

,SUD, elderly, woman,urban reimagining,liveability, waste,slums, impacts of cc, strategies of cc

SLUMS

Evaluate strategies

Intro: Slum dwellers experience multiple deprivations in their everyday life such as lack of access to clean water and sanitation services, insecurity of tenure and overcrowded living conditions, all of which have adverse effects on their socio-economic well-being. Several strategies have been implemented to improve the lives of slum dwellers including **top down and bottom up approaches such as redevelopment and self-help and in-situ upgrading schemes**.

The extent to which strategies implemented to manage urban slums have improved the lives of slum dwellers is dependent on the **political ability of the government, the extent of stakeholder involvement and sustainability of the strategies in managing urban slums**.

CASE STUDIES

Political ability

Political ability refers to whether the government considers and takes into account the variety of issues faced by the slum dwellers and implements various strategies accordingly. The ability of the government to implement the strategies affects the degree of success of strategies implemented.

Positive	negative
• In Sg, squatter settlements were prevalent until HDB flats were set up in 1960 and now majority of the population stay in the public housing ◦ Evaluation: success is due to long term strong political commitment as govt recognised and place high priority in addressing needs of low income families, offering them subsidies for housing	• São Paulo, Brazil, Cingapura project was a low cost housing initiative to move the poor population from favelas into high rise permanent structures ◦ Evaluation: unsuccessful due to inability of govt to implement strategy properly as govt failed to fund the resources and use it for political agenda instead, hence improper inefficient implementation of strategy by the govt, lived of slum dwellers would not improve

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Stakeholder involvement

Issues faced by slum dweller are multifaceted, crucial that stakeholders like govt, community based organisation and slum community work together in order to understand the varying needs of slum dwellers

It is evident that stakeholders play different yet irreplaceable roles to improve lives of slum dwellers and need to have sustained motivation to help them as these strategies take place over a long period of time

Positive	negative
self help housing schemes for Kambi Moto community in Kenya allowed many households to secure tenure and redesign more stable and secure homes due to good collaboration between Nairobi City council, NGO called technical team, local savings group Mungano and slum dwellers, addressing housing needs for slum dwellers	- Dharavi Redevelopment in Mumbai India where many residents and NGOs protested against the initial plan of replacing slum structures with high rise buildings as it can disrupt cottage industries the slum dwellers depend on for their livelihoods and many felt the govt planned without consulting the local community - El Rabaul Barcelona, redeveloped housing only affordable to middle income despite 60% of units meant for low income, slum dwellers also chased out to make way for 1992 Barcelona olympics reimagining

Sustainability

the sustainability of the strategies is also important in evaluating the extent to which strategies can improve the lives of slum dwellers. Sustainability of the strategies refer to whether the strategy is properly implemented and can be effective in the long-run.

+ve:

- Tap water for slum dwellers program ran by social enterprise Shobar Jonno Pani (SJP), aim to provide clean water to slum dwellers and successfully done so as they deliver the water directly to slums and average repayment ratio is 98%, well planed strategy will sustain for long period and allow positive changes to happen as needs addressed

-ve:

- Water supply issue in Lagos, Nigeria, in 2008, the strategy was to build boreholes using a large sum of money from the World Bank. The strategy aims to increase sustainable access to basic urban services through investments in critical infrastructure. However, more than half of the boreholes have stopped working after 5 years despite aiming to last for 20 to 30 years due to various malfunctions in the borehole system and efforts to fix it were futile affecting the residents as they then lacked clean water for their daily activities and they were required to contribute money to help out in fixing the boreholes. Thus, the strategy seems to be ineffective as the residents are still deprived of clean water despite being supported by a large sum of money.

Root cause: must address underlying issues which is urban poverty to help improve lives of slum dwellers in long term

Positive:

- positive case study takes place in Milton Keynes, England. Milton Keynes was a new town built with an Act of Parliament which approved the building of a new community of around 250 000 people., constructed to help address the issue of housing shortage and overpopulation in London. The targets of establishing Milton Keynes included having a variety of housing types, low-density development to attract professional classes, and an efficient transport system. This addresses the root cause of the development of slums, which is overcrowding in major cities due to the inability to provide housing for the entire population, hence forcing people into slums. By creating a new town with several targets in place, not only does this provide housing for slum dwellers, but also paves way for regional development in the long term as well. Hence, this strategy is effective in improving the lives of slum dwellers.

Negative:

negative example is the Pruitt-Igor housing project in St. Louis, Missouri, USA, which was intended to provide modern, affordable housing for low-income residents who were displaced by slum clearance initiatives. However, this project faced the lack of support services as it solely focused on housing without providing residents with access to job training, education or other social services that could have helped them escape poverty. As a result, many residents remained trapped in cycles of unemployment and poverty. Furthermore, the design and location of Pruitt-Igor did not integrate residents into the broader urban fabric but instead reinforced their isolation, both physically and socially, from the rest of the city.

