely useful for the examination of the direction for JICA projects on to traffic safety in the future.

For the activity processes, regardless of the country or area, the following are universal and can be applied in any location.

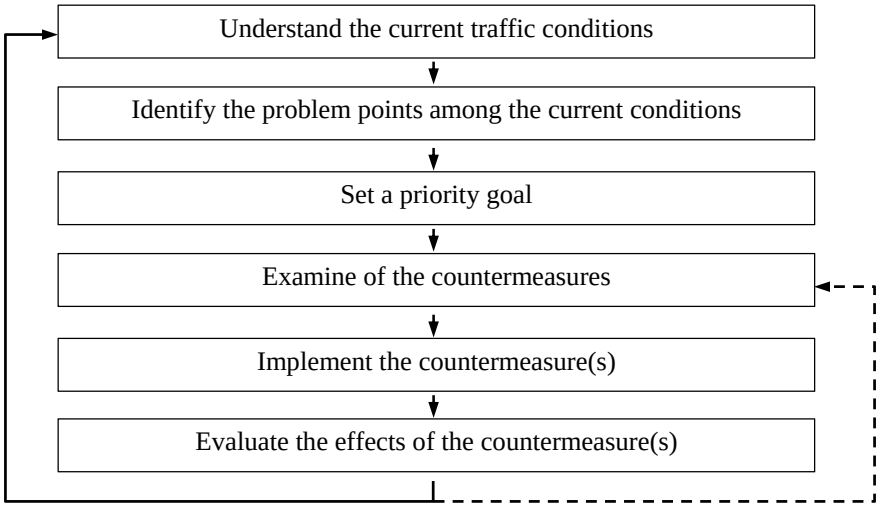


Figure 5.3.1 Required Activity Process for Traffic Safety

First, there is a need to "understand the current traffic conditions." With regards to the current traffic conditions, this may be comprised of conditions such as "many vehicles", "large number of driver's license holders", "not good roads", "breakdown of vehicles", "not good traffic order", "poor education", "many locations where vehicles can be used" and "large numbers of traffic crashes".

From these current conditions, as much as possible, it is necessary to obtain the accurate data. Usually, organizations involved in traffic safety would have such statistical data. However, there are cases where the data is unavailable, or in some cases, even if such data is available, there are cases where the data is insufficient or inaccurate. In this case, in order to "understand the current traffic situations", it will be necessary to conduct a new survey. In the future, there is a need to establish an organization that will be solely in charge of data collection and management. It will also be necessary to determine the kind of data that should be collected and a periodic review of collected data should be conducted.

The second step is to "identify the problem points among the current conditions." It is very important to be able to identify the root cause of the problem and not just the symptoms. There will be instances when a new traffic survey will be required in order to identify the root cause of the traffic problem. Unless this is identified, it will not be possible to proceed to the next step.
When several problem points were identified, it will be necessary to "set a priority goal."

Once the priority problem point is identified, the next step is to "examine the countermeasures." For these types of countermeasures, the problem points need to be examined in detail. From here, there are many categories of countermeasures, however, there are cases where a completely new countermeasure that was not considered previously needs to be considered. This will lead to the next step which is to "implement the countermeasure" as a pilot implementation or as an experiment.

During implementation of countermeasures, it is very important to observe, collect and evaluate various data that are more detailed resulting from the implementation of the countermeasure. Because it is possible that traffic conditions would change and the results of implementation will be drastically different from what was expected. Such cases would require continuing “evaluation of the effects of the countermeasures” which may result in the adjustments of countermeasures until a higher level and more responsive countermeasure is formulated.

5.3.2 Direction of Traffic Safety for Future JICA Projects

Based on the necessary activity processes for traffic safety, the structure of the flowchart for the “Direction of Traffic Safety for Future JICA Projects” is shown in Figure 5.3.2.

The reason for the efforts of JICA in traffic safety is the premise of saving lives from traffic safety. Upon this, traffic safety is identified as one element for the improvement of the quality of infrastructure. At the time of progressing with traffic safety, for purposes of this Study, the main things to keep in mind with regards to the fundamental direction are the “3 viewpoints” and the “6 categories of traffic safety countermeasures”.

