ADB

Addressing Climate Change in Asia and the Pacific

Impacts on Food, Fuel, and People

Asian Development Bank

Despite rapid growth over the last decade, over 30% of the people of Asia and the Pacific still live on less than $2 per day.

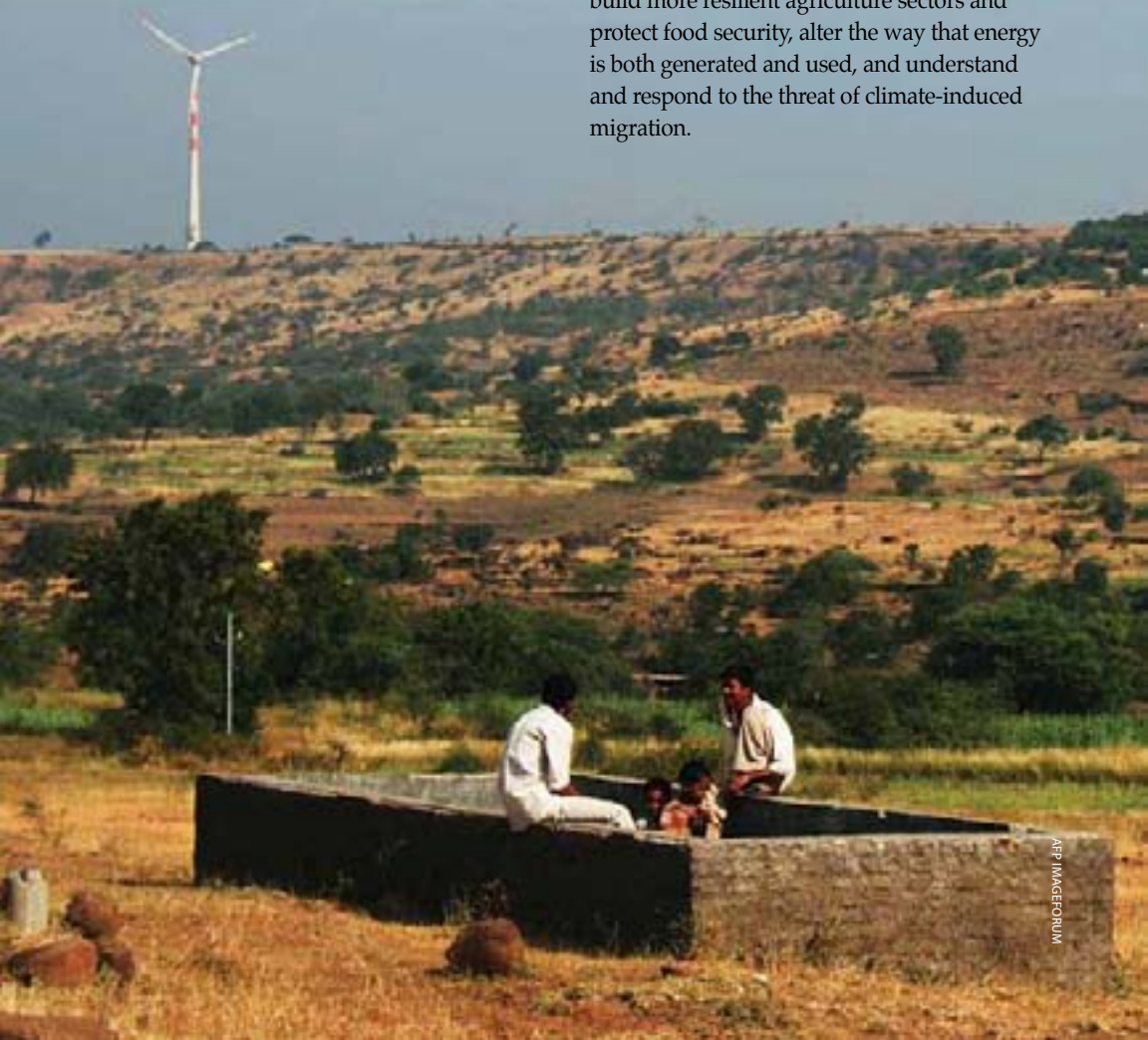
To reduce and eventually eliminate this poverty, economic development must continue and accelerate.

