Time to Broaden the Transport Safety Debate

STUDY ON VARIOUS ELEMENTS OF RURAL TRANSPORT SAFETY

A Synthesis of pilot case studies from Sri Lanka, India, Madagascar, Cameroon and Peru

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SUMMARY

Up to today safety issues in the transport sector –unsurprisingly- have overwhelmingly concentrated on roads, highways and motorised traffic. The statistics related to road safety paint a bleak picture:

- The World Health Organisation predicts that by 2020 road crashes will be the third most important cause of death or disability world wide.
- More than eighty five per cent of the road traffic deaths and injuries occur in low income and middle income countries, yet they own only some 40 per cent of the world's motor vehicles.
- The economic cost globally is estimated at between $64.5 billion and $100 billion. This compares with total bilateral overseas aid that amounted to $106.5 billion in 2005
- Estimates indicate that, over the next 15 years, the number of people dying annually in road crashes may rise to 2.4 million, with the increase occurring in developing and transitional countries (*source www.GRSProadsafety.org*)

These statistics have triggered a lot of attention both at international, regional and national level. Global Road Safety Partnership is nowadays one of the bigger players and is uniting governments, business and civil society in concerted efforts to save lives. The World Health Organization (WHO) devoted their World Health Day to road safety in 2004. Consequently the United Nations established the UN Road Safety Collaboration consisting of mainly UN bodies. More recently the World Bank established the Global Road Safety Facility to generate increased funding while for low and middle income countries the Road Traffic Injuries Research Network (RTIRN) has been set up in Sri Lanka with the main aim to develop appropriate strategies/interventions for developing countries. And finally a UN International Road Safety Week is planned for April 2007.

Recently IFRTD got invited by the UN Economic Commission for Africa and WHO to organise a panel on safety dimensions in rural transport at the upcoming Annual Road Safety Conference in Ghana with the main aim to broaden the debate beyond roads. However data on road crashes are already scarce to begin with (It is estimated that in some countries less than half of the deaths that happen as a result of a road crash are reported). But this especially applies to information and data on safety issues in rural transport. Hence five researchers and members of IFRTD carried out small and mainly qualitative studies in **India, Peru, Cameroon**, **Madagascar** and **Sri Lanka** to explore if, and if yes how rural transport safety issues affect the lives of women, men and children in rural areas. The studies explored themes such as:

- **Safety from harassment,** particularly for women/girls in rural Cameroon and rural Peru.
- **Safety issues on rural roads.** A study in India showed that by building rural roads and opening up areas safety will become a problem especially with increased interaction between motorised and non-motorised traffic.
- **Safety issues on other local infrastructure -** footbridges, other water crossings, paths, tracks and water transport. The study in Sri Lanka showed that the majority of rural communities depend on non-engineered waterway crossings carrying a major risk for local communities.

The studies have looked at various aspects of rural transport safety. In India and Peru the researchers looked at safety issues on rural roads. The researchers argue that by building rural roads and opening up formerly isolated areas safety becomes a critical issue, particularly due to the increased interaction between motorised and non-motorised traffic. While the India study by Ashoke Sarkar has looked at the development of an Accident Potential Index (API), the Peru case study by Maria Gutierrez has concentrated on the gender dimensions of safety and highlighted the distinction between safety and security. The study entitled '*The better the road the greater the risk*' explores the linkages between road rehabilitation, tourism and children and women's safety. It demonstrates that people, especially women and girl children, feel increasingly unsafe after the roads open up.

Sexual harassment on transport services is prevalent, one respondent stated "*If I use the car that passes through at 6AM in the morning I won't get a seat when the bus returns, so I would travel crushed or squeezed in the bus, and sometimes they touch me".* The study on the Bayam-Salam women in Cameroon also explores the gender dimensions of rural transport safety.

In Madagascar Didier Young found that the interaction between motorised and non-motorised transport caused the most incidents on rural roads. These incidents are rarely fatal and with injuries treated at rural health clinics they generally go unreported. The Madagascar study also focused on some safety elements of rural water transport, highlighting the additional risks associated with the use of traditional pirogues.

Granie R Jayalath assessed the safety issues of local infrastructure, mainly footbridges and other water crossings, in Sri Lanka. The study, carried out in four villages, revealed that the majority of water crossings are non-engineered and do not meet any safety standards. Of 142 families interviewed, about 40% were able to recall occasions when they have been compelled to keep their sick elderly mothers at home due to the safety risks involved with carrying them across water crossings. However for most rural communities the water crossings remain a positive advancement despite their safety shortcomings as they halve the time it takes them to reach critical services.

More particularly the studies highlight the following issues:

- **Safety regulations and law enforcement**
  - Lack of information and data on rural transport and rural transport safety
  - A broader definition of safety is needed to include aspects of rural transport
  - Minimum safety standards need to be developed that are appropriate for the rural context and take into account poverty reduction criteria
  - The Accident Potential Index can help identify the most dangerous road stretches
- **Gender and safety**
  - Safety and security are important issues for women especially on community roads and public vehicles
  - Sexual harassment is prevalent
  - More quantitative and qualitative research is needed on gender and safety issues
- **Community participation**
  - Communities have developed coping mechanisms, such as such as using a variety of transport modes or simply not travelling, to minimise safety risks
  - Involve communities in design and implementation phase of safety programmes
  - Involve communities in road and infrastructure maintenance

Way forward: better law enforcement?