For grasping the current conditions, in addition to knowing the general traffic situation, it is necessary to consider that seasonal festivals and rituals may lead to different actions conducted by people (e.g., Ramadan, Lunar New Year).

For this Study, there is a broad classification of the ASEAN countries that were the subject of the analysis, evaluation of its current traffic safety efforts and the traffic crash risk based on each country’s economic development level. From here, as JICA’s direction of efforts, traffic safety countermeasures are divided by low income countries and middle income countries (“direction of cooperation” and “cooperation category”).

Furthermore, at the time of implementing traffic safety countermeasures in Japan, there were differences in the level of traffic safety among different regions but now almost every region has reached the same level of traffic safety. The institutions and organizations of the different regions mutually shared information with each other to improve traffic safety and this is an effective method for continuously improving traffic safety countermeasures.

The same could be done in the ASEAN countries where countries would share their experiences and solutions to raise their traffic safety level and motivation.

Also, for traffic safety programs, no matter whether it is of government or the private sector, various organizations should be involved in the implementation. The various experts from different organizations each with their own strengths should be gathered in an “All Japan” team. Also, existing research efforts, vehicle manufacturers and government and the private sector should cooperate with each other. These things have been identified as necessary for the direction of traffic safety for JICA projects.

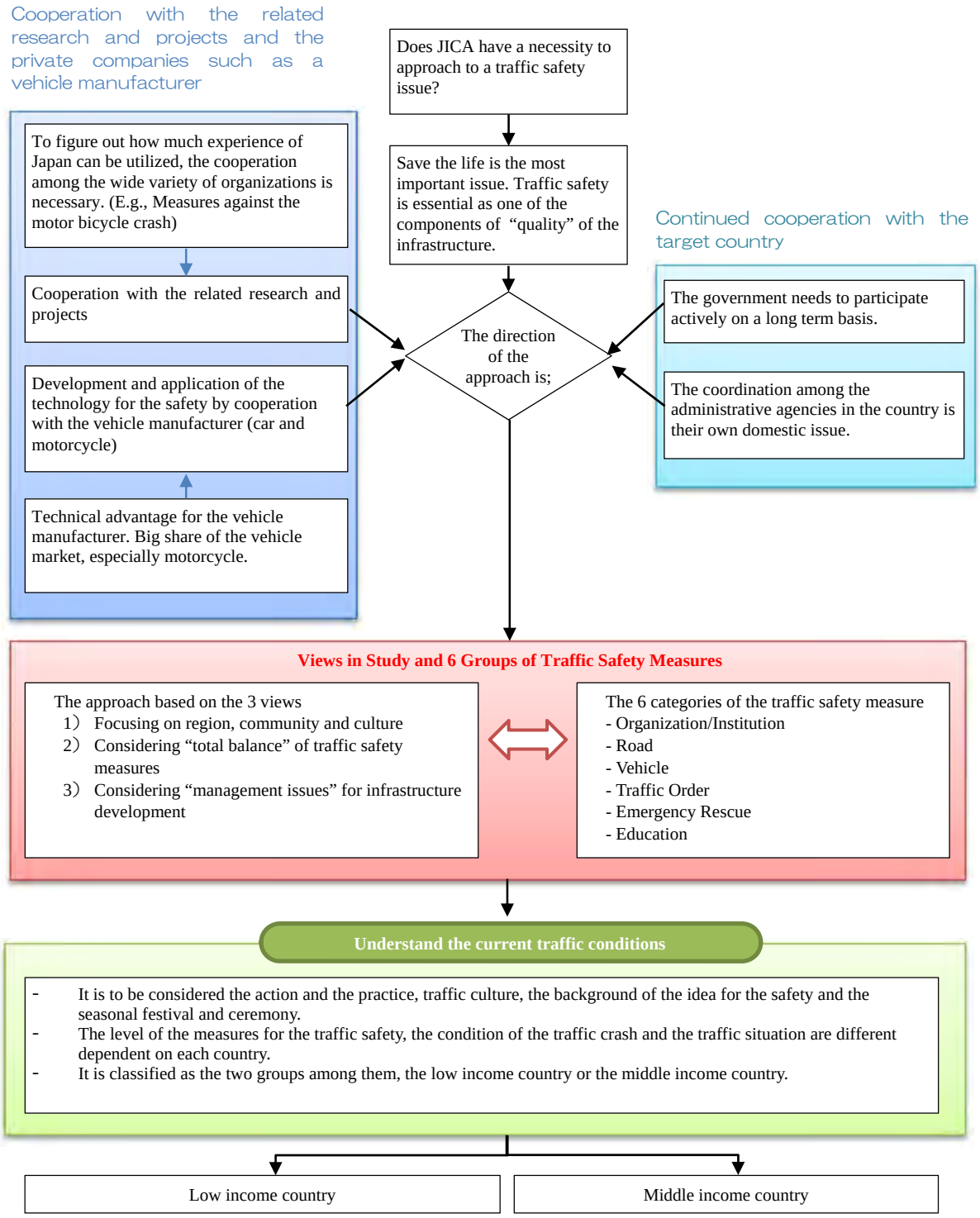


Figure 5.3.2 Direction of Traffic Safety for Future JICA Projects-1 (to be continued)