However, climate change presents major new challenges to the region's development. It demands a shift to a much less carbon-intensive pattern of economic growth and the incorporation of adaptation measures to help cope with the adverse effects of climate change, including melting glaciers, rising sea levels, and more frequent extreme weather events.

While climate change adds new dimensions to all aspects of economic development plans and programs, it will most fundamentally affect the agriculture and energy sectors as well as human settlement.

In recognition of these three key areas—food, fuel, and people—the Asian Development Bank (ADB) has supported analyses on each of these key climate change issues.

Addressing the new challenges imposed by climate change will require collective action by governments, communities, civil society, international organizations, and the private sector. Developing countries will need to build more resilient agriculture sectors and protect food security, alter the way that energy is both generated and used, and understand and respond to the threat of climate-induced migration.



Climate change and food security

Building greater climate resilience into the agriculture sector in Asia and the Pacific must begin with an understanding of the likely added risks and vulnerabilities the sector will face from climate change.

The ADB-sponsored agriculture sector study, carried out by the International Food Policy Research Institute (IFPRI), uses predictions of global climate models to develop scenarios to 2050 for Asia and to derive implications for food security.

The study recommends cost-effective adaptation responses that could better equip vulnerable regions and countries to cope with the likely impacts of climate change under alternative scenarios.

Improved energy security and reduced carbon intensity

No segment of the world's economy will be more affected in the drive to reduce greenhouse gas (GHG) emissions than energy and fuels. The energy sector study, carried out by The Energy and Resources Institute (TERI), reviews recent experience in end-use energy efficiency, new technologies, and practices for higher efficiency in fossil fuel energy production as well as ways to expand energy production from renewable sources.

Implications for energy security are derived along with recommendations for financing, technology transfer, and associated policy and institutional reforms.

Climate-induced migration

The study on climate change and human settlements—examining the prospects for climate-induced migration—was done in cooperation with researchers at the University of Adelaide. The study uses climate change scenarios—covering short-, medium-, and long-term time horizons—to predict likely impacts of climate change on population displacement and migration and how this may affect social conditions in Asia and the Pacific.

The key findings of each study are summarized in the following pages. Full details are available in the individual reports provided in the attached disk.

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Impacts of Climate Change on Agriculture

Climate change is threatening food production systems, livelihoods, and the food security of billions of people across Asia and the Pacific.

More than 60% of the region's economically active population and their dependents rely on agriculture for their livelihoods.

Climate change will intensify the struggle over land and water and increase the risk of resource conflicts, particularly in Central and South Asia.

Decreased agricultural production across most of the region will result in higher food prices and lower food consumption, especially among the poor.

An increased number of people will be at risk of hunger unless steps are taken to build resilience to climate change. Areas that are already lagging behind in achieving the Millennium Development Goals and other indicators of improved human well-being will likely suffer the most.

Key findings from the study include:

- Irrigated agriculture in the region is expected to decline with rice declines in the range of 14%–20%; wheat, 2%–44%; maize, 2%–5%; and soybean of 9%–18% over the next 40 years.

- Food prices are expected to increase sharply for key crops. Rice prices are projected to be 29%–37% higher in 2050 compared to those predicted in the absence of climate change, with wheat prices predicted to be 81%–102% higher, maize prices to rise by 58%–97%, and soybean prices to increase by 14%–49%.

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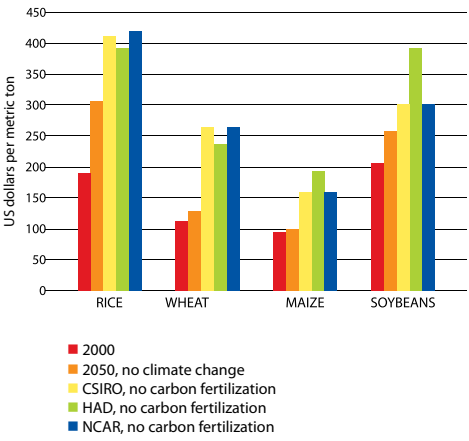
World Prices, Major Grains, 2000–2050



CSIRO = Commonwealth Scientific and Industrial Research Organisation, Australia; HAD = Hadley Center, United Kingdom; NCAR = National Center for Atmospheric Research, United States.