Woman

Intro:

Women living in cities generally face a lack of gender equality, often experiencing discrimination against them, and gender biases towards men. Common issues faced by women include unequal access to safe public spaces, especially at night, where they are prone to harassment, low economic well-being as well as uneven distribution of power and resources between men and women, due to the majority of positions in the government being held by men.

Case studies

Root cause

Positive:

- Port Moresby, Papua New Guinea, Safe city programme by United Nations was implemented. New measures such as forming women vendors' associations, helped to identify threats towards women and developed measures to reduce them. Market stalls in Gerehu market were renovated, sanitation and toilet designs were improved and a playground for young children who accompany women vendors was built. Furthermore, lighting was improved and police, market controllers and security guards were trained to prevent and respond to violence against women. Hence, the improved infrastructure and increased surveillance in public spaces allowed women to feel more safe and comfortable outdoors, giving them safe access to leisure facilities, social activities and job opportunities. Thus, this strategy has successfully improved the perceptions and experiences of the safety of women in markets and reduced violence in the Gerehu market, addressing the root cause of having unequal access to public spaces and increasing the liveability of women in cities.
- In Singapore, to boost women's share in the workforce, many initiatives and resources were made available. More than 68,000 women have received help from Workforce Singapore (WSG). Myriad resources are provided such as career advice, training services, self-assessment and career mentors to provide assistance. This approach shows that by assessing the root cause of the issue, positive changes can occur. Assistance is given in various forms to cater to the wide range of needs and situations the women are in. Hence, to ensure that the strategies can indeed benefit the women, understanding and empathising with their unique situations is crucial.
- . For example the Safe City programme in Ho Chi Minh City, Vietnam, organized and implemented by the UN, aims to enhance safety by improving public transport infrastructure, addressing social norms, and proposing regulations and policies to prevent and respond to sexual violence against women in public spaces. As part of this initiative, a large-scale survey on sexual harassment in public areas was conducted, and communication tools were developed to reach 8.5 million people in the city with messages on preventing sexual harassment. This UN programme tackles the root cause of women's safety in public spaces, as much of the infrastructure and services are designed by men without adequate consideration of women's need

Negative:

- Pink Taxi service in Cairo, Egypt. In response to the high rates of sexual harassment in public transportation, pink taxis, which are taxis driven by women and only serves female passengers, were introduced. Although this initiative provides a safer transport option for women, allowing them to travel without the fear of harassment, it only provides a temporary solution, only addressing the symptom of harassment, rather than solving the root cause of gender-based violence and societal attitudes towards women. This also creates a negative side-effect of segregation between men and women as it indirectly reinforces the idea that women need to be separated from men to be safe. Therefore, in order for strategies to address the root cause of issues women in cities face, they have to be holistic and target the underlying reasons through methods such as education to address negative stereotypes and perceptions of women and changes in public infrastructure in order to create a genuinely inclusive and safe environment for women in cities.
- To deal with social isolation among woman in Japan and having more women in the workforce, the government introduced policies to boost women's employment such as providing extended childcare leaves and short work-hour options. However, at the same time the government gave bonuses to husbands whose wives stay at home, and the tax system benefits single-income families. Additionally, most struggling single mothers avoid using government assistance as they are concerned that it will affect their job prospects. This shows that the government was not able to make effective changes to ease the social isolation faced by women as the government did not consider the varied issues faced by women from varied backgrounds

Political ability: whether govt takes account issues of woman and perspectives in planning and decision making processes where woman are supported and encouraged to participate in all areas of urban life on an equal basis with men

Positive:

- gender mainstreaming in urban planning in Vienna, Austria. The Municipals women office opened in 1992 and ensures women and men are accounted equally in policy, legislation and resource allocation in 2020. Hence the infrastructure and public spaces designed cater to the needs of people of each gender and the outcome is an urban landscape that benefits everyone, such as parks that are lit to provide safety and access, social housing that is designed with flexibility of different family situations to meet the different physiological, economical and social needs. Therefore, this strategy proves

effective as this makes the city for both women and men more liveable as their needs are met, achieving equity in the city.

Negative:

- Women in parliament in Rwanda. Despite 64 percent seats for women candidates in the 2013 Rwanda Parliamentary elections, there were still stigmatization and negative attitudes towards women in politics. Hence, UN Women supported a series of training leadership sessions to boost leadership skills and reverse the stigma. However, this led women to be less present at home due to the time-consuming sessions, hence causing the sessions to be perceived negatively by their husbands, raising a trigger for domestic violence. Thus, this strategy proves ineffective as many women have other commitments such as family, and many women in society are still upholding the traditional gender role and norms of a woman taking care of the household. Therefore, in order for the government to include women more in political decisions, stigmas and stereotypes first need to be addressed and considered as societal perceptions of roles of men and women are different in terms of their needs.