Source: Study Team

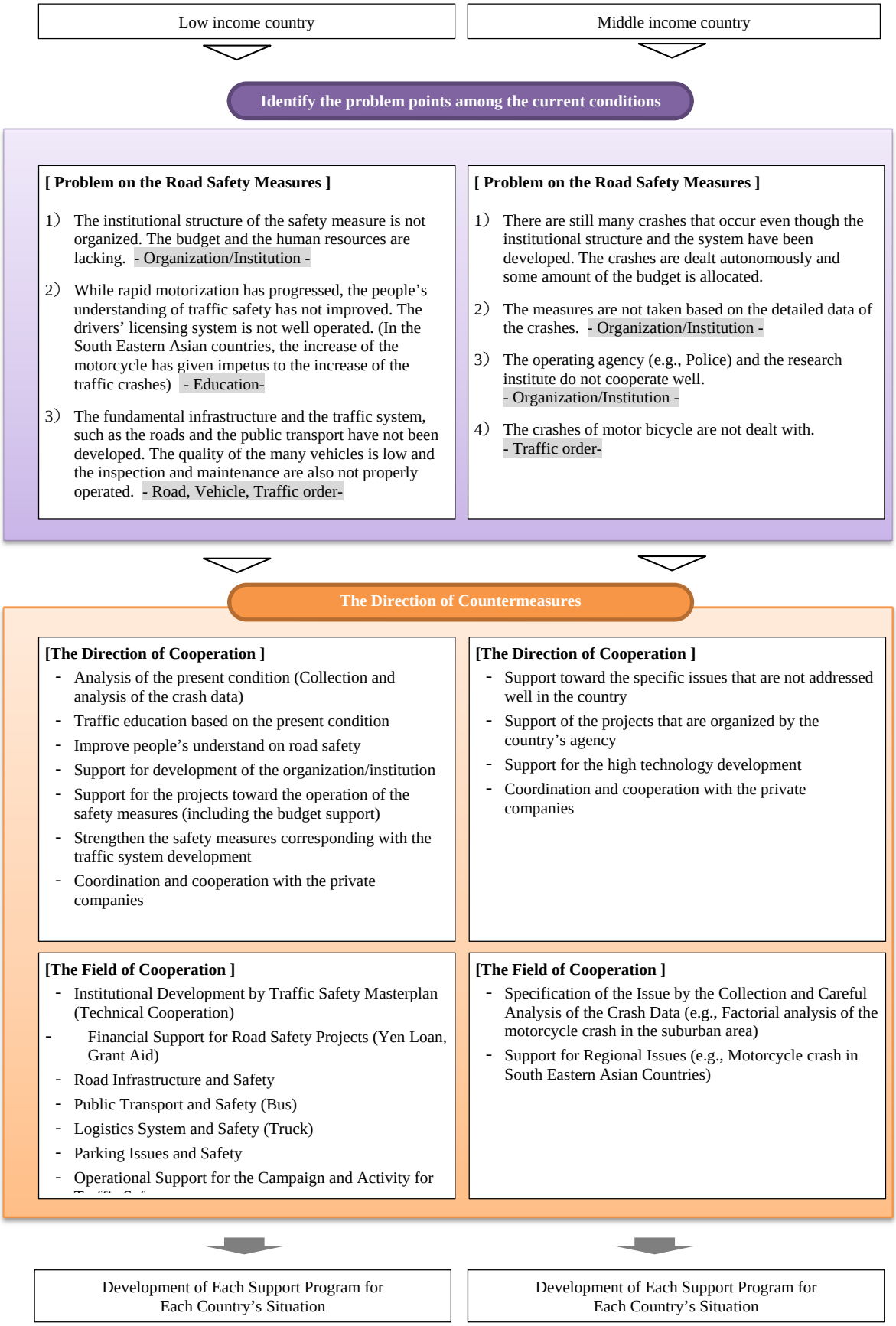


Figure 5.3.3 Direction of Traffic Safety for Future JICA Projects-2

Source: Study Team

5.3.3 Proposal for JICA Projects with Regards to Traffic Safety

Based on this Study, as JICA projects are focused on traffic safety, the following projects are proposed.

1. Systematic arrangement and analysis of road safety measures

As part of phase 2 of this study, to understand Japan's efforts in traffic safety better, it is necessary to study more and to organize Japan's experiences in a systematic manner. Also, in addition to public private participation which includes research institutions, the future direction of JICA also needs to be examined.
The research flow is as follows:

1. For each of the 6 categories of traffic countermeasures, document the history of Japan's efforts
2. With regards to 1., document the "background" of the implemented efforts and the "traffic problems" and "countermeasures" of that period
3. Document the implementation efforts of the countermeasures
4. With regards to the 6 categories of traffic safety in Japan, analyze how the balance has changed
5. Organise the direction of JICA's projects moving forward

2. Implement a Project in the ASEAN Countries

Utilizing the knowledge from this Study, select a model country from the ASEAN countries and develop concretely the project in the targeted country. The flow of the project is assumed to have 2 phases.

1. Targeted towards the ASEAN countries, and examine the "current traffic situation" and "identify the traffic problems" from a literature review and on the ground survey
2. Based on the results of the examination in 1., and upon the clarification of the project purpose, select 2-3 countries to implement the project that will act as model countries