Recommended response:

- Estimated incremental investment needs for agricultural research, irrigation improvements, and climate-resilient rural roads in the region are $3.0 billion–$3.8 billion annually from 2010–2050.

- Complementary investments that will be needed in the education and health sectors are estimated to cost $1.2 billion annually to 2050.

- A pro-growth and pro-poor development agenda that supports agricultural sustainability—including better targeting to cope with climate change impacts—will improve both rural welfare and resilience to climate change.

- National development planning processes should incorporate climate change action plans and, where possible, should access international climate change funds.

- Despite remaining uncertainty regarding climate change impacts, investment is warranted in research on climate-resilient agriculture, rural infrastructure, and disaster preparedness information systems.

- Greenhouse gas mitigation strategies for the agriculture sector—covering energy production and use, fugitive emissions control, and carbon sequestration—should be designed with an eye to complementing adaptation measures.

- Policy focus should be on improving land and water management, protecting ecosystem services, reducing inefficient subsidies, supporting development of carbon markets (and other measures to obtain payment for ecosystem services), and promoting open and transparent trade.

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- Public–private partnership should be formed, particularly to support development of information technologies, market support, and extension services.

- Assistance should be targeted to those countries most vulnerable to climate change, including Afghanistan, Bangladesh, Cambodia, India, Lao People's Democratic Republic, Myanmar, and Nepal.

- Regional cooperation initiatives in Asia, such as the Central Asian Countries Initiative for Land Management (CACILM), and the Greater Mekong Subregion Core Environment Program, are important building blocks for enhanced climate change adaptation.

- ADB, the Association of South East Asian Nations (ASEAN), the South Asian Association for Regional Cooperation (SAARC), and other regional organizations should play more prominent roles in technology and knowledge transfer.

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Climate Change and Energy Security

The Asia and Pacific region needs expanding supplies of energy to improve the lives of the poor through continued rapid economic growth, while simultaneously ensuring that this development is both locally and globally environmentally sustainable.

Developing countries of the region are projected to account for nearly 40% of the global demand for primary energy by 2030 if current development patterns continue. The region is the fastest growing source of anticipated new energy-related GHG emissions because of a heavy reliance on fossil fuels.

Developing Asia has a dual interest in decoupling future economic growth from GHG emissions and enhancing their energy security. Through reduced reliance on foreign fuel sources and by expanded production from domestic fuel sources coupled with improved energy efficiency—countries are driving efforts to increase renewable energy production and to achieve greater demand and supply side energy efficiency.

While each country faces unique challenges and opportunities, the general findings and conclusions from the energy sector study include:

- Attention must continue to focus on expanding energy access, since of the 1.6 billion people in the world who lack access to electricity, about 60% live in the Asia and Pacific region.

- There is considerable room for energy efficiency improvement, both in the production and use of energy.

- The region is well endowed with clean energy resources—including opportunities for expanded hydropower, geothermal, biomass, and wind power.

Policy

- Expanded renewable energy sources and enhanced energy efficiency can break the current dominance of fossil fuels if policy barriers are addressed. Emphasis should be placed on developing forward-looking policies to internalize environmental and social costs into energy price and regulatory signals.

