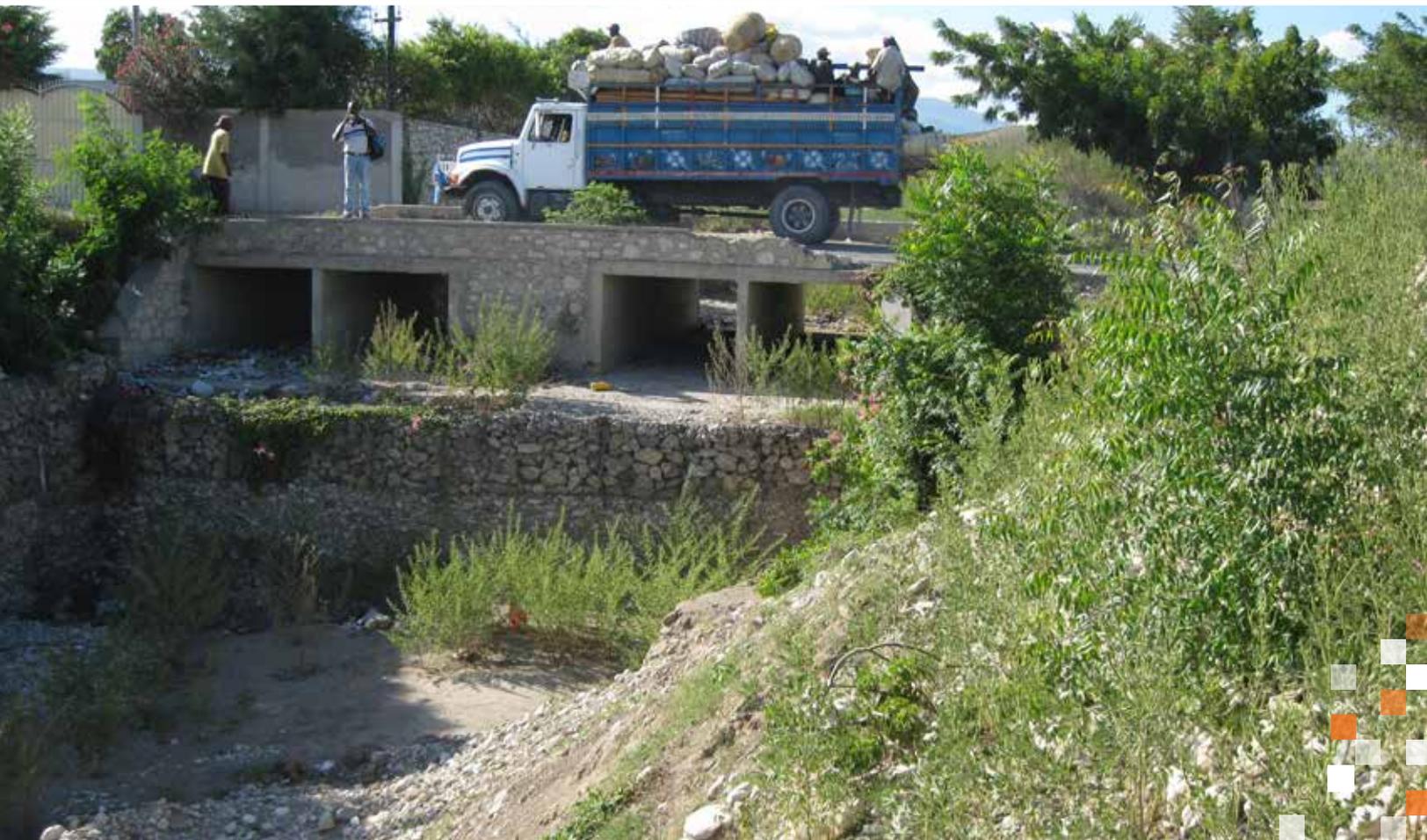


TRANSPORT



PDNA GUIDELINES VOLUME B



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## INTRODUCTION

The Transport Sector, in accordance with the most recent International Standard Industrial Classification of All Economic Activities of the world-wide System of National Accounts (United Nations, *International Standard Industrial Classification of All Economic Activities, Rev.4*, New York, 2008, (<http://unstats.org/unsd/cr/registry/>), includes the following set of activities to move both persons and cargo:

- Road transport
- Railroad transport
- Pipeline transport
- Air transport
- Transport support, including airports, ports, tunnels, bridges, etc.
- Postal services

As in other sectors of economic and social activity, the Transport Sector may sustain destruction of its physical assets – infrastructure and vehicles – (damage) and changes in its production flows, which may include both decline in production and higher production costs.