As the small studies have shown rural transport safety is multi-dimensional and a reality for most people but especially women and children in rural areas. But what are some of the offered solutions? The most obvious answer which is something all studies introduced is better law enforcement. This is a solution the study on Rural Transport Services commissioned by the Sub Saharan African Transport Policy Programme and carried out by a team of rural transport specialists led by Paul Starkey shed some light on. The study revealed that operators, regulators and passengers agreed that enforcement of existing and new safety regulations would bring an end to all existing –already limited- rural transport services. And this would be a disaster for rural communities' accessibility and counterproductive to most rural roads programmes' goals and objectives! A more context-sensitive approach and realistic safety regulations are needed and can, for example, mean that in those rural areas with transport scarcity, freight vehicles would be allowed to combine passengers and freight. .

Other ways forward and key recommendations

- Safety needs to be fully integrated into major rural roads programmes from the design to implementation phase. This is especially relevant to sensitise communities on pending changes.
- Communities have to participate in designing safety interventions to get a more holistic picture of safety needs and perceptions
- Communities should also participate in prioritising appropriate local infrastructure, such as water crossings and help build and maintain them. Road maintenance, using labour-based approaches is another area to keep roads in a good condition.
- And finally, more research, both quantitative and qualitative, is needed to generate more knowledge, data and information about men, women and children's perceptions and realities relating to safety and security risks in rural areas. These small studies are only the tip of the iceberg and did not for example touch upon the safety of IMTs, goods and personal belongings.

2.0 THE CASE STUDIES

2.1 CAMEROON CASE STUDY BY VIVIEN MELI

Title: Gender and Safety: a case study of the Bayam Salam women in rural Cameroon

The Bayam Salam (a local adaptation from the English *buy and sell*) women and in some cases men are micro-entrepreneurs who travel between rural areas to buy merchandise (divided into non-perishables and perishable goods) and then travel to the urban areas to sell. This is a very popular income generating activity for vulnerable populations in Cameroon, especially widows, single-headed female households, orphans etc. This is illustrated by the proverb "the market is the orphan's mother", as it nurtures her as well as provides social and financial protection. For the purposes of the study the rural zones of Bagam and Galim were selected and the urban zone of Mbouda in between which the Bayam Salam women travel. These are both situated in the Western part of Cameroon in the district of Bamboutos and known to be in a volcanic yet fertile area.

The main objective of the study was to document whether the Bayam Salam women in particular face safety issues while travelling between the rural and urban areas to buy and sell their goods. To this end the researcher carried out individual interviews with Bayam Salam women and where applicable Bayam Salam men, local authorities and transport operators. In addition focus group interviews were held with the women and men separately. Finally the behaviour and attitudes of the various actors while en route were observed. The report focuses on four elements:

- The activities of the Bayam Salam women and their dependency on rural transport
- The challenges, requirements and structure of rural transport which the women face while travelling
- The interaction between the various rural road users
- Local survival mechanisms of the Bayam Salam women when faced with safety issues

2.2 Key findings

- Both Bayam Salam women and men are dependent on mainly motorised transport for transporting their merchandise from the main (tarred) road to the market. There are three predominant means of transport: (1) a pick-up or mini-truck, (2) a bush taxi, or (3) a motor bike. Each represents its own safety hazards pending on the position where he/she is seated. *The safer the seat the higher the fare* is the applied principle.
- The taxi fare is the main determinant for one's safety while using the various modes of transport. This is particularly true in the rainy season. For example those that sit inside the vehicle pay more than those who sit on top of their merchandise on the back. Obviously the latter involves exposure to more safety risks.
- In a lot of cases traders go directly to producers to negotiate a better price. In order to transport the goods to the main road from where motorised means of transport are available, traders mainly use headloading, barrows and pousse-pousse (local rickshaws). Particularly on these community tracks women traders face a lot of safety issues mainly in the form of sexual harassment. In fact of the 16 women interviewed all women experienced some form of harassment on the feeder roads without wanting to go into details
- Reliable and safe transport is even more critical for those Bayam Salam traders who trade in perishable goods. The research confirms that transport is, in fact, the main determinant for product selection for Bayam Salam traders in general and women in particular.
- Rural transport doesn't have a high priority in the public transport system, let alone rural transport safety. Proof of this is the transport chart that is given to the transport operators which shows three categories of transport: urban, inter-urban and freight. Although with the recent development of a road safety awareness programme this may change.
- In the rainy season women traders become even more marginalised since drivers prefer men as passengers in case the vehicles get stuck and the drivers need manpower to get them out. In reality most women stop trading during the rainy season and look for other means to generate income.

