

PDNA

POST-DISASTER NEEDS ASSESSMENT

DRF

DISASTER RECOVERY FRAMEWORK

Session 4

Estimating the economic value of the disaster effect



Objectives of this session

- Estimate the economic value to disaster effects
- Understand how the disaster effect is aggregated and summarised in a typical PDNA report
- Test your understanding of the estimating costs of effects through a simple case study

The PDNA Process



In a nutshell...

*The economic valuation of the disaster effect consists of a **gap analysis**...*

BEFORE – **AFTER** = **GAP**

CONTEXT ANALYSIS
AND PRE DISASTER
BASELINE DATA

EFFECTS OF
THE EVENT
PRESENTED IN
POST DISASTER
DATA SET

COMPARE
PRE-AND POST
DISASTER
SCENARIOS

... that is conducted **across all PDNA sectors** and for **each disaster-affected area**.

Key PDNA terminology

There are two essential concepts needed to undertake the disaster effect assessment:

damage and **loss**

Damage

- Refers to the **total or partial destruction** of infrastructure and physical assets. Its cost is estimated at the replacing or repairing market prices prevailing just before the disaster.
- Damages are **valued first in physical terms** (number of houses of a specific typology, Km of roads or pipelines, size and types of schools or hospitals); and **then in terms of their monetary value**, using unit current market prices.

Loss

- Economic loss refers to **changes in economic flows** arising from the disaster.
- These changes in flows continue until the achievement of full economic recovery and reconstruction, in some cases lasting for several years.
- Loss is **expressed in current monetary values**.

Estimating the Value of Effects

Damage



Value of **total/partial destruction** of infrastructure and physical assets



Value of **changes to social service delivery** and access to goods and services



Value of **changes to governance processes** derived from disruption to governance as result of the event



Value of **changes to risks and vulnerabilities** derived from the extent of the population exposure

Losses

Estimating Damage



Value of total/partial destruction of infrastructure and assets (Damage)

- Categorize the physical assets by **size, capacity and construction materials** (m^3 debris removal, m^2 of damaged schools or hospitals, km of damaged roads or water pipe lines).
- Obtain current **market price** for repair and construction.
- Calendar of **time** over which repair and reconstruction will take place.
- Estimate the **unit value** (US\$/ m^3 of debris removal, US\$/ m^2 of RC construction) and aggregate **the total value**.

Estimating Loss



Value of changes to social service delivery and access to goods and services (Loss)

Pre-disaster minus post-disaster estimates of losses due to :

- Forgone income opportunities
- Higher operating costs
- Unexpected expenses

Estimating Loss : examples



Value of changes to governance processes derived from disruption to governance

- Estimate increased costs of coordination needs over time such as temporary facilities and resources and restoration of government capacities.
- Estimate higher expenditure for service delivery over time.
- Estimate higher expenditure for temporary staff over time
- Calculate current value and aggregate.

Estimating Loss



Value of changes to risks and vulnerabilities (loss)

- Estimate additional expenditures to address secondary risks over time
- Estimate higher costs for communications campaigns to prevent risks over time (to boil drinking water and digging a ditch in a temporary shelter)
- Calculate current value and aggregate

Examples of loss

1. Foregone income opportunities

Private:

- total loss of crops or reduction in farm output
- income reduction from businesses, rent, etc.

Public:

- Income loss/revenue from public facilities and firms like airports, ports, state-owned enterprises, etc.

Example of loss

2. Higher operating costs

- additional expenses to produce same output of goods and/or services during the recovery phase
 - Cost of replanting new crops
 - Cost of temporary power and/or water supply;
 - rent of temporary offices firms

3. Unexpected expenses

- cleaning up of debris
- unexpected expenses on temporary shelters, water supply, medicines, food supply, etc. for the government.