The Transport Sector is so vast and complex that in many countries several governmental bodies – ministries or other offices – may have to cover it, depending on each country's size and governmental structure; and such government bodies may exist both at national and sub-national levels.

## ASSESSMENT PROCESS

This chapter describes the procedure to assess the effects of a disaster on the Transport Sector, following the traditional methodology originally developed by the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) (*Handbook for estimating the socio-economic and environmental impact of disasters*, 4 volumes, United Nations, 2003), further developed by the World Bank's Global Facility for Disaster Recovery and Reduction (GFDRR) (*Guidance Notes for Damage, Loss and Needs Assessment*, 3 volumes, The World Bank, Washington, D.C., 2010), and now expanded and adopted by the PDNA. Application of the methodology enables the assessment of disasters' economic and social impact on the Transport Sector, and the estimation of post-disaster needs for recovery and reconstruction.

The value of destroyed assets is estimated by first measuring the physical quantities that may have been destroyed and then multiplying them by the unit construction cost prevailing at the time of the disaster to replace the destroyed units with the same characteristics they had prior to the disaster event.

The value of production flow changes in the Transport Sector may include both a decline in quantity and value of the transport services of persons and cargo as well as a possible increase in the costs of transport. In this regard, it must be mentioned that it has been found in the many cases of disaster impact assessment conducted in the past years in different countries of the world, that traffic of persons and cargo is not necessarily fully or permanently interrupted after a disaster; rather, after a brief initial paralysis of traffic flows, part of the traffic may be delayed and another part may be re-routed via alternative roads or modes of transport. Therefore, the total gross value of transport service provision may not actually change very much, but its breakdown among sub-sectors or modes may be altered due to the disaster. However, when alternative routes are used – having different characteristics in comparison to the destroyed one – changes occur in the total value added of transport production, caused by changes in intermediate consumption (i.e. higher transport costs).

The most frequent case of higher transport costs in this sector occurs with vehicular traffic that must utilise alternative, longer and lower-quality physical routes that result in higher costs of operation. Other higher costs are incurred when users are required to use alternative ports or airports that have higher operational costs than the ones they normally use. In addition, transport production losses may be incurred when certain products cannot reach the intended markets in time due to damage to their normal routes of transport. This is typical for perishable agricultural and fishery products that do not reach markets in time; however, these costs refer to the value of the production that does not reach the market, and should be accounted for under the Primary Production Sector and not under Transport.

Special care must be exercised therefore in separating disaster effects within the Transport Sector and those caused in other sectors that make use of the transport infrastructure and services.

To conduct a full assessment of the Transport Sector after disasters, the sectoral assessment team must include civil, transport and structural engineers for the estimation of the value of destruction (damage), and transport economists with experience in the sector must participate in the estimation of changes in the production flows of transport services. This sectoral assessment team must be fully knowledgeable in the possible modification of traffic flows that may arise after a disaster, the possible shift of cargo and persons between transport modes or sub-sectors, and the methodology of estimating the value of transport costs, an essential part of transport economics.

In view of the similarities among these sub-sectors, only the procedure for assessment of road transport will be described in full.



## PRE-DISASTER SITUATION

The following information is essential for the estimation of disaster effects, and must be collected as the first stage of the assessment:

- Location and capacities of each of the transport sub-systems as listed above, and their main individual components;
- Number and capacities of the vehicular stock available in each of the sub-systems;
- Most recent origin and destination surveys in the affected and nearby areas;
- Marginal operating costs in each of the transport modes for different types of vehicles; and
- Annual reports of performance of (private or public) transport enterprises.

This type of information is normally available from the ministries of public works or transport, in the respective departments of roads, ports and airports; from private enterprises that operate roads, railways, ports and airports under concession arrangements; from building contractors and associations, civil defence institutions and – in some cases – insurance companies. Data on transport flows is usually available from the planning and operations departments of ministry of public works, and may also be obtained from recent feasibility studies of new roads.