- Motor bikes offer most mobility but also cause most accidents. There are at least two accidents per week.
- Due to the bad state of the roads, overloading, speeding, bad driving habits, no driver's licences and non-enforcement of the law, road accidents are frequent. Bribery is the order of the day especially at the various road blocks. Since women often sit on top of their merchandise on the back of the pick-ups they are more prone to being a victim of these bribes.
- Although the researcher attempted but no reports on the quality of the vehicles and/or drivers were made available to them. Based on observation it was obvious that the vehicles were often not fit for the road and in a lot of instances the drivers had no licence.
- Transport is both a positive and negative precursor for social and economic empowerment for the Bayam Salam women. If reliable, transport offers them an opportunity for economic independence through their income generating activities. But unreliable and unsafe transport actually prevents women from becoming independent.
- Last but not least, unsafe and unreliable transport is related to the transmission of HIV/AIDS and other sexually transmitted diseases. In order to negotiate a better and safer seat often sexual favours are exchanged, and in some cases demanded, between the provider and the traders. Hence a woman's safety may be determined by the sexual services she offers, often unprotected. This increases the chances of contracting an STD or worse transmit the HIV virus which may lead to AIDS.
- There is also an issue with personal safety and safety of goods. Especially when travelling at night women run the risk of being mugged or worse personally violated especially in isolated rural areas. Women are however not indifferent to the above situation and have in fact developed survival mechanisms. They use for example a different means of transport for themselves and another for their merchandise in order to reduce the risk. Or, they buy a diversity of goods in smaller quantities and have the potential to stock some of it to reduce transport needs. In addition they contribute financially in cases of community-based road maintenance. Women pool their resources and may ask one man to buy their goods for them. And in the unfortunate event of them getting stuck women stay together and will support one another. In fact of the 16 women interviewed over 60% reported having had to spend the night somewhere.

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2.3 Conclusions and recommendations

The conclusions and recommendations can be summarised as follows:

- To better organise rural transport needs.
- Since this was a small qualitative study there is a need to do more in-depth and quantitative studies.
- There is a huge need to tackle corruption to stop road block bribes
- To maintain roads on a regular basis
- To develop safety programmes specifically targeted at Bayam Salam women
- Regular and affordable transport
- Collect more data especially at village level

3.0 MADAGASCAR CASE STUDY BY DIDIER YOUNG

Title: Assessing Major Transport Security Problems in the rural areas of the High Plateaux of Madagascar

Case Study: Soavinandriana

3.1 Background

Over the last five years, the Madagascar Government has been investing considerably in road maintenance. As a result of maintaining national and provincial roads effectively, the economic and social interest of roads rehabilitation is becoming evident. But accessing rural areas still remains a big constraint, resulting consequently

in safety and security problems. The study area is Soavinandriana district, located at the centre of Madagascar's High lands, and is similar in characteristics as Antananarivo province. Almost all modes of transport which exist in Madagascar are found here, while 10 out of 15 communes are completely isolated. Only 26% of the passable roads in the area are tarred or paved. Overall the study aims to understand safety issues in relation to transport activities in rural areas, and assess in more detail how rural people perceive safety issues.

3.2. Key findings

- The majority (69%) of people walk or cycle. Market transport services represent only 31%, and around half of these are by motorised transport. Farm produce sales as well as buying basic commodities are the main reason why people travel, no matter what distance
- Men and women travel equally on daily short trips. However, men are more involved in long distance travel.
- Most of the markets are located at between 2 and 4 hour walking (10 to 20 km) from the farms. Bad roads, with people carrying money and their goods, constitute a very important risk factor for accidents, losses or harassment
- The study revealed that there are several coping mechanisms to ensure users' safety: People share bicycles, for example, which is proof of an existing solidarity.
- The main means of transport are private such as motorbikes, bikes, carriage, etc. as well as public such as bush taxi, pick up, trucks, etc. In addition to land there is water transport. .
- On public transport, overloading and the lack of comfort, are frequently presented as factors that can influence the user's decision to travel. Obviously this may lead to important delays and/or losses of goods.
- Around 92% of the interviewees travel at least once a week. Most of them (57%) travel to attend the weekly market. According to some users, there is a direct link between unsafe transport and travel frequency. Some indicated they would travel more if the road conditions would allow it.
- In general, very little cases of accidents or incidents are registered at the decentralised or central government level. Data collection is more accurate for motorised transport, which the government tracks, than non-motorised traffic. For most informants, the risk of accidents is minimal. Most of accidents or incidents occur in very remote rural areas, and injured people cannot be easily transported to health centres. Overall these kind of incidents do not get reported to the police.
- There are not many passable roads which limits the number of vehicles. Most of the operators interviewed said to observe the speed limit (40km/h). However, the better the condition of the roads, the faster they drive. Informants from the Police mentioned some imprudence and some cases of drunk driving. Local councillors don't think that risks are high, which was confirmed by the low levels of reported accidents.
- A lot of operators lack experience and don't have the capacity or the licence required to drive a vehicle. Even when they do have a licence in most cases it is obtained illegally.
- Around 73% of people interviewed stated that bad roads limit their mobility. During rainy seasons, roads are very slippery and water transport across the lake becomes dangerous. During the dry season and for distances shorter than one hour people don't experience problems
- With the lack of financial (or deposit) services (micro finance), people have to carry money on them. This situation invites banditry. Women are especially vulnerable as they are the easiest targets.
- All the private IMTs have similar safety risks. IMT users (motorbikes, bikes, animal traction, etc.) face identical problems as pedestrians. Although some modes are part of the regulatory framework, waterways are not included. Using boats on the lake (the only existing means of water transport in the area) seem to present a vital risk, which can discourage users and operators at the risk of drowning.
- In general, all means of transport observed are in relatively bad condition. They are highly modified, in order to customise them to meet local needs. Safety risks depend on the mode used.
- Used boats are mainly made of timber without any safety consideration. Despite the important of water transport in the area no alternative has yet been developed.

