


JICA’s Assistance for Adaptation to Climate Change

JICA Climate Change



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Japan International Cooperation Agency

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JICA and Adaptation to Climate Change

Climate change and its effects have already become obvious all over the world. The Intergovernmental Panel on Climate Change (IPCC) states in their Summary for Policy Makers (SPM) of the Fourth Assessment Report (AR4) that the “warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level”. Climate change has been affecting the climate system of cryosphere, as well as mountain glaciers and ecosystems of the land and sea.

If climate change continues, considerable impacts are projected, including not only direct impacts such as health damages by heat waves and increased infectious vector-borne diseases, but also indirect impacts upon freshwater resources and food production. This in turn will result in a serious threat to the existence of human beings. It is anticipated that such impacts will be more serious in developing countries.

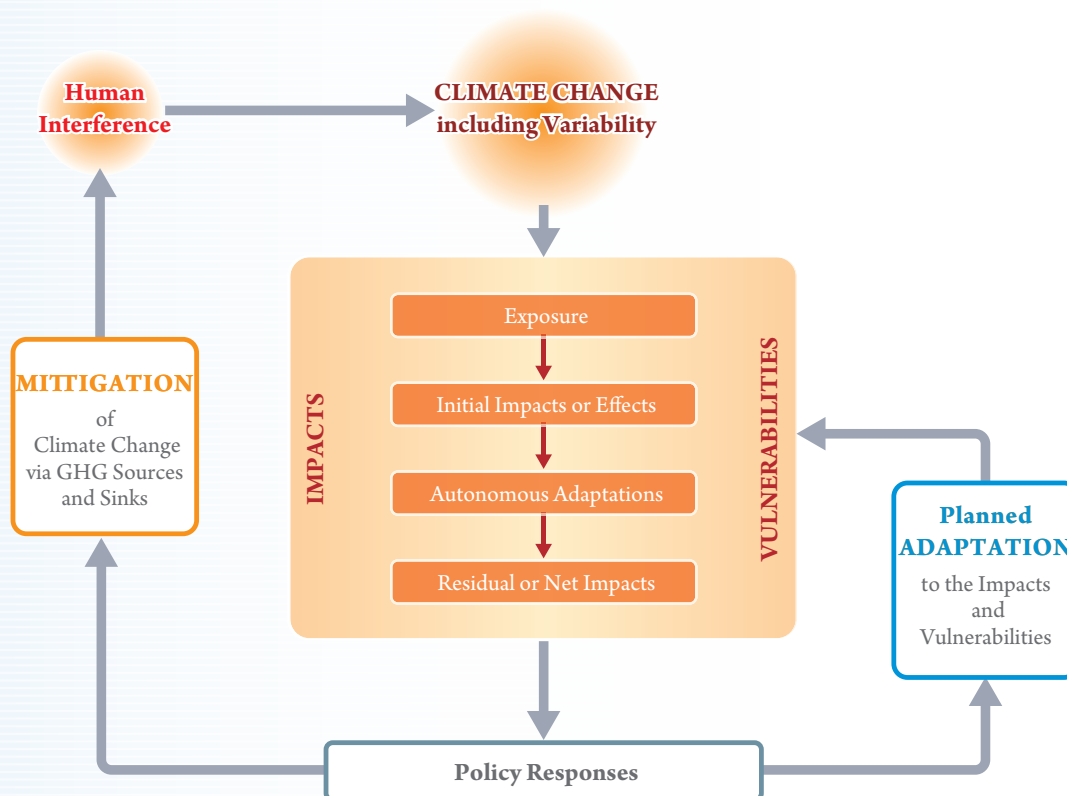
Mitigation measures, namely reduction in emissions and enhancement of the removals of greenhouse gases, are now urgently required to address climate change. However, even if various efforts for mitigation are quickly promoted, it will

take some time before the effects of such efforts are realized in the global climate system. During this time, the impact of climate change upon the globe is inevitable. Therefore, “adaptation measures” for responding to these unavoidable impacts are critical.

In order for human society to minimize the negative impacts of climate change, it is more effective to promote well planned adaptation measures in advance rather than responding to actual impacts when they occur.