## FIELD VISITS FOR POST-DISASTER DATA COLLECTION

A field visit or visits by the Transport Sector Assessment Team to directly observe the effects of the disaster in the affected areas is essential, and should be undertaken as the second stage of the assessment. Where initial damage assessments (IDAs) have been undertaken, the Transport Sector Assessment Team would engage in field visits for verification purposes. In many cases, an initial aerial survey – if feasible – may provide the necessary overview on which to base subsequent, detailed field visits by road, boat or foot to key points of the transport system. During the field visits, the sectoral team assessing the effects of the disaster must draw its own conclusions with regard to the post-disaster status of the entire system, the requirements for rehabilitation and reconstruction, and the manner in which the system may function or perform under abnormal, post-disaster conditions.

Needless to say, the sectoral team entrusted with the assessment must have previous experience in analysing post-disaster situations and scenarios in the Transport Sector.

# ESTIMATION OF DISASTER EFFECTS

## EFFECTS ON INFRASTRUCTURE AND PHYSICAL ASSETS

Detailed procedures for the estimation of disaster effects in the road Transport Sector are described here; disaster effects on other sub-sectors of transport may be estimated following similar procedures. In due time, similar detailed methodological notes for the other sub-sectors may be developed and added to the PDNA Handbook.

When undertaking the assessment, it must be remembered that the Transport Sector is usually one of the most affected in terms of disaster effects, frequently surpassing the destruction to housing and agriculture, depending on the type and extent of the natural phenomena that caused the disaster. In addition, one should bear in mind that destruction (damage) is sustained not only by road surfaces or structures, but by associated bridges, culverts and other drainage works. In addition, in cases of earthquakes, damage is caused not only by the initial earth tremor but by aftershocks as well. Floods may cause both the collapse of structures and the erosion of road surfaces and earth fills.

Another consideration to be kept in mind during an assessment is that not all damage is evident immediately after the disaster; other damage may become obvious only days after the initial disaster. This is usually the case after long-term flooding when, after water subsides, the road surfaces may appear undamaged. Generally, water may seep through porosities in the pavement surface and erode the base and sub-base of the road, a condition aggravated by the continued use of the road. This leads to subsidence that may cause serious accidents. Another misleading case is that of structures that may seem to keep their verticality after earthquakes, although their construction materials may have lost their elasticity and structural capacity. In both cases, the affected structures must be demolished and replaced.

Other types of natural hazards that may cause damage to road transport are landslides and mudslides, which may destroy the road carpeting and interrupt vehicular traffic, resulting in higher transport costs.

In general terms, the value of damage in this sector may be estimated as the value of investment required to replace the physical assets of the sector assuming the same physical characteristics as they had prior to the disaster, and the unit costs prevailing at the time of the disaster.

It is customary to break down the entire road Transport Sector into the following components to undertake the assessment: primary roads network, secondary roads network, and tertiary roads network. This is so because their characteristics are usually different among the three types of roads, and also because different government level organisations usually undertake their construction, maintenance and operation. In some countries, primary roads fall within the purview of the central government, while secondary roads are usually built and maintained by provincial governments, and tertiary roads are built and maintained by district or municipal governments. Should they exist in the disaster-affected area, roads under concession may be added into the above analysis and classification, duly recognising that their construction, maintenance and operation fall under the jurisdiction of a private or public enterprise.

During the field surveys, the Transport Sector Assessment Team must ascertain the extent and cost of rehabilitation or reconstruction of road transport works, based on the type and severity of destruction. The physical and traffic absorption characteristics of each affected component or road sections must be combined with the unit cost of rehabilitation or reconstruction, as required.

Unit costs for rehabilitation may be obtained from the Study and Design and Maintenance Departments or Units in the Transport or Public Works ministry or agency, in the cases where they would be entrusted with the task. When rehabilitation or reconstruction is to be entrusted to private contractors, unit costs may be obtained from private contractors who work in the sector.

Unit costs for reconstruction can only be obtained after a detailed design of the new infrastructure has been completed. However, preliminary estimations may be obtained from Planning and Design Departments of the Public Works ministry or agency that may have recently developed similar new projects for construction.

As an aid to the specialist involved in the assessment of disaster damage, Table 1 shows the range of costs for rehabilitation and reconstruction of different types of roads in the Latin America and Caribbean region. This table has been developed by the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) for use within the Latin America and Caribbean region. Similar values may be used in other developing countries located in different regions. Special care must be exercised by the Transport Assessment Team when applying these figures, to give due consideration to local cost conditions and to adjust for inflation.