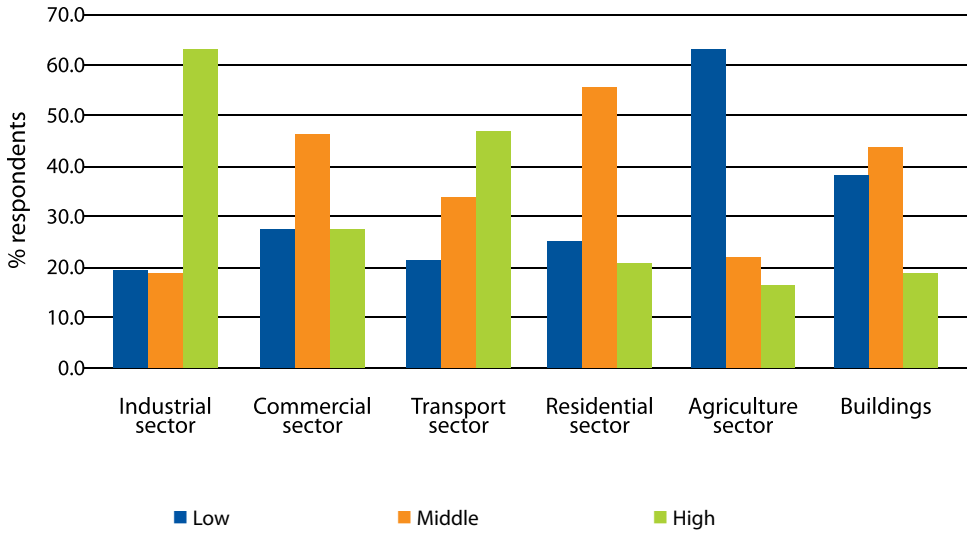
- The drive to expand production from renewable energy sources includes not only opportunities to reduce GHG emissions but also to expand rural electricity access, diversify the energy mix, and reduce dependence on fossil fuel imports.

- Systemic shifts will be needed in the generation and distribution of power, including introduction of smart grids, where affordable, to increase efficiency and through the introduction of decentralized, distributed renewable energy generation to better service the needs of rural populations.

- The introduction of sustainable transport and urban development patterns requires immediate attention, as these are the fastest growing sources of energy consumption.

- Policy mechanisms are needed to break the current pattern of investment and technology transfer for low-carbon energy development being concentrated in middle-income countries.

Energy Saving Potential in Sectors



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Technology

- Most countries currently lack the infrastructure to absorb and deploy energy efficiency and renewable energy technologies on a large scale, highlighting the need for expanded collaboration between developed and developing countries to build capacity, lower manufacturing costs, and speed technology deployment.

- Energy efficiency improvements in buildings could contribute to large reductions in GHG emissions. Retrofitting high-rise residential buildings with energy-efficient technologies when they are refurbished can yield energy savings of up to 80%. More efficient air cooling systems offer the potential for significant low-cost energy savings. Energy efficiency improvements in appliances could yield at least 25% savings.

- Solar and biomass technologies (including efficient first-generation and advanced biofuels), among others, are keys to a less carbon-intensive and more energy secure future for the region.

- The large and rapidly growing markets of the People's Republic of China and India can help to increase the access to and affordability of clean energy technologies for the rest of Asia by driving down costs through economies of scale.

- Especially in Southeast Asia, use of high-temperature geothermal resources can be expanded for electricity generation, while lower-temperature geothermal resources can be tapped for a range of direct uses, such as district heating and industrial processing.

Finance

- Market-based mechanisms, such as the Clean Development Mechanism (CDM) established by the Kyoto Protocol, have been shown to promote investments in renewable energy and energy efficiency, and they should be continued and expanded using programmatic approaches.

- Hydropower generation in developing countries generally costs between $0.02 to $0.06 per kilowatt hour. Such systems commonly operate without major replacement costs for 50 years or more.

- Progress has been made on the use of financial incentives to encourage investment in energy efficiency and renewables—such as Energy Service Companies (ESCOs) and feed-in tariffs for renewable energy.

- Innovative financing modalities are needed to leverage international and private sector funds for clean energy investments.