Climate change was raised as one of the main theme at the G8 Gleneagles Summit 2005 held in the UK. At the 12th Conference of the Parties (COP12) and the 2nd Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (COP/MOP2) in Nairobi, Kenya in 2006, one of the most important topics brought up concerned the vulnerability and adaptation to climate change in developing countries. The need to garner support from the international community was also discussed. Furthermore, the G8 Heiligendamm Summit 2007 held in Germany declared a commitment to strengthen the adaptive capacity in developing countries through cooperation in achieving sustainable development*¹.

Figure 1 Places of adaptation in the climate change issues



Source: IPCC-WG2, Third Assessment Report (2001)

*1 G8 Summit 2007 Heiligendamm, Growth and responsibility in the world economy, Summit Declaration (7 June 2007)

Japan International Cooperation Agency (JICA), an independent administrative institution responsible for technical cooperation of Japanese Official Development Assistance (ODA), has been promoting adaptation measures to climate change, based on the concept of “human security” as a critical basic policy for development assistance, following the Japanese government’s policies related to climate change (p.11).

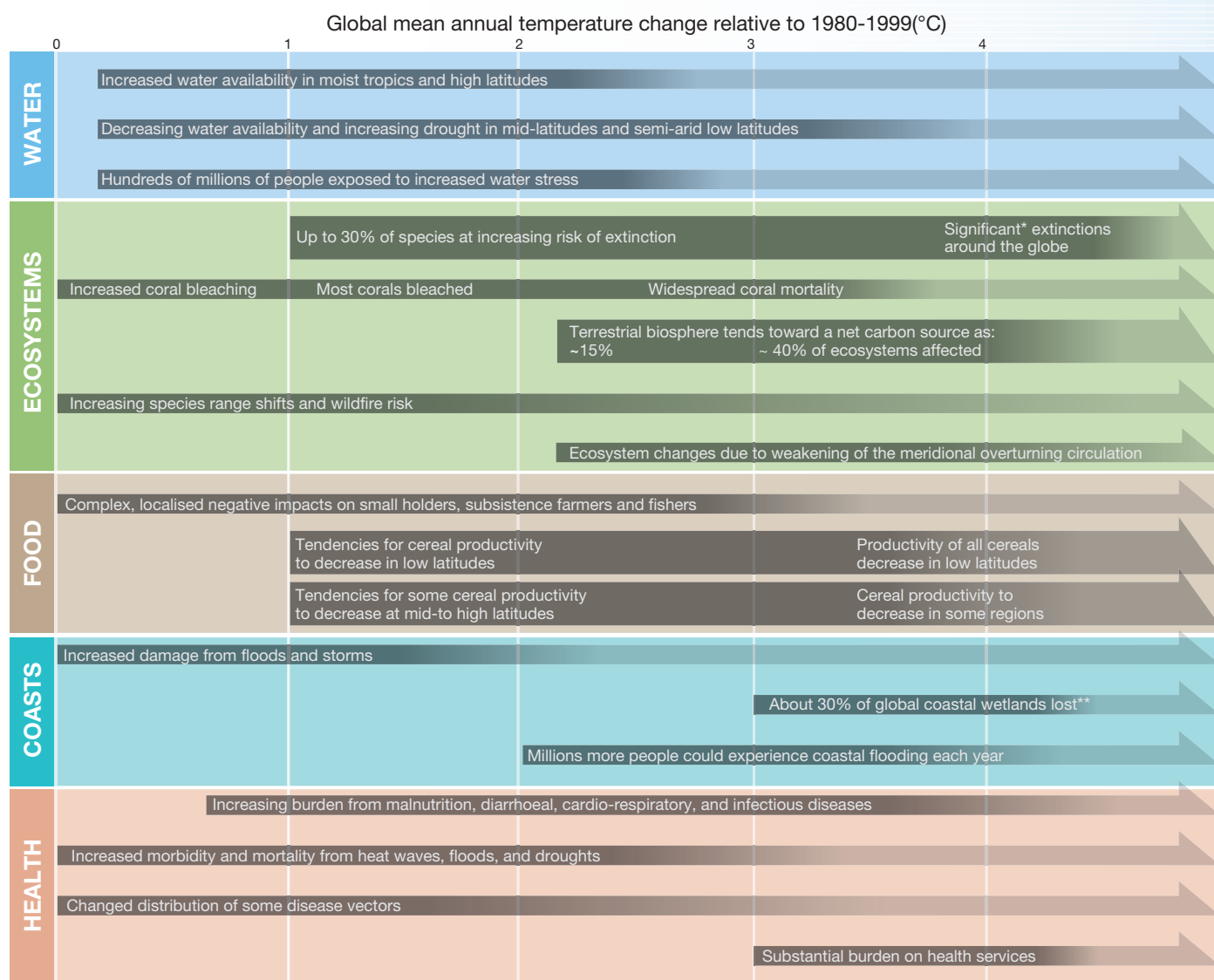
In developing countries for which JICA provides cooperation, many people living in poverty depend on agriculture and fishery, both of which are easily affected by climate conditions. If climate change continues, the poor will be the first to suffer. Climate change may also directly threaten human life and the means for living.