3.3 Conclusion and recommendations

- Reforms are under way in Madagascar. There is a new system to collect (on monthly basis) and analyse data on accidents and safety issues, but as of yet has teething issues. There are plans to revise road and traffic regulation and drivers licence standards. However great and needed they don't take into account other means of transport found in rural areas which would only require a minimum of arrangements. It is important that all factors and risks resulting from the interaction between motorised and non-motorised traffic are included in the new regulations.
- In the surveyed area, road accidents risks are still few, and not considered by people as a determining factor for travelling. However, the fear that means of transport can break down (due to overloading and bad condition) combined with the climate conditions (rains contribute to deteriorating roads that are generally already bad) are the main obstacles for people to cancel or reduce travelling.
- People acknowledge that road conditions play a great role in safety issues in the rural area of Soavinandriana district. Hence, maintaining them is obviously important. Combined with government's efforts, rural communities can be involved as well through labour-based approaches. This will help maintain the roads in a sustained manner, as well as create ownership at the local level.

4.0 INDIA CASE STUDY BY ASHOKE SARKAR

Title: Impact of PMGSY Roads on the Traffic Safety of school-going Children in Rural Areas

In the year 2000, the Government of India initiated a programme, popularly known as Prime Minister Gram Sadak Yojana (PMGSY), for the construction of all-weather rural roads to connect all villages with over 500 residents by the end of 2007. (Rural roads are classified as village roads and non-major district roads). Rajasthan, the study site, is one of the very few states which would reach this target on time. It has been widely acknowledged that these roads have improved social, physical, financial and human capital of the population of the connected villages. However the increased accessibility has meant that more motorised traffic, private as well as public, have started plying into the interior areas. This is especially true for the PMGSY-all weather roads and resulted in a significant increase of high speed and heavy motorised vehicles in and around the villages. The study argues that rural road accidents are generally more fatal than those on urban roads because (1) higher speed used on rural roads, (2) rural roads don't have specific design but have evolved more over time (3) rural roads are multi-functional and see variety of users and NMT and motorised, and (4) law enforcement level on rural roads are lower. In addition villagers are not used to heavy and speeding vehicles; and need time to make adjustments and change traffic behaviour. Especially school-going children who have to travel long distances face new safety risks. Up to now no safety programme has been initiated to sensitise the population and especially school children and there is an urgent need to study the impact of the PMGSY programme on new safety risks targeting amongst others school-children.

The main objectives for the study are:

- To identify the parameters to be considered for determining the traffic safety of school going children;
- To determine the weights of the identified parameters as perceived by the villagers;
- To quantify a Accident Potential Index to accidents for school going children travelling along PMGSY roads in a few selected villages in Rajasthan namely Mahatwas, Kutina, Chawandi, Bighana Jat and Bhim Singh Pura.

4.1. Methodology

The methodology adopted in this study was to develop a quantification technique by which accident exposure index along the PMGSY road for school going children in a village could be determined based on a few selected parameters. This would help to compare the villages in the study area based on the susceptibility levels of school going children to traffic accidents.

The Accident Potential Index (API) for school going children of a village has been expressed as:

$$API = \sum w_i V_i$$

Where
N = Number of parameters considered for quantifying accident index;
w_i = weight associated with parameter i;
V_i = score on ith parameter based on the existing situation.

The weights associated with the selected parameters were normalized so that $\sum w_i = 1$ and scores were assigned on the selected parameters which varied between 1 and 5, where 1 represented highly satisfactory and 5 highly dissatisfactory. Theoretically, the maximum possible value of AEI is 5 representing very high exposure index to traffic accidents.