Climate Change and Migration

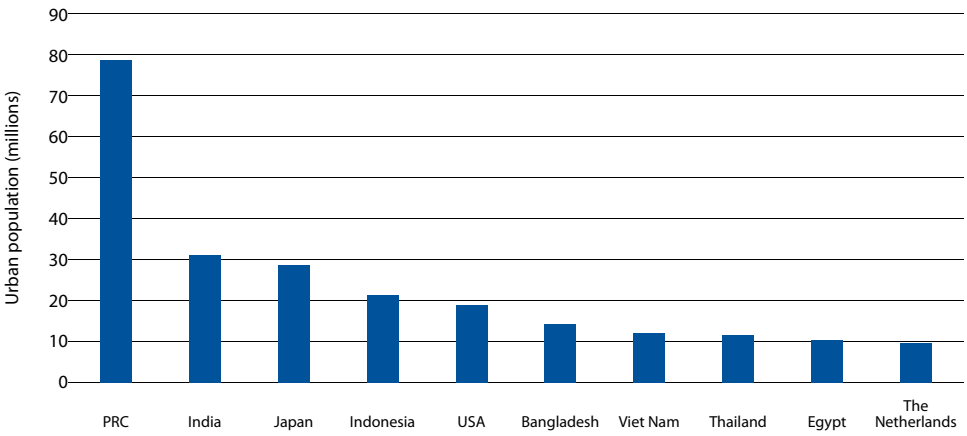
The effects of climate change are increasingly affecting global migration patterns. In the Asia and Pacific region, however, environmental change is currently not the only—or even the most important—migration concern. Migration results from a range of economic, social, and demographic factors, making climate-induced migration difficult to define.

The key factors involved in the complex relationship between migration and climate change include:

- migrant networks,
- the extent to which mobility is a preferred strategy for adjusting to change,
- migration and poverty linkages,
- planned and unplanned cycles of in-country (internal) migration,
- gender and age factors, and
- development policy.

One of the key distinctions in considering the relationship between environmental change and migration is between "mobility" as an adaptation strategy and "displacement," when environmental degradation becomes so extreme that people are forced to leave an area. In Asia and the Pacific, changing one's place of residence on a permanent or temporary basis has long been a widely availed option in the face of declining or lost livelihood prospects.

Countries with largest urban populations living 10 meters below sea level



Climate change is an additional driver of migration and therefore, should not be seen as separable from other drivers. Policies and strategies to deal with climate change should not consider climate-induced migration in isolation from the array of migration drivers.

Migration can be beneficial to both regional stability and socioeconomic development in the country of origin and in settlement areas with appropriate planning and policies.

In the Asia and Pacific region, likely migration hotspots include areas affected by sea level rise, cyclones and typhoons, flooding, and water stress, especially at river deltas, in low lying small island states, and in arid regions of Central and West Asia.

The impact of environmental hazards is mediated not only by the severity of the hazard but also by the community's resources to respond to that impact. Whether or not an event or impact will result in population mobility is influenced by the availability of other responses and adaptations as well as the community's past experience in dealing with similar environmental hardships.

Barriers to safe and legal internal and international migration for those forced to move primarily as a result of environmental factors are likely to be even more significant in the future.

Responses to climate-induced migration should maximize positive development outcomes, such as gaining access to new skills and labor for migrants and to the benefit of settlement areas.

International migration will not on its own provide a solution to the impact of climate change. Migration must be considered alongside other adaptation strategies to safeguard livelihood opportunities for affected communities across the Asia and Pacific region.

Appropriate and effective governance systems and policy mechanisms are needed to facilitate migration at minimal cost and to encourage the safe transfer and wise use of remittances.

National settlement policies will heavily influence internal migration, and it is important to bring climate change considerations into spatial planning. Additional analysis is needed to find effective planning approaches to divert investment and economic activity away from vulnerable areas of the region's cities.

Migration management, international cooperation, development assistance mechanisms, improved governance, effective resettlement schemes, sound economic development policies and long-term spatial planning are some strategies that will help deal with migration induced by climate change.

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About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than $2 a day, with 903 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

Asian Development Bank
6 ADB Avenue, Mandaluyong City
15550 Metro Manila, Philippines
Tel +63 2 632 4444
Fax +63 2 636 2444
www.adb.org
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