At the model countries, the necessary activity processes are required to be implemented for traffic safety

1. With regards to "understanding the current situation of the traffic conditions" and "identifying the traffic problems", review the results from the selection of the model countries
2. Examine the countermeasures concretely for traffic problems
3. For the model countries, implement the examined countermeasures
4. Evaluate and propose an evaluation method to see the results of the countermeasures that were implemented

3. Insert Traffic Safety into Existing or Future JICA Projects

For ongoing or future projects, add to data collection and analysis the road safety perspective. [For example, at the time of the present situation grasp in transportation master plan, road safety data will be collected, or introduce a mechanism such as a traffic safety assessment.]

4. Specific Project Proposals in ASEAN

Based on overseas study in this study, propose a specific project proposal for Myanmar, Malaysia and Thailand.

- Road safety management and capacity building project in Yangon metropolitan area

- Improvement of road public transport in Yangon metropolitan area
- Study of motorcycle traffic crash analysis and measures in Malaysia [Including the improvement and promotion of traffic safety ideas through the training for license acquisition.]

5. Enhancement of Knowledge Co-Creation Program on Traffic Safety

In addition to the existing Knowledge Co-Creation Program on "Traffic Police Administration", it may be worth planning to enrich the range of courses with the focus on such as the analysis of traffic crash data.