4.2 Key findings

- In developing a simple yet effective Accident Exposure Index for the PMGSY programme a number of parameters had to be included:
    - Geometric characteristics of road
    - Width and quality of shoulder
    - Distances that need to be travelled along PMGSY road for school-going children
    - Mode of transport used by the students
    - Traffic volume and mix on the road
- Eight experts were invited to rate these parameters on a scale from 1 to 5 which were consequently weighted. For the PMGSY context the road geometry was most important (0.26) followed by shoulder width and quality (0.25). This is especially relevant for single-lane roads as is the case for the PMGSY roads. Traffic volume and mix (0.19) came next especially since it takes time to adjust to a new traffic landscape. Distance of travel (0.15) and mode of transport of user (0.14) were still seen as important but not as highly rated as the others. It was observed that school-going children mainly go by foot or bicycle. Buses are only used for primary schools.
- With the villagers and school-children a local questionnaire was developed and data collected with the use of a local NGO. 100 students -44 girls and 56 boys were interviewed. Both boys and girls mainly use bicycles to go to school and travel between 4 and 10 kilometers to school, always spending at least a part of their journey on PMGSY roads. Only in two of the five villages they both walk and cycle.
- The questionnaire revealed that there is a general sense of insecurity after the PGMSY road construction. In fact a boy was killed last year while traveling to school. Minor accidents are frequent although data are not collected systematically and a major accident is waiting to happen. The villagers feel this is due to the following reasons:
    - Increase in fast moving motorized vehicles
    - Speeding and disobedience to traffic rules by most of the drivers of motorised vehicles
    - No road markings and sign posts
    - Lack of education on road safety of the villagers
- In addition boys and girls were asked about their perceptions of safety and invited to rate the various parameters which are listed in Table 1 below. It was expected that there would be gender-based differences in perception on traffic safety and exposure to accidents. But, it was found during the survey that there was not much variation in their perception and thus the analysis has been done for both the groups together. However, the assumption that vulnerability to accidents varies with the kind of mode was substantiated because all the respondents indicated that risk was higher for pedestrians as compared to cyclists.

Table 1. Scores on the selected parameters as obtained through questionnaire survey

Village	Scores on				
	Road Geometrics (RGC)	Shoulder quality (WQS)	Distance of travel (DT)	Mode of travel (MT)	Traffic characteristics (TV)
Mahtawas	5	4	3	3	5
Kutina	3	2	3	3	5
Chawandi	5	1	3	3	5
Bighana Jat	1	1	4	3/5*	4
Bhim Singh Pura	3	5	1	5	5

- These values were all entered into the Accident Potential Index equation of which the results are listed below in Table 2:

Village	Accident Potential Index for students travelling by	
	Walk	Bicycle
Mahatwas	-	4.12
Kutina	-	3.10
Chawandi	-	3.37
Bighana Jat	2.57	2.29
Bhim Singh Pura	3.86	-

- You can see that index is the highest for the children going to school from Mahatwas (4.12) and the lowest for those from Bighana Jat traveling by bicycle. The reasons could be observed from Table 1. For example, the scores for all the parameters on the road connecting Mahatwas are quite high. Both road geometrics and the quality of shoulder are very poor and also the traffic volume and mix are also quite heavy. The API indices help to prioritize the stretches according to exposure to possible accidents. The worst stretches could then be taken up for improvements to reduce the possibility of accidents. This could be done by looking at the scores (Table-1) for that stretch, identify the parameters which have high (poor) scores and then take measures to improve so as to improve the scores on those parameters.

4.3. Conclusions and recommendations

- The developed API is a simple technique that allows people to assess the safety risk on rural roads in general and the PMGSY programme in particular. Obviously the Index can be customised to fit more contexts.
- Policy makers can use it to identify stretches that need improvements.
- This study was done with a very limited scope. It would be interesting to do this on a larger scale.
- Surprisingly cyclists felt safer on rural roads in this study than pedestrians.
- For large scale rural roads programmes it is important to integrate a safety component to sensitise rural communities on the changes in the traffic environment.

5.0 SRI LANKA CASE STUDY BY GRANIE JAYALATH

Title: Safety Issues of Rural Water way Crossings of Sri Lanka

5.1. Background

According to the RDA (Road Development Authority), Sri Lanka has a provincial road network of 15,532 km including 1262 bridge crossings. It has an unclassified rural road network of approximately 66,500 km, managed by local authorities; and a network of footpaths of 150,000 km which is not classified. On average, there are about 120,000 engineered rural waterway crossings and it is estimated that Sri Lanka has about 255,000 non-engineered waterway crossings. Because of a lack of financial and human resources, local authorities called Pradeshiya Sabas are unable to maintain these water crossings which they consider non-engineered and unsafe.

The objectives of the study are (1) to assess the safety-related issues of these non-engineered rural waterway crossings, (2) to find out the safety concerns of communities and marginalised people sectors of society, and (3) to assess the characteristics of rural waterway crossings. This was done in four rural villages within two provinces (Sabaragamuwa and Western Provinces of Sri Lanka). The study attempts to collect information by using a questionnaire and by conducting expert focus group discussions on the following: i) a general overview and an assessment of rural waterway crossings in Sri Lanka; ii) an assessment of current state of safety concerns of local and other agencies including those of village communities; iii) a qualitative analysis to assess the impact and involvement of rural communities including marginalised people in planning such crossings. Within the four villages, 67 waterway crossings were examined and 142 affected but representative families were interviewed in order to have a representative sample.

a. Current state of safety of the water way crossings

- In general rural waterway crossings can broadly be grouped in two categories: those constructed and maintained by Pradeshiya Sabas (these are engineered structures) and those non-engineered and community-based and managed.
- All the non-engineered crossings have significant problems, such as poor attention given to abutments and at present the structural stability of these crossings is at risk.
- Almost all the examined crossings have been constructed mainly to shorten the walking distances to critical services and other villages. 80% of such crossings have alternative access routes but the distance is 5 to 12 times more compared to the water crossing.

b. Community Involvement

- In general no one claims responsibility for crossing maintenance, except in few cases where small village groups voluntary have claimed ownership.
- Communities have no perception over the structural deficiencies. In addition because the crossing are narrow, have no handrails and no lighting rural communities cannot use these in order to transport loads and goods which limits their socio-economic development potential –especially compared to city dwellers.
- The location and construction are decided by the communities. About 40% of crossings have been constructed initially because of individual need and subsequently opened up to the majority.
- In 27 cases the Pradeshiya Sabas have provided construction materials for free but haven't provided any sort of engineering guide or supervision during construction or maintenance. According to interviewees, they never have maintained these crossings and haven't followed up on –written or verbal- complaints.

