Using **simple interest** and **compound interest** in **disaster management** is crucial when dealing with emergency loans, recovery funding, insurance payouts, and rebuilding projects. These concepts help governments, businesses, and individuals understand the **cost of borrowing** or the **growth of investment funds** used for disaster response and recovery.

◆ 1. Simple Interest in Emergency Loans

◆ Math Concept:

$$\text{Simple Interest (SI)} = \frac{P \times R \times T}{100}$$

Where:

- P = Principal (amount borrowed)
- R = Interest rate
- T = Time (in years)

✅ Example:

After a hurricane, a small business takes a loan of **$20,000** at **5% simple interest** for **3 years** to rebuild.

$$SI = \frac{20,000 \times 5 \times 3}{100} = \$3,000$$

- The business repays a total of **$23,000** after 3 years.

- This helps them recover without facing sudden high-interest charges.

◆ 2. Compound Interest in Disaster Recovery Funds

◆ Math Concept:

$$\text{Compound Interest (CI)} = P\left(1 + \frac{R}{100}\right)^T - P$$

Where:

- P = Initial amount invested

- R = Annual interest rate

- T = Time in years

✅ **Example:**

A government sets up a **disaster relief fund** of **$50,000** invested at **4% compound interest** for **2 years**.

$$CI = 50,000 \left(1 + \frac{4}{100}\right)^2 - 50,000 = 50,000(1.04)^2 - 50,000 = 50,000 \times 1.0816 - 50,000 = 54,080 - 50,000 = \$4,080$$

- After 2 years, the fund grows to **$54,080**, adding **$4,080** that can be used for additional disaster aid.

◆ 3. **Interest Used in Rebuilding Housing Projects**

◆ **Use Case:** Governments or NGOs may take **loans** to finance large-scale **housing reconstruction** projects.

Example (Simple Interest):
NGO borrows **$100,000** at 6% SI for 4 years:

$$SI = \frac{100,000 \times 6 \times 4}{100} = \$24,000$$

- Total repayment = **$124,000**

This helps estimate total cost and plan budget accordingly.

◆ 4. **Insurance Funds Growing Over Time**

◆ **Use Case:** Insurance companies invest funds using **compound interest** to grow disaster reserves.

Example:

Insurance company invests **$200,000** at 5% compound interest for 3 years:

$$CI = 200,000 \left(1 + \frac{5}{100}\right)^3 - 200,000 = 200,000 \times 1.157625 - 200,000 = 231,525 - 200,000 = \$31,525$$

- The investment earns **$31,525** extra for future payouts.

✅ Summary Table:

Scenario	Math Concept	Formula	Example
Business recovery loan	Simple Interest	$SI = \frac{PRT}{100}$	$3,000 interest on $20,000 at 5% for 3 years
Government relief fund	Compound Interest	$CI = P(1 + \frac{R}{100})^T - P$	$4,080 gain on $50,000 at 4% for 2 years
Rebuilding homes	Simple Interest	$SI = \frac{PRT}{100}$	$24,000 interest on $100,000 at 6% for 4 years
Insurance reserve	Compound Interest	$CI = P(1 + \frac{R}{100})^T - P$	$31,525 gain on $200,000 at 5% for 3 years