From the view point of human security, it is JICA’s essential task to provide assistance to promote the adaptation to climate change in developing countries, where serious impacts are expected.

Technical cooperation projects provided by JICA have had various positive effects as adaptation measures. In many cases, these projects have been conducted to minimize damages suffered from climatic disasters and/or changes of climate conditions in the regions already vulnerable to climate change. Furthermore, some of the projects using “participatory approach”, which JICA emphasizes in its assistance policy, are also regarded as effective for local communities’ adaptation to climate change.

The following pages introduce cases of these projects.

Figure 2 Illustrative examples of global impacts projected for climate changes (and sea level and atmospheric carbon dioxide where relevant) associated with different amounts of increase in global average surface temperature in the 21st century



*Significant is defined here as more than 40%

**Based on average rate of sea level rise of 4.2 mm/year from 2000 to 2080.

Source: IPCC-WG2, Fourth Assessment Report (2007)

Possibilities/directionality of adaptation cooperation in respective areas (1)

Water Resource

Examples

■ Project for Water Supply in Afar Region

Ethiopia Grant Aid

Implementation period: January 2006—under execution

**Implementation period" refers to the term from launch of the basic design study up to completion of the project.

Securing safe water is an issue that deeply relates to a wide variety of areas from basic education to healthcare, agricultural and rural development. Even among the sub-Saharan countries, Ethiopia is a country that has extreme difficulty in accessing safe water.

Afar, a desert region situated in the northeastern area of Ethiopia and the site of this project, is one of the country's poorest regions with harsh natural conditions, where annual average precipitation is 150mm. The water supply rate is extremely low, and women and children spend considerable energy in securing water.

There have been reports that annual precipitation and maximum daily precipitation have both decreased in the Sudan/ Sahel regions (including Ethiopia) in recent years. It is not yet clear whether this decrease attributable to the impacts of climate change. However, if the population in this region increases in the future, the problems related to water shortage are expected to escalate. Furthermore, if precipitation decreases even more as a result of climate change, securing safe water will become even more difficult.

This project provides technical support for expanding, repairing, and maintaining existing facilities and repairing wells in order to develop water facilities in nine towns in the Afar state. Through this support, the rate of water supply which was 49.4% in 2006 is expected to increase to 75.6% by 2010, the target year of the plan.



Bailing out water from a hand dug well with a depth of approximately 15 meters

If the local people can secure safe water through this support, health conditions will improve and the risk of infection through waterborne diseases will



Working with Ethiopian counterparts and Japanese side concerning the project

decrease. In addition, socioeconomic situation is expected to become more active, leading to the improvement of the quality of lives in the community.

This project was not carried out with the impact of climate change in mind. However, carrying out these activities in a region that is even now experiencing harsh climate conditions, will not only contribute to solving current problems, but will also prevent those problems from becoming more serious. It will also strengthen potential adaptive capacity.

▶ Characteristic of Cooperation in the Area of Water Resources

Historically, JICA has cooperated in this area through various activities such as the development of basic information and assessment of water resource with models. Mid-term demand forecast has also been carried out in order to develop future plans. Furthermore, in areas that have particular difficulty in securing safe water, JICA develops facilities through grant aids. These activities are carried out through capacity development of local administration officials and the local people themselves, and are expected to produce greater effects as an adaptation measure.