Stakeholder involvement

Positive:

- The Health Promotion Board (HPB)'s Women's Health Advisory, along with public and private healthcare providers, offers subsidized health screenings and follow-up care to support women's health. For example, the National University Hospital (NUH) and Singapore General Hospital (SGH) are actively involved in providing comprehensive health services specifically tailored for women. These services include a range of screenings and health workshops designed to promote healthy living. Women are strongly encouraged to participate in these health screenings and workshops, which aim to increase their awareness and engagement in preventive healthcare. The Women's Health Initiative has been successful in boosting awareness and participation in preventive health screenings among women in Singapore. This proactive approach has resulted in earlier detection of health issues, better management of chronic conditions, and overall improved health outcomes for women. The collaboration among various stakeholders, including government agencies, public and private healthcare providers, and community organizations, ensures the sustainability and effectiveness of the program.
- Collective Point 6, comprising feminist architects, sociologists, and urban planners. They have been striving to integrate principles of equality into the streets of Barcelona, Spain, for a decade, with an aim to make streets safer for both men and women. Despite their efforts in making Barcelona more inclusive for women by providing well lit streets,

reducing lurking spots for attackers and protesting against sexist advertisements, domestic violence is still prominent in the city as most women experience violence and attacks behind closed doors, proving the ineffectiveness of their strategy. This non-profit organization lacks the authority to address such cases effectively, due to lack of existing laws in the country concerning domestic violence against women and the limited political involvement in implementing potential solutions. Therefore, the needs of women are not met, proving the strategy ineffective without the help of a higher political power. Thus, in extreme cases, the efforts of stakeholders may not necessarily improve the liveability of women. (negative)

- The WSG example can be used as it includes collaborations between govt organisations

Elderly

Strategies:

Intro: The effectiveness of strategies to address the issues faced by the elderly living in the city is the capability of the solution to solve a certain problem faced by the elderly that are living in the city. These solutions will need to be able to meet the basic needs of elderly as well as perceived needs of elderly in terms of social, economical and psychological need. If these needs are not met, then there will be tension within the age group and it is an indicator that the social needs are not met. All of these needs are interdependent. Hence, some strategies are effective depending on many factors such as the individuals and government.

Political ability:

Positive:

- initiative called Community Care Apartments in Singapore which are supported to let the elderly live independently by providing them with basic services such as home repair, basic health check and 24 hour healthcare services. This shows how the Singapore government is able to plan infrastructure and schemes for elderly to live comfortably.
- Sg, seniors can receive healthcare subsidies under Medisave and CHAS schemes

Negative:

- USA, healthcare for elderly is used by the market based approach called Medicare to cover costs for elderly healthcare and disability. However this increased the price of healthcare making it inaccessible due to it being less affordable as money from the elderly pockets has to be taken out themselves and it also doesn't cover the cost of all health expenses. This shows how the government in US does not plan well for financial

causing financial instability within its elderly citizens, and is not as involved as the Singapore government, not meeting their needs, proving ineffective

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Stakeholder involvement

Positive:

The 'forget us not' initiative by Khoo Teck Huat Hospital and Alzheimer disease association aims to raise awareness of the increase of people with dementia and their unique needs to help them integrate in this society. This shows the different cooperations of stakeholders in order to organise a campaign which addresses issues of elderly, to make them feel heard and seen by citizens.

Negative:

Taipei the government plans to refurbish old housing development but after many years there is no official agreement to it with various stakeholders due to the resistance from residents who are uncooperative with such projects and taxpayers who do not see the purpose of it. Therefore many elderly houses cannot be improved and still struggle in the city. Their basic needs are not met and therefore their quality of lives cannot be improved in terms of social economical and environmental.

Root cause- as cities are designed for younger working generation, they are not really elderly friendly causing social exclusion, elderly will not face sense of belonging and might feel lonely

Positive:

For example, in Toyama, Japan there is a compact city strategy which promotes high density public walking transport exercise which avoids urban sprawling which can be isolating for elderly with limited mobility. As transport and facilities are more accessible, elderly are able to get around the city to get some basic necessities and services and hence their social | economical and environmental needs are met, amenities are located along tram network

Negative:

USA, paratransit service meant to shuttle suburban elderly to amenities require unduly amount of prior notice, doesn't provide the convenience elderly need

Evaluate issues:

Psychological well being vs economical well being vs social well being

- Economical:
 - In us 1/3 Americans aged 65 and above live below federal poverty line and spend 30% of their pension on housing, struggle with rising cost of everyday expenses like healthcare and transportation
- Social:
 - In sg, 2023 duke NUS survey found 4 in 5 elderly feel isolated even though they live with families
 - Even though got good CPF scheme, still lacking in terms of not enough benches and seats with backrest in public makes it harder to socialise in public, less accessible
- Actually everything is interconnected as issues faced multifaceted
 - In Japan, average monthly pensions is less than minimum wage, no stable income, many elderly cannot afford time for social activities+ heightened anxiety more elderly die alone

Waste

Below is a concise evaluation of **waste-management strategies** using **three assessment criteria**—**political ability**, **stakeholder involvement**, and **root-cause focus**—each supported by **precise, balanced mini-case-studies (positive + negative)**.