5. 2 Safety related characteristics of waterway structures

- The study revealed that the density of non-engineered waterway crossings varied spatially: density was low in coastal areas but significantly high when the terrain varies from rolling to mountainous.

- About 75% of the structures had a width of ≤ 3”0’ (approximately 0.91m), and up to 12% of these structures had a width exceeding 6’0”.
- More than 92% of the structures do not have any sort of engineered abutments, instead railings, concrete beam, slab or tree trunks have been kept just over the cannel banks and these footings are continuously subjected to scouring and erosion. Hence almost all these structures are so vulnerable to collapse and need immediate attention to avoid possible catastrophic failures.
- Almost all of the structures haven’t had any sort of pre-engineering planning or support prior to construct.
- Almost all structures were in full dark during night.
- Only 15% of these structures were fitted with handrails on either side whereas another 15% had only one railing and these railings were made out of bamboo or jungle sticks.
- Only 50% of the crossings had the width just sufficient enough for a motorbike or a foot bicycle to pass through.
- Out of 142 families interviewed, 45% were able to recall an accident and which in 75% were dragged downs.

5.3 Impacts on and involvement of communities

- Up to 60% of the structures have initially been constructed for the benefit of one individual or for a group of 4-6 people, but are now used by others as well.
- Villagers tend to use a non-engineered waterway crossing despite the risks involved, whenever the travel distance saved exceeds 50%
- In Sabaragamuwa Province 35% of the families didn’t have an alternative road to reach critical services and were completely dependent on waterway crossing.
- Almost all stated that during floods these crossings are not accessible, and instead are compelled to use alternative roads. As a result in Sabaragamuwa province the families listed above get completely isolated and have to use boats.
- In general non-engineered waterway crossings save both travel time and travel distance, hence 80% of those interviewed were satisfied with the spatial locations where the crossings have been constructed.
- Over 90% of interviewees expressed dissatisfaction towards Pradesahiya Saba over their attitudes towards the maintenance and improvements of waterway crossings.
- Out of 142 families interviewed about 40% were able to recall incidents where they have been compelled to keep their sick old mothers at home, mainly because of the difficulty to take them over the water crossings in chairs.
- Up to 60% families were highly worried because their children do not have the full opportunities to make use of educational facilities available in cities, because of unsafe crossings especially in late evenings.

5.4 Conclusions and recommendations

- Despite having a very comprehensive administrative network comprising 274 Pradeshiya Saba covering the whole island, still development potentials of remote villages have so far not been materialised because of non-optimised “connectivity” to services.
- In general there wasn’t any sort of government organisations including Pradeshiya Saba to maintain these non-engineered structures. Out of 67 structures examined only 15% have been maintaining by small groups 4-5 villagers, the same groups who have initiated and constructed these crossings.
- It is required to maintain an inventory of these crossings by each Pradeshiya Saba and then to rank the crossings based on a set of criteria, for example the number of families served, would be one major criterion. Such an approach would assign a unique reference number for each crossing and will further ensure effective utilization of limited funds.
- Pradeshiya Sabas should further provide engineering guidelines during planning and supervision during construction, and then gradually the prevailing situation could be eradicated.

- To supplement the effort of Pradeshiya Sabas (PSs) it is suggested that PSs should encourage "Participatory Approach" for planning, construction and maintain of these waterway crossings. In Sabaragamuwa province for exemple, (80 km from capital), the villagers were so keen and enthusiastic to have the "Participatory Approach" for planning, construction and to maintain.
- An assignment is to be taken up, to inventory the waterway crossings initially of few PSs and then to work out a ranking system to facilitate investment decision of said PSs.
- Because these structures are non-engineered, frequent attention is required to avoid or to prevent catastrophic failures, hence it is appropriate each Pradeshya Saba to appoint groups comprising 4-5 villagers and to establish effective communication with these groups.
- Ministry of Transport and Railways at the moment is engaged in the preparation of a "National Transport Policy" for Sri Lanka and there you do not get any provision with regard to the rural waterway crossings, so it is correct time that our National Transport Policy should take this issue up.

6.0 PERU CASE STUDY BY MARIA GUTIERREZ

Title: "*The better the road, the greater the risk*" : A case study on impact of roads rehabilitation on safety and cultural values

In Peru the Ministry of Transport and Communication manages the Rural Roads project to allow for safe and reliable road conditions from urban hubs to rural areas and vice versa. During its second phase (2001-2006), it has rehabilitated 4398 kilometres of rural roads and improved 3,650 kilometres of rural trails through supporting 553 community-based micro-enterprises which are responsible for maintaining 2,888 kilometres of the roads. Due to the recent decentralisation process rural road management is being transferred to local governments.