Possibilities/directionality of adaptation cooperation in respective areas (2)

Agricultural and Rural Development

Examples

■ The Study on Comprehensive Agricultural Development of Prek Thnot River Basin Cambodia

Development Study

Implementation period: July 2005—August 2008 under execution

In Cambodia, rice cultivation forms the center of agricultural production. However, its productivity is unstable, since most of the production depends on rain-fed cultivation. The Prek Thnot river basin region frequently suffers from damage due to droughts in the dry season and floods in the rainy season. The lack of irrigation facilities in addition to the seasonal fluctuations in rainfall makes it difficult to use the water resources effectively. Due to these factors, rice productivity and the degree of self-sufficiency of the site was low in comparison to other regions in Cambodia.

Based on a master plan for the development of agriculture in this river basin, this project is currently being executed for the four purposes of (1) investigating measures for improving agricultural productivity through the effective use of water resources, (2) supporting rehabilitation of existing irrigation facilities with high level of priority/ urgency, (3) formulating flood warning plans and investigating measures for alleviating flood damage, and (4) capacity development of the counterpart concerning planning and environment and social considerations. In particular, JICA promote participation of local people and technology transfer to the counterparts through the various training courses.

If the fluctuations in rain fall increase due to future climate change, or if the level/ frequency of climatic damage (such as droughts and floods) intensify, this region might face a serious decrease in productivity. If development of irrigation facilities and effective use of water resources can be realized based on the results of this study, it is expected that

the community will be able to respond even if floods and droughts increase due to future climate change. If rice cultivation/ farming through the effective use of existing water resources is made

possible, agricultural productivity will rise and the higher resilience can be expected even in case of water shortages.

Furthermore, a flood warning plan will serve as countermeasures against current flood damage, and strengthen resilience in the case of future damage.



Comparison of rice growth status between traditional farming methods (left) and new farming methods implemented through the pilot project (System of Rice Intensification: SRI) (Right)

► Characteristics of Cooperation in the Area of Agriculture/ Food Supplies

Historically, JICA has much technical experience in the improvement of irrigation facilities, participatory irrigation management, and technical cooperation in rice cultivation. In addition, JICA adopts cross-cutting and comprehensive approach for agricultural and rural development. If the local people are encouraged to take the initiative in solving their own problems, their adaptive capacity toward the impact to climate change is also expected to strengthened.

In the agriculture/rural development sector, many of the short-to-mid-term measures to address existing issues are the first step toward adaptation measures. JICA's cooperation projects (such as the improvement of irrigation facilities, development/introduction of crop varieties for arid regions and saline soil, and the improvement of the local infrastructure through participatory rural development) can also act as adaptation measures toward climate change. Furthermore, it can also be said that typhoon disaster management, agricultural stockpiling, and resource management cooperation are effective as adaptation measures.



Meeting between NGO staff and farmers for the implementation of new rice cropping technology

Possibilities/directionality of adaptation cooperation in respective areas (3)

Forestry and Natural Resource Conservation

Examples

■ Coastal Wetland Conservation in Yucatan Peninsula

Mexico

Technical Cooperation Project

Implementation period: March 2003–February 2008

Ría Celestún Biosphere Reserve (RBRC), situated in the Yucatan Peninsula of Mexico, is an important breeding ground for flamingos and sea turtles, as well as the overwinter area for migratory birds. However, segmentation of the hydrological cycle caused by road construction and soil salinization due to little rainfall has led to problems such as loss of mangroves.

The mangrove forests that grow naturally on the coastal areas play many important roles such as preservation of the coast as bank protections, utilization as tourism resources, and the conservation of marine ecology. It is still unclear whether the current trend of diminished rainfall is a result of climate change, however, there is a fear of greater damage if things worsen due to climate change.

This project aimed at the better conservation of wetland ecosystems through the promotion of environmental management activities. The RBRC office plays a central role in the project. The project carries out the five activities: (1) mangrove reforestation, (2) support for local people through eco-tourism, (3) promotion of solid waste management, (4) promotion of information sharing among organizations related to conservation, and (5) promotion of environmental education.

Through reforestation of the dead mangrove forest under this project, it is expected to directly alleviate the impact of natural disasters such as high tides and floods as impact of future climate change. In addition, the conservation of the ecosystem has been promoted through participatory conservation activities and environmental education. Environmental conservation activities - such as those lead by the RBRC office - strengthen resilience to climate change.