1. Political Ability

Definition: The degree to which waste-management strategies are feasible, supported, and sustained within political systems (policy stability, funding, authority alignment, compliance).

Positive Case Study: South Korea – Mandatory Recycling & Volume-Based Waste Fees

Summary:

South Korea implemented a national *Volume-Based Waste Fee (VBWF)* system requiring

households to pay for waste by the bag and separating recyclables.

Why Politically Effective:

- Strong central legislation and enforcement.
- Clear financial incentives for local governments.
- Policy stability across administrations.

Outcome: Recycling rates > 60% and reduced landfill use.

Positives:

- Long-term political backing ensured continuity.
- National–municipal coordination reduced implementation gaps.

Negatives:

- Political enforcement created resistance in some districts.
 - Requires high administrative capacity that other countries may lack.
-

Negative Case Study: Naples, Italy – Chronic Municipal Waste Crisis

Summary:

For over 20 years, Naples struggled with uncollected waste due to mismanaged contracts, political fragmentation and corruption.

Why Politically Weak:

- Conflicts between municipal, regional and national authorities.
- Infiltration of criminal networks into waste contracts.
- Lack of continuity after elections.

Positives:

- Periodic state intervention temporarily restored services.

Negatives:

- Persistent political instability prevented sustained solutions.
 - Public distrust undermined compliance with any new initiatives.
-

2. Stakeholder Involvement

Definition: How effectively citizens, businesses, NGOs, local authorities and waste-sector workers participate in designing, implementing and evaluating waste-management strategies.

Positive Case Study: San Francisco – Zero Waste Program

Summary:

San Francisco mobilized residents, businesses, waste companies and community NGOs toward a “Zero Waste by 2020” goal.

Why Stakeholder-Strong:

- Extensive community consultation.
- Mandatory composting implemented with education and collaboration.
- Partnerships with private haulers and non-profits.

Positives:

- High public buy-in; 80%+ diversion at peak.
- Businesses integrated into policy design (e.g., restaurant composting).

Negatives:

- High cost for outreach and compliance monitoring.
 - Some small businesses found sorting mandates burdensome.
-

Negative Case Study: Delhi, India – Waste Segregation Mandates 2017–2021

Summary:

Delhi introduced mandatory household waste segregation but without deep community engagement.

Why Stakeholder-Weak:

- Poor communication campaigns.
- Informal waste-picker networks initially excluded.
- Limited citizen understanding or incentives.

Positives:

- Policy created potential framework for sustainability.

Negatives:

- Low segregation rates (<50%).
 - Conflict with informal recyclers worsened compliance and reduced material recovery.
-

3. Root-Cause Focus

Definition: Whether strategies address underlying drivers of waste (over-consumption, packaging design, linear production models), rather than only symptoms (collection, landfilling).

Positive Case Study: European Union – Circular Economy Action Plan (CEAP)

Summary:

The EU CEAP targets upstream waste generation through product design standards, extended producer responsibility (EPR), and reductions in single-use plastics.

Why Root-Cause Focused:

- Targets production systems, not just disposal.
- Emphasizes eco-design, repairability, reuse, and materials recirculation.

Positives:

- Forces producers to reduce waste at source.
- Creates long-term shifts in packaging, electronics, and textiles.

Negatives:

- Implementation uneven across member states.
 - Businesses face upfront compliance costs and redesign challenges.
-

Negative Case Study: Cairo, Egypt – Landfill Expansion Approach

Summary:

Cairo historically responded to mounting waste volumes by building or expanding landfills, without addressing generation trends.

Why Root-Cause Weak:

- Focused almost entirely on end-of-pipe solutions.
- Minimal programs targeting waste reduction, recycling markets, or producer responsibility.

Positives:

- Short-term relief for overwhelmed waste services.

Negatives:

- Did not reduce waste growth; landfills reached capacity again.
- Reinforced a linear system with persistent environmental leakage.

Summary Table

Criterion	Positive Case Study (Key Strength)	Negative Case Study (Key Weakness)
Political Ability	Korea – stable national policy + financial incentives for compliance	Naples – political fragmentation, corruption, instability
Stakeholder Involvement	San Francisco – deep engagement + strong public buy-in	Delhi – poor community outreach + exclusion of informal sector
Root-Cause Focus	EU CEAP – systemic shift to circular economy	Cairo – reliance on landfill expansion without upstream measures

If you want, I can also produce:

- ✓ A comparative evaluation chart
- ✓ A full essay version
- ✓ A policy recommendation framework based on the three criteria

political ability

#'ve: Germany, Green Dot System EPR scheme - material-specific recycling targets of 60-75% met by 2000, as of 2021, over 100 WTE plants which also have advanced flue gas systems to minimise air pollution

- ve: India, weak enforcement of 2022 single use plastic ban, presence of open dump sites in Mumbai and Kolkata has caused toxic chemicals like cadmium to leach and contaminate groundwater which is used for drinking