**Table 1:** Ranges in the Cost of Rehabilitation and Reconstruction of Two-Way Roads (US Dollars per kilometer, in 2003)

Type of work	Range in Cost
<b>Rehabilitation</b>	
Dirt road, flat terrain	4,000 – 5,000
Dirt road, undulating terrain	5,000 – 6,000
Dirt road, mountainous terrain	6,000 – 8,000+
Gravel road, flat terrain	12,000 – 14,000
Gravel road, undulating terrain	15,000 – 18,000
Gravel road, mountainous terrain	18,000 – 21,000+
Paved road, flat terrain	22,000 – 25,000
Paved road, undulating terrain	25,000 – 28,000
Paved road, mountainous terrain	28,000 – 32,000+
<b>Reconstruction</b>	
Dirt road, flat terrain	8,000 – 10,000
Dirt road, undulating terrain	10,000 – 18,000
Dirt road, mountainous terrain	18,000 – 25,000+
Gravel road, flat terrain	45,000 – 50,000
Gravel road, undulating terrain	50,000 – 65,000
Gravel road, mountainous terrain	65,000 – 80,000+
Paved road, flat terrain	100,000 – 150,000
Paved road, undulating terrain	150,000 – 180,000
Paved road, mountainous terrain	180,000 – 250,000+

Source: UN-ECLAC

Destruction to vehicle stock – including automobiles, buses, trucks and other smaller vehicles – must also be estimated during the assessment for the Transport Sector. In addition, construction and maintenance equipment of the sector must be duly included. There are exceptions to the above general guideline: first of all, only vehicles used for collective transportation of persons and of cargo are to be included in the Transport Sector; second, destroyed household-owned vehicles for transport of family members are not usually included in the estimation of damage for the Transport Sector; and destroyed agricultural tractors and other equipment are included in the Agricultural Sector.

For the estimation of damage to vehicles, the following simple classification may be adopted to facilitate calculations:

Light passenger vehicle	1.1.1.1.1 
Medium passenger vehicle	1.1.1.1.2 
Large passenger bus	1.1.1.1.3 
Rigid (2-3 axle) cargo vehicle	1.1.1.1.4 
Flexible (4 or more axles) cargo trucks	1.1.1.1.5 

The number of destroyed vehicles is usually estimated during the emergency phase. It may be estimated through consultations with transport enterprise associations and insurance company representatives. Their monetary value may be estimated on the basis of information given in the Highway Design Model (HDM) used by the World Bank. When vehicles have only been partially destroyed, simple assumptions on their repair value must be made in comparison to their full value, to facilitate estimations; consultations with local repair shops may be required to ascertain typical unit costs under assumed conditions.

As mentioned above, the Transport Sector Assessment Team should be aware of the fact that only vehicles owned by private and public transport enterprises should be included as damage in the assessment of the Transport Sector, for delivery to the Macroeconomic Impact Assessment Team, and that household or individual vehicles should not be added to the sector’s assets that were destroyed by the disaster. Instead, the value of destroyed family or individually owned vehicles is to be estimated by the Transport Sector Assessment Team, and delivered to the assessment team in charge of estimating disaster impact on human development.

Another important consideration to be made by the Transport Sector Assessment Team is that the value of destroyed assets that is required is that of the full replacement of destroyed infrastructure and equipment (including vehicles) and not that of the depreciated assets. However, it is important that the average age of the destroyed infrastructure or equipment be delivered as well to the Macroeconomic Impact Assessment Team for further utilisation in their analysis of disaster impact.

**EFFECTS ON OR CHANGES IN TRANSPORT FLOWS**

Transport flow changes may occur in the Transport Sector after disasters, over the time required for the rehabilitation and reconstruction of transport works: their value may exceed that of damage and in some cases may lead to overall inflation; hence, the importance of their estimation. Transport flow changes in this sector include

a combination of: (i) the value of transport flows that are interrupted by the disaster, and (ii) temporary higher transport costs that may be incurred when longer alternate routes are necessary, and/or when alternate modes of transport are adopted after disasters.

In order to estimate transport flow changes, three key elements are required: the volume of traffic flows, the resulting higher unit operating costs of vehicles that occur after the disaster, and the time required for the rehabilitation or reconstruction.