Importance of costing the loss

- ❑ In the past, the cost of disasters was identified only in terms of damage due to urgency in reconstruction financing.
- ❑ It is difficult to estimate losses
- ❑ Total effects of disasters could be largely underestimated if losses are not accounted for
- ❑ Many social needs may not be addressed

Odisha PDNA : Damage and Loss

Sector/Themes	Damage (INR Cr)	Damage (\$ mil.)	Losses (INR Cr)	Losses (\$ mil.)	Needs (INR Cr)	Needs (\$ mil.)
Housing	3,075	439		-	8,996	1,285
Education and child protection	814	116	-	-	503	72
Health and nutrition	128	18	262	37	451	64
Cultural heritage and tourism	560	80	1,334	191	526	75
Agriculture, fisheries and livestock	1,576	225	1,454	208	2,347	335
Employment and livelihoods	772	110	4,105	586	3,069	438
Roads	326	47	21	3	425	61
Energy	8,139	1,163	254	36	9,748	1,393
Telecommunications	447	64		-	482	69
Public buildings	539	77	54	8	647	92
Water resources and coastal	5	1		-	86	12
Water and sanitation	266	38	158	23	819	117
Environment	77	11	253	36	465	66
Disaster risk reduction	6	1	1	0	278	40
Gender and social inclusion	24	3		-	27	4
Total	16,754	2,393	7,897	1,128	28,869	4,124

Application

Seema is the owner of a road side Street cart selling fresh fruit juice and fresh fruits in Somecity. After a five days of heavy rainfall a river broke through its dam and flooded houses and shops close-by, including the street cart. Seema has not been able to evacuate the area and are not able to access her street cart for five days.



On the sixth day, Seema goes back to retrieve her cart and all the equipment in the cart with a friend to assess the disaster effects on her street cart for her fruit juice business.



Application

Here is what Seema and her friend find:

- The street cart was partially destroyed:
 - Dirt and debris around the Street cart needs to be removed
 - The four wheels of the cart needs to be replaced.
 - All the equipment which include a juicer, a set of 10 glasses, jug, and other equipment all swept away in water
- Seema's business license was washed away

With the cart damaged and all equipment fully destroyed , Seema has no source of income. But since she lives on her income from the fruit juice stall, she rents a street cart for 15 days from her freind to resume her business.

Seema friend rents the cart for US\$ 10 dollars per day for 15 days. A local NGO is processing a grant of US\$ 500 dollars to repair the cart, buy new equipment and also purchase fresh fruits.

Application

Relevant post disaster data:

- Before the flood Seema had a monthly revenue of 1000 USD. She lost her income for 7 days
- Seema bought her street cart and Juicer and equipment about three years ago for 500 USD. It was already old and in disrepair and almost broken down.
- Cost of debris removal: 4 hours labor costs @ 2 US\$ per hour
- Cost of repair of cart: 100 US\$
- Cost of buying Juicer and equipment : US\$ 400
- Costs of renewing business license at local municipality: 10 USD
- Costs of rent for cart @ USD 10 per day

Application

Activity 1

- At your table, familiarise yourself with the case study
- Identify the different dimensions of the disaster effect
- Estimate the economic value of the disaster effect, using the following table:

Disaster effect	Damage	Loss/change in economic flows

Application

Disaster effect	Damage (USD)	Losses (USD)
Partially destroyed cart	100	
Totally destroyed Juicer and other equipment	400	
Cost of replacement of business license		10
Labour costs of debris removal @ of US\$ 2 each hour		8
Loss of revenue for 7 days @ of US\$ 33 per day		233
Rent cost of US\$ 10 per day for 15 days		150
TOTAL Total effects : 901	500	401

Key take-aways

- The economic valuation of the disaster effect consists of a gap analysis that is conducted across all PDNA sectors and in each disaster affected area.
- Damage refers to the total or partial destruction of infrastructure and physical assets and are valued first in physical terms and then in terms of their monetary value, using unit current market prices.
- Economic loss refers to changes in economic flows arising from the disaster and may continue until full economic recovery and reconstruction is achieved. Loss is expressed in current monetary values.



Questions?

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