- stakeholder

+ve: copenhagen denmark, each household given colour-coded bins to sort waste, nonprofit organization Dansk Retursystem runs scheme where citizens need to recycle plastic bottles and can get back deposit

- root cause:

+ve: in cairo, egypt, reliance on circular economy evident from how organic waste is fed to animals which are then eaten as food and 11000 tons of 20000 tons produced are reused as raw materials / recycled to make goods

-ve: in se, pulau semakau projected to be fully filled by 2035, lack of proper infrastructure discourages recycling due to easy contamination of bins (40%!), still heavy reliance on linear economy

Urban reimagining

Below is the same **three-criteria evaluation framework**—**political ability**, **stakeholder involvement**, and **root-cause focus**—now applied to **urban-reimagining strategies** (e.g., city redesign, public-space renewal, mobility transition, climate-resilient planning). Each criterion includes **precise, balanced, positive + negative mini-case studies**.

1. Political Ability

Definition: Feasibility, stability and governmental capacity to implement and sustain large-scale urban reimagining (funding, coordination, institutional support).

Positive Case Study: Medellín, Colombia – Social Urbanism

Summary:

Medellín transformed informal hillside settlements with cable cars, public escalators, libraries, and parks, integrating marginalized communities.

Why Politically Effective:

- Strong mayoral leadership with multi-term continuity.
- Alignment between city and regional government.
- Clear budgeting through participatory planning.

Positives:

- Stable political mandate enabled sustained investment.
- Improved accessibility and safety boosted public trust.

Negatives:

- Relies heavily on charismatic political champions.
 - Vulnerable to political shifts (later administrations scaled back aspects).
-

Negative Case Study: Detroit, USA – Failed Early Redevelopment Efforts (1980s–2000s)

Summary:

Before recent revitalizations, Detroit attempted numerous large-scale redevelopment plans that repeatedly stalled.

Why Politically Weak:

- Fragmented governance between city, county and state.

- Tax-base collapse reduced fiscal capacity.
- Long-standing mistrust between residents and leadership.

Positives:

- Some isolated downtown projects succeeded.

Negatives:

- Lack of cohesive political vision made citywide reimagining impossible.
 - Projects often abandoned mid-construction due to financial instability.
-

2. Stakeholder Involvement

Definition: Inclusiveness of residents, businesses, community groups, planners, and vulnerable populations in designing and shaping urban transformations.

Positive Case Study: Copenhagen, Denmark – Pedestrianization & Bicycle Urbanism

Summary:

Copenhagen's shift to pedestrian- and bike-dominant mobility was driven by decades of citizen consultation and co-design of public spaces.

Why Stakeholder-Strong:

- Iterative design involving residents and shop owners.
- Pilot-testing streets and plazas before permanent redesign.
- Strong collaboration with cycling associations and planners.

Positives:

- Widespread buy-in led to long-term stability.
- Changes reflected actual user behaviour, increasing acceptance.

Negatives:

- Long consultation processes slowed implementation.

- High expectations require constant public engagement.
-

Negative Case Study: Rio de Janeiro – Olympics-Driven Urban Projects (2016)

Summary:

Olympics-linked redevelopment included new transport routes and waterfront upgrades, but with limited input from affected communities.

Why Stakeholder-Weak:

- Projects planned on tight political timelines.
- Thousands displaced from favelas without meaningful consultation.
- Prioritized global image over resident needs.

Positives:

- Some infrastructure legacy (e.g., metro expansion).

Negatives:

- Social backlash and international criticism.
 - Distrust hindered subsequent urban initiatives.
-

3. Root-Cause Focus

Definition: Whether the strategy addresses fundamental drivers of urban decline or dysfunction (car dependency, spatial segregation, outdated zoning, climate risks) rather than superficial enhancements.

Positive Case Study: Paris, France – “15-Minute City” Framework

Summary:

Paris is restructuring itself so that residents can meet daily needs within walking/cycling distance—reshaping zoning, schools, transport and streets.

Why Root-Cause Focused:

- Tackles systemic issues: car dominance, long commutes, mono-functional districts.
- Integrates mobility, housing, education and commercial planning.

Positives:

- Reduces emissions and improves local economic vitality.
- Benefits extend beyond beautification to structural lifestyle change.

Negatives:

- Resistance from suburban commuters and drivers.
 - Requires multi-decade restructuring of land use.
-

Negative Case Study: Dubai – Surface-Level Beautification and Prestige Projects (2000s–present)

Summary:

Dubai has invested heavily in iconic architecture, waterfronts and luxury districts, often without addressing foundational urban issues (heat, car dependency, social inequity).

Why Root-Cause Weak:

- Prioritizes aesthetics and prestige developments.
- Little focus on reducing car reliance or addressing affordability.

Positives:

- Attracts investment and tourism.
- Creates visually striking and globally recognised districts.