With regard to the time of rehabilitation and reconstruction, the usually accepted time periods range from a minimum of three months for full rehabilitation, to about six months for the construction of alternate short road sections, through one to five years for full reconstruction (which may involve mitigation works through redesign and reinforcement) of entire road sections.

To estimate the flows of traffic that will be involved in the assessment of higher transport costs, the traffic patterns and volumes under pre-disaster conditions must be obtained, and rapid, post-disaster manual counts must be made of the expected temporary changes of flow brought about by the disaster. The pre-disaster traffic flows can be collected directly from the local authorities through the appropriate division or unit of the Transport or Public Works ministry or agency, using the most recent survey of origin and destination, duly updated when necessary. The modified post-disaster traffic flows must be measured by the Transport Sector Assessment Team or by the pertinent national or local authorities, bearing in mind the time required for rehabilitation and reconstruction of the affected roads.

The marginal operating cost of vehicles varies depending on the type of vehicle, type of terrain and quality of road surface. It includes different cost components, such as fuel, repairs, tires, depreciation, crew salaries, additional time for passengers, etc. Such operating costs are normally available in the affected country for their direct application in the estimation of traffic flow changes. In fact, planning departments of the Transport or Public



Works ministries or agencies usually have the required information. Should this information not be available, use can be made of data shown in Table 2 in the next page, duly adjusted to local conditions by the Transport Assessment Team, which provides the ranges of typical values of marginal operating costs for different road conditions and for the main types of vehicles in developing countries of the Latin America and Caribbean region. These ranges have been developed by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC). The range indicated goes from good to poor state of conservation of the road surface, using roughness as the main parameter.

**Table 2:** Marginal Operating Costs of Different Types of Vehicles in Different Types of Road Conditions (US Cents Per Vehicle-Kilometer, in 2003)

Type of road	Type of terrain	Type of vehicle				
		Cars and other light vehicles	Medium size buses	Large buses	Flatbed and other trucks	Rigs and trailer trucks
Paved roads	Flat	29 – 32	63 - 69	80 - 91	107 - 126	139 - 154
	Undulating	30 – 33	65 - 75	112 - 120	125 - 156	155 - 181
	Mountainous	31 – 34	69 - 80	144 - 157	156 - 182	156 - 225
Gravel roads	Flat	44 – 56	106 - 126	135 - 163	179 - 220	203 - 243
	Undulating	49 – 63	111 - 136	157 - 189	180 - 225	204 - 267
	Mountainous	46 – 67	114 - 144	197 - 234	184 - 249	207 - 246
Dirt roads	Flat	44 – 56	90 - 111	125 - 147	179 - 223	203 - 243
	Undulating	45 – 63	92 - 113	127 - 162	180 - 226	206 - 246
	Mountainous	46 – 57	96 - 113	134 - 176	184 - 249	207 - 267

Source: UN-ECLAC

For the assessment of road transport flow changes, separate estimations are to be made of the following possible components, and the total aggregated for delivery to the Macroeconomic Assessment Team:

- Gross value of temporarily interrupted transport of cargo and persons, when significant in comparison to the non-disaster annual amount;
- Gross value of temporary decline in toll receipts in roads under concession agreements;
- Urgent expenditures made to re-open transport traffic under at least minimum conditions, during the emergency stage, after the disaster has caused traffic interruptions; and
- Higher cost of transport due to the temporary utilisation of alternative (longer and lower quality) road sections, incurred by transport companies during the period of recovery and reconstruction, which in fact represents an increase in intermediate consumption for the sector.

When analysing disaster effects on public and private enterprises that administer or manage airports, ports, and other transport terminals, the changes in transport flows must include:

- Possible temporary decline in revenues earned by public and private transport enterprises caused by stoppage or slowdown of operations; and
- Possible higher costs of operation of the enterprise caused by the disaster.

The Transport Sector Assessment Team should be aware that in the above estimation of changes in Transport Sector flows, only the modifications in transport flows of private and public transport enterprises are to be included and delivered to the Macroeconomic Assessment Team. It is essential that any changes occurring in the transport flows of persons, using their family-owned vehicles, are not to be added to the total, since private personal transport is not included in the road Transport Sector accounts.

In connection with the above, estimations of the possible changes in private personal transport costs are to be made by the assessment team as well, but used only to provide inputs to the assessment team in charge of estimating disaster impact on human development. The latter team will use such information to ascertain the aggregated impact of the disaster on human development, through analysis of household or personal income decline and of cost-of-living increases caused by the disaster.