► Characteristics of Cooperation in the Area of Forest/ Natural Environment Conservation

Cooperation in forestry/ natural conservation includes: (1) research and development of adaptive technologies such as those for vegetation restoration in degraded and semiarid land, (2) transfer of adaptive technologies to administrative officers and local core players (this includes dissemina-

tion of sustainable watershed management and ecosystem conservation utilizing green corridors), (3) establishment of a foundation for monitoring and management by administrative officers and local people for sustainable use of natural resources, and (4) development of problem-solving abilities among related organizations and individuals through the activities stated in (1) to (3). JICA's assistance also aims to develop the capacity of individuals and organizations to respond to environmental change appropriately.



Environmental education



Mangrove reforestation

Possibilities/directionality of adaptation cooperation in respective areas (4)

Disaster Management

Examples

■ Project for Construction of Multipurpose Cyclone Shelters (Phase V)

Bangladesh

Grant Aid

Implementation period: March 2003- November 2005 (Completion)

**Implementation period" refers to the term from launch of the basic design study up to completion of the project.

Bangladesh is a low-lying country with 80% of the national land lying less than 9 meters above sea level, and suffers extensive damage from floods and cyclones during the rainy season. In particular, the Bengal gulf area has been greatly affected by high tides as a result of cyclones over the years. The damage is immense, as it is indicated by the fact that 76% of the dead by tropical cyclones are from India and Bangladesh. In Bangladesh, about 300,000 lives were lost in 1970 and about 140,000 in 1991.

After the damage caused by the cyclone in 1991, many bilateral and international donor organizations jointly initiated the establishment of cyclone shelters. JICA has cooperated consistently and established 91 shelters.

This project was carried out to assist the construction of two-story, multipurpose cyclone shelters in high risk areas. These shelters have been used primarily as elementary

schools with open space on the first floor, classrooms, staff room, warehouse, and toilets on the second floor. The rooftop can also be used as an emergency evacuation area. This facility is prepared for damage from high tides during cyclones.

► Characteristics of Cooperation in the Area of Disaster

Prevention

While some countries/ regions that are affected by a higher risk of high tides/ flood as a result of climate change, other countries/ regions with little rainfall have a higher risk of drought and forest fires. The measures against current disasters are thought to be effective to alleviate damage even if the risks increase in the future due to climate change. In particular, JICA's participatory activities are expected not only to develop hard infrastructures such as shelters, but also to greatly contribute to the establishment of appropriate operation systems.



Example of shelter/ primary school completed in February 2001 by Japan's free Grant Aid



Interior of the shelter. Usually used as a classroom.

Possibilities/directionality of adaptation cooperation in respective areas (5)

Urban-Regional Development and Transportation

Examples

■ Project for Provision for Portable Steel Bridges on Upazila and Union Roads

Bangladesh

Grant Aid

Implementation period: December 2004–under execution

**Implementation period* refers to the term from launch of the basic design study up to completion of the project.

Bangladesh faces various problems in the inland region, in addition to the problems in the coastal region mentioned in the previous page. The upstream areas of its three largest rivers, the Ganges, the Brahmaputra, and the Meghna, experience an annual rainfall of 10,000mm, and it is said that 20% of the national land is inundated during the rainy season. For such reasons, the traffic system suffers severe damage because 60-70% of transportation depends on roads. In particular, rural areas have insufficient bridges and many of those bridges are frequently damaged or washed away by floods. The damage prevents local passage during rainy seasons and cause serious barriers for the local economic development.

The purposes of this project were to contribute to the improvement of quality of life in rural areas, to help alleviate poverty, and to help develop infrastructure. The project assisted the procurement of materials necessary to construct bridges in high priority areas. The case introduced here includes assistance in the construction of 92 bridges; however, prior assistance has contributed to the construction of 74 bridges, 80 bridges, and 76 bridges in previous three phases.

The bridges constructed through the project are less than 150 meters in length and have a width of 3.35 meters, an automobile and a rickshaw can cross at same time. The building materials used to construct the bridges were developed so that they could be transported and installed by human

power even in remote areas and places with poor footing. With this material, safe and flood resilient bridges can be constructed, thus preventing villages in remote areas from being isolated during floods. Specifically, the construction of such bridges on local roads that are essential to the community secures a safe transportation system throughout the year.