Negatives:

- Underlying issues (walkability, heat stress, socio-economic segmentation) remain.
 - High resource and energy use exacerbate sustainability challenges.
-

Summary Table

Criterion	Positive Case Study (Key Strength)	Negative Case Study (Key Weakness)
Political Ability	Medellín – coherent political leadership; stable investment	Detroit (pre-2010s) – fragmentation, underfunding, stalled plans
Stakeholder Involvement	Copenhagen – co-design, pilots, strong public buy-in	Rio Olympics – displacement, limited consultation
Root-Cause Focus	Paris 15-Minute City – addresses systemic car dependence & zoning	Dubai prestige projects – focus on aesthetics over structural problems

If you want, I can also create:

- ✓ a combined framework comparing waste management and urban reimagining strategies
- ✓ an essay-style version
- ✓ a policy brief or recommendations for a specific city or project

Climate change

Evaluate strategies

Adaptation vs mitigation

A>M In countries more vulnerable to impacts:

- In Netherlands, A was done before M as evident by how Delta works, a series of dykes and dams and storm surge barriers started construction in 1950s after catastrophic North Sea Flood
 - LNorth Sea Flood; mitigation measures like the National Environmental Policy Plan only came in 1980s
- however, M>A because some countries don't have enough resources to adapt, M allows for international collaboration to strengthen adaptive capacity for vulnerable countries (M is more of global effort whereas A is national effort)
 - - GCF funds help Kiribati build seawater desalination plant that runs on solar power so people don't need burn kerosene and have reliable freshwater supply
- M>A for long-term sustainability, address root cause:
 - - even tho Bangladesh build 4000km of embankments in 1960s, had to spend 400 million to upgrade 600km in 2013; fossil fuels counts for like 95% of their energy

Stakeholder involvement

State:

+ve: brazil president lula increased enforcement, funding, land ownership -> Amazon deforestation decreased by 50% in late 2000s; germany's energiewende only possible due to state incentives, infrastructural development to shift away from fossil fuels

-ve: president bolsonaro basically undid whatever lula did

- NGOS:

*ve Urgenda Foundation sue Dutch government in 2015 for not doing more to cut emissions - court legally mandate

Netherlands to cut by 25% by 2020;

ActionAid India help cyclone-stricken state of Odisha develop climate-resilient agriculture, aquaculture, microfinance

- Firms:

- +ve: BYD and Tesla make EVs commercially attractive + develop the tech

-ve: Volkswagen manipulate emissions tests to downplay GHG emissions by their cars;

BYD and Tesla engage in lithium mining for batteries

everyone work together:

- **ve: China's SOEs like Three Gorges Corporation help large-scale renewable energy infrastructure as direct response to NDCs set during PA and state also help upgrade charging infrastructure so BYD can increase profits; Philippines government help Foundation for the Philippine Environment do large-scale restoration projects

•-ve: in sg carbon tax, businesses pass down costs to consumer where every \$5

increase translate to 1% increase in electricity

bill bo

Causes of CC

Below is a **clean, exam-ready bullet-point version** of the causes of climate change according to the *Singapore H1 Geography 2025 syllabus* — with **examples placed directly under each point**.

1. Natural Causes of Climate Change

• Variations in Solar Output

- Changes in solar irradiance influence the amount of energy reaching Earth.
- *Limitation*: Recent warming rises faster than can be explained by solar cycles.
Examples:
 - Historic solar minima/maxima (e.g., Maunder Minimum) associated with regional cooling/warming patterns.

- Modern satellite measurements show only slight irradiance changes — insufficient to explain 20th–21st century warming.
-

• Changes in Thermohaline Circulation

- Alterations in global ocean currents redistribute heat, causing regional climate changes.
- *Mechanism*: Disruption (e.g., freshwater influx) slows heat transport, affecting temperatures.

Examples:

- North Atlantic circulation slowdowns linked to cooler regional temperatures in past climates.
 - Recent weakening of the Atlantic Meridional Overturning Circulation (AMOC) studied as a contributor to altered European weather.
-

• Changes in Ice Sheets / Cryosphere

- Expansion or melting of ice changes Earth's albedo (reflectivity).
- Less ice → lower albedo → more heat absorbed → warming (positive feedback).

Examples:

- Arctic sea-ice decline in the last few decades enhances heat absorption each summer.
 - Greenland ice loss accelerates warming via reduced reflectivity.
-

• Natural Feedback Mechanisms

- Natural systems can amplify or dampen initial climate changes.
- *Positive feedbacks* magnify warming; *negative feedbacks* reduce it (weaker in present climate).

Examples:

- **Ice–albedo feedback**: retreat of Arctic sea ice increases warming.
 - **Water vapour feedback**: warmer air holds more moisture (a greenhouse gas), amplifying warming.
-

Evaluation of Natural Causes

- Strong influence over long timescales (glacial–interglacial cycles).