The qualitative study is carried out in two main areas: in Cajamarca it looked at safety aspects of rural roads built as part of the programme and an old community trail called Qhapaq Nan that links an old city Cumbemayo to Cajamarca which is one of the most important cities in the North of Peru. The other is in Chupaca where there is a small circuit of 15 kms of rural roads and a trail of 2350 kms which connects small towns. Both places are attractive for tourism.

It has the following objectives:

- Identification of linkages between roads rehabilitation, tourism and children's and women's safety
- Identification of traditional safety codes
- Identification of harassment cases, particularly for women/girls, related to the design of transport services and facilities

The study distinguishes safety and security risks. *Safety risks are usually seen in terms of accidents resulting in injuries, death or damage to IMTs or vehicles. Security risks can include cases of criminality in transport and mobility*[1]. It also focuses on two types of roads: rural roads which links small towns or districts and a trail system which connects the most isolated and remote communities. An example of the latter are the old Inca trails which still connect communities, cities and important archaeological ruins. The most important ones have also been rehabilitated.

6.1. Methodology

Data collection took place in two field trips, the first one to Cajamarca, where the researcher was assisted by the rural roads personnel, and the second to Huachac where PASDHI, a local Catholic Church branch helped to

[1] www.ifrtd.org

identify the main stakeholders and unsafe events. In Cajamarca the researcher interviewed the head of the rural Roads Project, a female maintenance worker, two school teachers, the mayor and one council of Chetilla district, the tenant governor of Cumbe and local people along the road. In Chupaca, the mayor of Huachac district, bus operators, roads police, Antapampa Municipality Agent, students and producers were interviewed.

A focus group discussion was carried out in Cajamarca, with students, teachers, literacy workers, rural roads assistant and monitor, and local people to identify unsafe situations, sectors and paths. A second one in Huachac with local elderly, transport users and the local development committee to identify traditional values and how to integrate these in appropriate safety regulations for transport services and local development. Secondary information helped to identify current policies and institutions related to the case study,

6.2. Key findings

- There are two main bodies responsible for road safety in Peru. The National Council for Road Safety is responsible for the safety of users, including pedestrians, drivers and passengers as well as the main policy-making body. Their main focus is on safety and security in urban zones and areas with high density traffic. Accidents do not get segregated according to location or mode of transport. The local Ombudsman is the other body and actually carried out a study on safety in interprovincial traffic, due to the high number of accidents. It treats mobility and access as rights which should be enjoyed. In the study it was shown that people's mobility and economic development was improved due to road improvement. It didn't mention somehow that poor people are still excluded from this growth spurt and still walk on abandoned paths as transport fares are too expensive.
- There is a national policy that requires all motorised vehicles (including boats, motorbikes, etc.) to have car insurance which insures accidents. However law enforcement is weak and not many drivers comply with this law, implying a heightened security risk..
- Local governments have to regulate IMTs and stations, including parking for the animals. This also presents problems with enforcement and often animals obstruct the roads.
- A local maintenance micro-enterprise carried out a week-long daily traffic count which sees a lot of private vehicles due to increased tourism. Private station wagons were also frequent and are often used to steal animals, goods and tools due to the free space these cars have in the back as well as a light motor. This is illustrated by the following quote from a local governor:
  "They turn the motor off and pull the car so we do not notice they are stealing us, and then they reach a short road that connects to Cajamarca to escape."
- In addition public buses and combis (mini-buses that are allowed to carry 22 passengers) are very frequent.. In both areas people thought these combis to be the most risky, especially at peak hours when they overload. For (young) women and girls there is the added risk of sexual harassment on the bus either by co-passengers or the drivers as the following story from Rosario demonstrates:
  *"If I loose the car that passes through at 6 AM in the morning, I won't get a seat, when the bus returns, so I would travel crushed or squeezed in the bus, and sometimes they touch me" (*sic)
- On the trails there used to be a tradition to collectively maintain these twice a year. Due to funded programmes this tradition has been lost and a lot of trails deteriorated when the funding ended and people no longer got paid. This has affected safety conditions for all users but especially for women and children who often carry or headload loads. The trails are mainly used by students, by agriculturalists to transport their goods on donkeys and horses as well as cyclists and motorcycle taxis.
- Cultural values and perceptions also change due to increased mobility. It was noted that people feel increasingly unsafe after the rehabilitation of the road. This is because of an increase in thefts, cattle rustling, robberies and rapes as the area has become more accessible for external visitors. Since animals are their savings most rural people prefer someone (in most instances girls) to stay at home and watch. Victoria a micro-entrepreneur describes the following: … *even if we are working on the road, it might happen in few minutes, so my daughter who stopped studying stays at home, and also most of families.* If this were true

on a large scale it would defeat, paradoxically, the objective of the entire rural roads programme to improve access to services.