6 Conclusions

Traffic crashes kill 3,400 people per day and more than 1.3 million per year. Every year, a total of 50 million people are injured by traffic crashes and many more have suffered from physical injury and mental distress.

Based on the situation, United Nations and WHO declared 2011 to 2020 as UN－Resolution, and global campaigns have been launched to target a 50% reduction on the fatalities due to traffic crashes. However, as reported by WHO in 2015, the number of deaths due to traffic crashes has increased and thus further global actions are required to be implemented. In “Sustainable Development Goals (SDGs)” developed in October 2015, traffic safety is stated as one of important issues.

Quality of infrastructure has been discussed in various countries including Japan, and inclusiveness, safety, resiliency and sustainability are considered as its key factors. However, “safety” was emphasized on safety of railways. Though road is a representative transport infrastructure, road traffic safety hasn’t been focused on.

On the other hand, major Japanese automobile producers have contributed not only to improve safety of vehicles, but also to enhance traffic safety in developing countries and developed countries as a part of their CSR activities.

In spite of such trend, JICA has not actively conducted traffic safety projects. Comprehensive cooperation on traffic safety has been provided only in Vietnam, which include technical cooperation and yen-loan projects. This is because (i) conventional international cooperation has been based on request from recipient countries and traffic safety has not been their concern, (ii) impact of traffic safety program is difficult to evaluate, and (iii) unlike infrastructure improvements, traffic safety is usually considered a domestic issue for the counterparts. In addition, Japan as a donor country (i) has various authorities engaging in traffic safety measures that are not well coordinated in international cooperation, and (ii) since traffic safety measures have been implemented mainly by government agencies, consultants have limited experiences and capacities on traffic safety. In addition, up to now, JICA has not implemented many traffic safety projects and this is considered one of the reasons why consultants have limited experience in traffic safety.

Traffic safety measures in Technical cooperation and yen-loan/grant aid project of road infrastructure development are limited to development of safety facilities. On the other hand, education and enforcement which are important for traffic safety in developing countries have been somehow neglected. The number of fatalities by traffic crashes has rapidly increased upon completion of new road. In Vietnam for example, a newly opened road is called a “death road”.

Japan now promotes “quality infrastructure investment”. And since Japan is a leading producer of automobile and motorcycle in the world it should enhance traffic safety in infrastructure development, which requires comprehensive, long-term and detailed approach. JICA is expected to implement such measures through cooperation with other international aid organizations in order to ensure that each country shall conduct traffic safety measure appropriately and at the same time enhance people’s awareness on traffic safety.

Japan can provide good lessons based on its own experiences. Unlike Western countries with vast amounts of land and a long history of an automobile-centric society, Japan had progress in modernization and urbanization in existing high density urban areas and had overcome serious problems that resulted from rapid motorization. These experiences will provide helpful tips for lower and middle income countries which are now suffering from increased traffic crashes caused by rapid motorization and changes in lifestyle.

To provide integrated financial and technical cooperation on traffic safety, JICA should play a key role as a bilateral aid agency.

As described in Chapter 5, JICA's possible traffic safety measures include (i) cooperation for low income countries without adequate traffic safety system, (ii) cooperation for middle income countries which have traffic safety system but cannot operate them effectively, and, (iii) provision of traffic safety measures into individual transport infrastructure and transport system projects.

The traffic safety project should be implemented responsibly by each government in agreement with its citizens, which require comprehensive and long-term approach. However, ODA project has limited scope and terms. In this sense, it is important to coordinate with Japanese automobile and motorcycle producers in implementing the ODA project.

In addition, this Study has proposed overall direction of future cooperation of JICA. In order to proceed with specific actions afterwards, it is necessary (i) to make the platform which enhances coordination among administrative unit, and other related authorities such as Japan Automobile Federation (JAF), and automobile manufacturers, and (ii) to develop an implementation framework (including division of roles) through specific project formation.

Finally, this Study is a first step on a series of actions for traffic safety and is expected to be expanded into specific projects in the developing countries.