- Cannot explain rapid 20th–21st century warming.
 - Insufficient magnitude compared with observed temperature trends.
-

2. Anthropogenic (Human) Causes of Climate Change

• Increase in Greenhouse Gas (GHG) Emissions

- Burning fossil fuels (coal, oil, natural gas) releases large amounts of CO₂, CH₄, N₂O.
 - Industrialisation and transportation are major contributors.
Examples:
 - Coal-fired power plants in China, India and the US contribute significant CO₂ emissions.
 - Transportation emissions in developed cities (e.g., Los Angeles, London, Singapore) increase atmospheric CO₂.
-

• Industrial and Agricultural Activities

- Cement production releases CO₂.
 - Agricultural activities (rice cultivation, livestock) emit methane.
Examples:
 - Methane from cattle farming in the US and Brazil contributes to enhanced greenhouse effect.
 - Southeast Asian rice paddies emit methane during anaerobic decomposition.
-

• Reduction of Major Carbon Sinks

- Deforestation reduces photosynthesis and releases stored carbon.
- Draining peatlands exposes peat to oxygen → rapid oxidation → CO₂ emissions.
Examples (Southeast Asia – strongly recommended for exams):
- **Indonesia (Borneo, Sumatra):** Peatland drainage via canals for oil-palm plantations turns peat from a sink to a major carbon source.
- **Central Kalimantan:** Drained peat domes produce high CO₂ emissions; rewetting projects aim to restore sink capacity.

- **Indonesia's forestry sector:** Largest contributor to national emissions due to peat fires and palm-oil expansion.
-

• Enhanced Greenhouse Effect

- More GHGs trap more outgoing long-wave radiation, warming the lower atmosphere.
- Well-documented relationship between higher CO₂ concentrations and rising temperatures.

Examples:

- Atmospheric CO₂ surpassing 420 ppm (highest in ~3 million years).
 - Temperature rise of ~1.1°C above pre-industrial levels corresponds strongly with post-1950 GHG surge.
-

• Human-Amplified Feedback Mechanisms

- Human warming triggers additional feedbacks that accelerate climate change.

Examples:

- **Peatland degradation in Indonesia** → higher temperatures → faster peat decomposition → more CO₂.
 - **Melting Arctic permafrost** → releases methane → amplifies warming.
-

Evaluation of Anthropogenic Causes

- Dominant driver of contemporary climate change.
 - Magnitude and speed match observed warming patterns.
 - Supported by climate models, empirical data, and IPCC conclusions.
 - Human activity affects both **sources** (emissions) and **sinks** (deforestation, drainage) → compound effect.
-

3. Case-Study Bundle (for fast recall)

- **Indonesia peatlands (Central Kalimantan, Sumatra, Borneo):**
 - Drained for oil-palm agriculture → oxidation + fires → massive CO₂ releases.
 - Rewetting projects (REDD+) show emissions reductions.

- **Indonesia forestry sector:**
 - Largest national emissions source (deforestation + peat fires).
- **Arctic sea ice decline:**
 - Reduces albedo → amplifies warming.
- **AMOC weakening:**
 - Evidence of altered ocean circulation affecting heat redistribution.

These examples directly match the Singapore H1 Geography syllabus requirement for contemporary, regionally relevant case studies, especially in Southeast Asia.

If you'd like, I can also produce:

- ✓ A short 20-marker model essay
- ✓ A comparison table (natural vs. anthropogenic causes)
- ✓ A memory-optimized summary for exam revision

Which one would you like?

Below is a **bullet-point, exam-ready evaluation of strategies for responding to climate change**, aligned with the **Singapore H1 Geography (2025) syllabus** — with **examples placed under each point**.

1. Mitigation Strategies (Address Causes of Climate Change)

• Transition to Renewable Energy

- Reduce reliance on fossil fuels by shifting to solar, wind, hydro, geothermal.
 - Cuts CO₂ emissions at source.
- Examples:**
- **Germany's Energiewende:** large-scale wind and solar adoption.
 - **Singapore's SolarNova programme:** widespread solar PV on HDB rooftops and public buildings.
- Evaluation:**
- Effective for long-term global emissions reduction.
 - Limited by intermittency, high initial costs, land constraints (especially for small states like Singapore).

• Energy Efficiency Improvements

- Reduce energy demand through efficient buildings, appliances, transport, and urban planning.

Examples:

- **Japan's Top Runner Programme:** pushes energy efficiency standards.
- **Singapore's Green Mark Scheme:** incentivises energy-efficient buildings.

Evaluation:

- Very cost-effective; immediate emissions reductions.
 - Magnitude of impact depends on adoption rate and national energy profile.
-

• Carbon Pricing (Carbon Tax / Cap-and-Trade)

- Prices carbon emissions to incentivise reduction.

Examples:

- **Singapore's carbon tax:** starting at S\$5/tonne CO₂e, rising to S\$25 (2024) and S\$45 by 2030.
- **EU Emissions Trading Scheme (ETS):** sets a cap and allows trading of permits.