## **EFFECTS ON GOVERNANCE AND DECISION-MAKING PROCESS**

The Transport Sector infrastructure is normally owned by the public sector while transport services are usually in the hands of private sector entities; in addition, the public sector is responsible for the function of oversight and regulation of the sector. Disasters usually disrupt the function of governance, and the assessment should analyse this effect.

Governance is affected in five possible areas:

1. Knowledge and skills: technical expertise and institutional information for the sector;
2. Resources: human, material and financial, including availability of skilled labour, raw materials for processing, cost and price structure, etc.;
3. Systems, information management, communications and basic inputs; and
4. Legal authority, monitoring, oversight and reporting.

As part of the assessment, the team must ascertain how the capacity of the public sector to oversee the normal functioning of the Transport Sector may have been compromised (including the availability of registries, etc.), how the disaster may have modified the structure of costs for transportation services that may require modification of tariffs, and also the availability of skilled labour for the sector.

Transport tariffs might rise, and users would face higher costs of living. It is also possible that, rather than transferring such transport costs to the public, government subsidies may be chosen. This possibility needs to be analysed by the assessment team, and its recommendations transferred to the Macroeconomic Impact Assessment Team.

## **EFFECTS ON RISKS AND VULNERABILITIES**

After a disaster, risk for transport infrastructure and services must be re-examined. Pre-existing disaster risk assessment of some transport system components may not have taken place, as they may have been located in disaster-prone geographical areas due to the absence or insufficiency of land-zone mapping and of drainage standards. In addition, the disaster may have increased risk and vulnerability of transport infrastructure through instability of sloping terrain that may cause further landslides, the occurrence of aftershocks following an earthquake, the possible occurrence of further intensive rainfall and flooding, etc. Such higher risks need to be fully analysed and schemes for reducing or eliminating them must be devised as part of recovery and reconstruction with risk reduction.



## ASSESSMENT OF DISASTER IMPACT

In addition to the estimation of the value of destroyed assets and of production flow changes for the sector, the Transport Sector Assessment Team is required to carry out additional estimations and their results are to be delivered to the team in charge of the assessment of macroeconomic impact and the team entrusted with analysing disaster impact on human development.

For the analysis of disaster impact on macroeconomic conditions, these additional estimations include the possible impact on the country's gross domestic product (GDP), on the balance of payments (BoP) and trade (BoT), and on the fiscal budget. These estimations are to be made regardless of whether the transport facilities and services are government-owned or under concession to private enterprises. The macro analysis is carried out by a different assessment team.

The Transport Sector damage assessment should include the necessary breakdowns so that estimations can be made of the value of rehabilitation and reconstruction items that must be imported from abroad – including equipment, machinery, construction materials and skilled labour – due to absence of domestic production (the so called “imported component” of damage).

Estimations must be made of the impact of transport flow changes on the country's balance of payments and trade, through the estimation of any significant amounts of increased imports or decreased exports of fuels for the Transport Sector arising from the disaster. In addition, the impact of losses on the government budget must be ascertained in terms of increased operational costs and lower revenues when the government directly owns transport enterprises and services.

The above information is to be delivered by the Transport Sector Assessment Team to the separate assessment team in charge of overall macroeconomic impact analysis.

In addition to the previously described estimations, when the Transport Sector Assessment Team has completed the estimation of higher transport costs faced by households and individuals when using private transport means (i.e. their own vehicles) such additional costs are to be delivered to the assessment team in charge of analysing disaster impact on human development.

## CROSS-SECTORAL LINKAGES AND ISSUES

During the assessment, several cross-cutting issues must be given due consideration. These include the differential impact of the disaster on gender and the possible impact on the environment.

For the Transport Sector, the gender breakdown of the labour force – whether skilled or not – is an essential part of the baseline information gathered at the start of the assessment, together with information on wages and salaries. Once the estimated values of production losses for the Transport Sector have been made, separate estimates are to be made of the number of jobs temporarily or permanently lost due to the disaster for both men and women, together with how their personal income may have declined.

Due to the disaster, environmental conditions may be altered which may cause further difficulties to the Transport Sector. Any such difficulties must be quantified by the assessment team with assistance from environmental economists, and expressed in monetary terms for inclusion in the assessment.