- The researcher was not able to get accurate data on rape but it is quite frequent according to the women who participated in the focus group discussion. Local survival mechanisms are to say that you are HIV-positive, to put up fences in the garden, to acquire a cell phone, walk in groups or organise a neighbourhood watch for civic safety and obviously not drink excessively. .

6.3. Conclusions and recommendations

- Rehabilitation of the roads is certainly needed and is one of the ways to a better living standard. However the negative behaviors and impacts (gangs, robbery, assaults and rapes) that come with it deserve attention as well and mitigating factors need to be developed.
- Road safety has always been a concern for pedestrians and peasants in general, but in particular for women and children who could easily fall victim to harassment or rape.
- Rural transport is still very informal and infrequent and needs to be improved and formalised.
- Safety and security are the main demands of rural and urban population, and civil society organisations need to be engaged more in planning and implementation phase to help develop the mitigating factors. .

7.0 SUMMARY OF ISSUES FROM THE SAFETY STUDIES

There are several key issues that can be drawn from the case studies that are synthesised below.

7.1 Safety regulations and law enforcement

The main challenge all studies assessed is the lack of data on rural transport in general and rural transport safety in particular. In some cases, such as Cameroon and Madagascar rural transport is not sufficiently integrated into the national safety policies and focuses mainly on bigger tarred roads and motorised traffic. In addition, in Sri Lanka the national draft rural transport policy does not include non-engineered water crossings and up to date no attempt has been made to count and assess these crossings nationwide in terms of safety. The studies recommend a broader definition of safety which would go beyond just roads and include some of the rural issues as well. In most instances, accidents in rural areas go unreported due to distance to health centres and/or police stations; this means that the exact data and information on accidents, incidents and safety concerns in rural areas are unknown. In fact, the studies reveal that the number of incidents is indeed bigger than official data imply and a better data collection system is needed.

In Peru and India where large rural roads programmes are implemented the studies recommend integrating a safety component from the programme's inception to prepare communities for impending changes. As a result of these programmes there are increased safety risks due to the interaction between motorised and non-motorised road users and especially India has developed an Accident Potential Index to identify the most vulnerable stretches.

Better law enforcement was another solution the studies introduced. This is a solution the study on Rural Transport Services commissioned by the Sub Saharan African Transport Policy Programme and carried out by a team of rural transport specialists led by Paul Starkey shed some light on (available through http://www.ifrtd.gn.apc.org/new/issues/t_services.php). The study revealed that operators, regulators and passengers agreed that enforcement of existing and new safety regulations would bring an end to all existing – already limited- rural transport services. And this would be a disaster for rural communities' accessibility and counterproductive to most rural roads programmes' goals and objectives! A more context-sensitive approach and realistic safety regulations are needed and can, for example, mean that in those rural areas with transport

scarcity, freight vehicles would be allowed to combine passengers and freight. It is a question of developing minimum safety standards (as a compromise between the regulations and the practices and contexts)

7.2 Gender and safety

The majority of the studies revealed that safety has a lot of gender dimensions. In Peru and Cameroon the studies differentiated between safety and security in the sense that the latter refers to criminality in transport and mobility. Both authors assessed that women are particularly vulnerable on community roads and in public vehicles not only in terms of their safety but security as well. One respondent stated "*If I use the car that passes through at 6AM in the morning I won't get a seat when the bus returns, so I would travel crushed or squeezed in the bus, and sometimes they touch me".* The Peruvian study also demonstrates that especially women and girl children feel increasingly unsafe after the roads open up due to a rural road programme. The gender dimensions of safety are certainly an area that needs to be studied in more detail.

7.3 Community participation

All researchers felt that communities should have more responsibility in developing appropriate safety programmes. At the moment stakeholders have developed coping mechanisms, such as using a variety of transport modes or simply not travelling, to minimise safety risks. But these coping mechanisms are obviously not long-term solutions –and in fact reduce accessibility- and a lot of interviewees expressed an interest in becoming more engaged in safety issues. Stakeholder involvement, including women and children, is already key in order to obtain a full picture of the various safety perceptions in order for appropriate interventions to be designed. This could mean for example that in Peru and India communities get involved in designing a safety programme for the rural roads programme, while in Sri Lanka the researcher recommended that the communities be involved in not only prioritising the most dangerous crossings but also help in constructing and maintaining them. In Cameroon and Madagascar the researchers recommended that communities are contracted for labour-based approaches to road maintenance which will help improve the road conditions and again minimise risks.

7.4 Ways forward and key recommendations

- Safety needs to be fully integrated into major rural roads programmes from the design to implementation phase. This is especially relevant to sensitise communities on pending changes.
- Communities have to participate in designing safety interventions to get a more holistic picture of safety needs and perceptions
- Communities should also participate in prioritising appropriate local infrastructure, such as water crossings and help build and maintain them. Road maintenance, using labour-based approaches is another area to keep roads in a good condition.
- A minimum safety standard is needed that
- And finally, more research, both quantitative and qualitative, is needed to generate more knowledge, data and information about men, women and children's perceptions and realities relating to safety and security risks in rural areas. These small studies are only the tip of the iceberg and did not for example touch upon the safety of IMTs, goods and personal belongings.