Evaluation:

- Economically efficient; encourages industry transformation.
 - Effectiveness depends on tax level/cap strictness; too low → limited behavioural change.
-

• Protection and Expansion of Carbon Sinks

- Preserve forests, peatlands, mangroves; restore degraded ecosystems.

Examples:

- **Indonesia's peatland restoration (REDD+, Central Kalimantan):** rewetting canals, reducing CO₂ emissions.
- **Brazil's Amazon conservation (pre-2015)** reduced deforestation significantly.
- **Singapore's mangrove restoration in Pulau Tekong.**

Evaluation:

- Highly effective as both mitigation and adaptation.
 - Politically difficult where land-use change pressures are high.
-

• Low-Carbon Urban Transport

- Promote public transport, EVs, active mobility.

Examples:

- **Norway:** world's highest EV adoption due to strong incentives.
- **Singapore:** car-lite strategy, integrated MRT network, EV infrastructure expansion.

Evaluation:

- Reduces both emissions and urban pollution.
 - Requires long-term planning and heavy public investment.
-

2. Adaptation Strategies (Manage Impacts of Climate Change)

• Coastal Protection

- Hard engineering (seawalls, polders) and soft engineering (mangroves, beach nourishment) to reduce flooding risk.

Examples:

- **Netherlands:** Delta Works, polders protecting low-lying land.
- **Singapore:** proposed “Long Island” reclamation; sea walls and tidal gates along East Coast & Marina Barrage.

Evaluation:

- Highly effective for safeguarding infrastructure.
 - Very costly; may shift rather than solve risk; can have ecological impacts.
-

• Flood Management & Water Diversification

- Diversifying water sources, improving drainage, increasing flood storage capacity.

Examples:

- **Singapore's Four National Taps:** desalination, NEWater, imported water, local catchments provide water security during climate variability.
- **China's Sponge Cities:** urban design to absorb heavy rainfall.

Evaluation:

- Builds long-term resilience to extreme rainfall and droughts.
- Requires major redesign of urban landscapes; uneven implementation.

• Climate-Resilient Agriculture

- Adjusting farming methods to cope with temperature/rainfall changes.

Examples:

- **Drought-resistant crop varieties** in Sub-Saharan Africa.
- **Precision agriculture** in Australia to reduce water usage.

Evaluation:

- Essential for food security in vulnerable regions.
 - Adoption limited by cost, technology access, and farmer skills.
-

• Early Warning Systems & Disaster Preparedness

- Using climate data, satellite monitoring, and emergency planning to reduce damage.

Examples:

- **Bangladesh:** cyclone warning systems drastically reduced cyclone mortality since the 1990s.
- **Japan:** earthquake & tsunami early warning infrastructure adapted for climate hazards too.

Evaluation:

- High benefit–cost ratio; saves lives.
 - Less effective for slow-onset events (e.g., sea-level rise) and depends on local preparedness.
-

• Urban Heat Island (UHI) Management

- Cooling strategies to reduce heat stress in cities.

Examples:

- **Singapore:** greenery expansion (e.g., Park Connector Network), cool materials, reflective roofs.
- **Seoul:** Cheonggyecheon restoration lowered city-centre temperatures.

Evaluation:

- Reduces energy demand and heat-related health risks.
 - Works best when integrated into long-term city planning.
-

3. International and Policy-Level Strategies

- **Multilateral Agreements**

- Cooperative global action to reduce emissions.

Examples:

- **Paris Agreement (2015)**: commitments to limit warming to well below 2°C; countries submit Nationally Determined Contributions (NDCs).
- **Montreal Protocol (1987)** indirectly aids climate by phasing out ozone-depleting substances (some are powerful GHGs).

Evaluation:

- Crucial for global coordination; sets shared goals.
 - Voluntary nature of NDCs → uneven ambition; enforcement is weak.
-

- **Climate Finance & Technology Transfer**

- Funds and technologies transferred from developed to developing countries.

Examples:

- **Green Climate Fund**: supports renewable energy and adaptation projects in vulnerable nations.
- **ASEAN cooperation**: haze prevention, peatland management, renewable energy partnerships.

Evaluation:

- Helps poorer nations build resilience and cut emissions.
 - Funding gaps and slow disbursement reduce effectiveness.
-

4. Overall Evaluation (Comparative Judgement)

- **Mitigation** tackles root causes → essential for long-term global temperature stabilisation.
- **Adaptation** is unavoidable, especially for small island states (e.g., Singapore) and vulnerable regions.

- **Most effective approach = combined mitigation + adaptation**, scaled to national context.
 - **Challenges**: political will, funding constraints, uneven global responsibility, technological limitations.
 - **Success depends on international coordination** because climate change is transboundary.
-

If you want, I can also create:

- ✓ A **full 20-mark model essay** using these points
- ✓ A **comparison table** of strategies (ranked by effectiveness, cost, feasibility)
- ✓ A **short revision sheet** suitable for last-minute studying

Just tell me what format you prefer!