## ESTIMATION OF POST-DISASTER ECONOMIC RECOVERY AND RECONSTRUCTION REQUIREMENTS OR NEEDS

The Transport Sector Assessment Team should be aware that the estimation of post-disaster financial requirements to achieve economic recovery and disaster-resilient reconstruction of the sector cannot be undertaken until it has completed the estimation of the value of destroyed assets (damage) and the value of transport production flows, and after these results have been delivered to the assessment team in charge of estimating disaster impact at the macroeconomic level. Completion of the above before undertaking the estimation of post-disaster recovery and reconstruction needs is required to ensure the accuracy and consistency of the entire assessment, as well as guaranteeing the absence of any undue influences in the estimation of needs.

The financial requirements or needs for economic recovery of the Transport Sector are defined as the amounts of financing required to ensure the progressive return of the service to normalcy. In a sense, these requirements involve the reduction of higher transport costs, and may involve some of the following activities:

- Setting up of temporary bridges or fords to facilitate traffic over road sections where bridges or other drainage works have been destroyed, until they may be rebuilt;
- Possible temporary government subsidies to collective transport systems in urban areas that are facing post-disaster higher transport costs, thus avoiding increases in transport tariffs charged to users;
- Setting up of possible, alternative, temporary schemes of transport in lieu of regular transport schemes that have been destroyed; and
- Possible temporary tax relief schemes for private and public transport companies over the recovery period.

The cost of such schemes should not in any case exceed the value of higher transport costs that have been estimated by the Transport Sector Assessment Team as arising due to the disaster. In addition, the value of possible insurance proceeds on transport services sales must be deducted from the estimated recovery needs values.

The financial requirements or needs for disaster-resilient reconstruction of destroyed assets are estimated by taking the estimated value of damage and increasing it by a certain percentage, whose magnitude depends on the degree of modernization, technological improvement and disaster-risk reduction degree that is required in the recovery and reconstruction strategy.

In that respect, reconstruction may involve higher standards of design and construction for bridges, culverts and other drainage works to accommodate for higher flood discharge capacities or increased resilience against earth tremors, and/or the addition of flood-control or landslide protection works for strategic road sections. The nominal transport capacity of the road and ancillary works, however, is not to be increased, since that would be a development requirement that is not associated with the reconstruction after a disaster.

The experience gained over the last 40 years over which post-disaster assessments have been conducted as a basis for defining recovery and reconstruction requirements indicate that the range to increase the value of damage falls between 12 to 25 percent. It is up to the experts comprising the Transport Sector Assessment Team to define the value of this coefficient, bearing in mind both the degree of disaster resilience required and the design standards prevailing when the destroyed assets were originally built.

The amount of possible insurance proceeds on destroyed transport assets should be deducted from the estimated value of reconstruction needs.

## ESTIMATION OF POST-DISASTER HUMAN DEVELOPMENT RECOVERY REQUIREMENTS OR NEEDS

Human development recovery needs in the Transport Sector are the amounts of financing that may be required for affected individual households during the recovery and reconstruction stages to continue to have adequate access to transport services, without incurring additional costs of living. As was initially stated in the introduction to this chapter, such possible higher transport costs are not to be added to the estimated changes in Transport Sector flow costs; instead, they should be estimated and kept separately by the Transport Sector Assessment Team, and should be delivered to the assessment team in charge of estimating human development recovery needs.

Should the Transport Sector Assessment Team estimate higher collective transport costs in urban systems that are to be met through a scheme of temporary government subsidy in order to avoid a general increase of transport tariffs as discussed in the preceding section, there would be no need to estimate additional or separate human development recovery needs for the users of the collective urban transport systems.

However, for families who may face higher transport costs after a disaster through higher consumption of fuel in their family vehicles and/or having to pay tolls for roads under construction, government schemes to alleviate such decline in human development and well-being should be explored. A temporary government scheme of reducing import duties on fuel or of providing subsidised fuel to these affected families, over the recovery period required to return to normalcy after the disaster, may be recommended; and its cost may be estimated as no

higher than the estimated higher cost of transport that these households may face after the disaster. Needless to say, implementing such scheme will have a negative bearing on the fiscal position, as it would imply lower revenues for the government in comparison to non-disaster conditions, and its cost to the government should be reported by the Transport Assessment Team to the Macroeconomic Assessment Team as well.

In any case, the estimated value of such a human development recovery need is not to be mixed or added to the estimated economic recovery needs described in the preceding section of this chapter, and should be kept separately.