Also commuter access and shopping can be improved, travel time thus shortening and making life easier for the people. Furthermore, even if the frequency and level of floods increase as a result of future climate change, the resilience of the area is expected to hold.

► Characteristics in Cooperation in the Area of Urban/ Regional Development and Transportation

According to JICA' design requirements for bridges, roads and seaports are usually based on current climate conditions. In areas facing damage due to current harsh climate conditions, the implementation of these measures presents a first step toward adaptation to future climate change.



A concrete bridge that was damaged by flood during the rainy season



Portable steel bridge in the Bangladesh / Rendering (Pavuna province)

Possibilities/directionality of adaptation cooperation in respective areas (6)

Health-Health Care

Examples

■ Lusaka District Primary Health Care Project

Zambia

Implementation period: Phase 1: March 1997–March 2002;

Phase 2: July 2002–July 2007

Climate change has various direct/ indirect impacts on human health. Direct impacts include heat-related illness such as heat stroke by rising air temperature and human damage due to increased extreme events such as floods. Indirect impacts include increases in vector-borne infectious diseases such as malaria and dengue fever as well as waterborne diseases such as cholera and diarrhea due to rising water temperature.

In the outskirts of Lusaka, Zambia's capital city, public services have not been able to keep up with the rapid population increase resulting worsening of sanitary conditions, such as uncontrolled solid waste and waste water. A project was carried out to change this situation in one of the most deprived unplanned settlements (they are called "compounds") of the city. As a result, the death toll from cholera was reduced drastically from 70 out of 10,000 people in 1994 to 1 out of 10,000 in the year 2000 in the compound. Based on the success, phase two of the project was carried out covering six similar compounds. The phase two project focused on two community-based activities with high impacts, i.e., regular growth monitoring of children integrated with other health services (GMP Plus) and participatory environmental hygiene improvement activities using internationally promoted methodology (PHAST). Epidemiological monitoring of cholera outbreaks was also conducted using GIS (Geographic Information Systems) combined with intensive household visits for prevention. As a result, there observed a significant improvement of health status in the target compounds, e.g., diarrhea and malnutrition among children under the age of five was reduced by half. If factors related climate change

such as rain fall can be incorporated into the GIS monitoring system in the future, it will contribute to provide basic information to detect the impact of climate change in the area. Unfortunately, outbreak of cholera continues to occur periodically in the area and the risks of cholera epidemic have not been eliminated. It is hoped that the community and the local health administration, whose capacity was strengthened through the project, will continue to manage the problems on their own.

► Characteristics in Cooperation in the Area of Health-Health Care

Developing countries with insufficient healthcare services and poor sanitary conditions have higher health related risks. Climate change could be a factor that further increases these risks. Among JICA's assistance projects, measures against vector/water/food-borne infectious diseases, and strengthening of health administration capacity to implement these measures have high relevance to adaptation measures against climate change. JICA has emphasized the importance of community participation activities. Such activities work effectively for a lot of aspects, including diagnosis of the sanitary conditions of their community, planning of actions for improvement, and taking action to establish a framework for implementation of those activities. Through strengthening such systems and capacities, it will enable community people to take appropriate measures in early stage if the health risks rise as a result of climate change. It will also contribute to help those in the community who are less liable to infectious diseases through improved health conditions. Those activities are expected to have effects as adaptation measures as well.



Public awareness activities by the region's health administrator



Growth monitoring of infants

Possibilities/directionality of adaptation cooperation in respective areas (7)

Acceptance of Trainees

JICA has conducted a variety of training courses under the Technical Training Participants Program over the years. This page introduces group/ region-focused training program which accept participants to Japan.

Among the various training courses accepting participants, there are several courses which focus on technology/ policies relating to mitigation and adaptation to climate change. In each training course, participants from respective countries stay in Japan for a duration from one to three months. These courses are also intended to transfer the knowledge and technology to the participants so that they may continue their efforts after they return to their home countries. JICA's aim is that participants will apply the acquired technology and institutional knowledge broadly in accordance with the conditions of their home country. The following training courses were held in FY2006.

Global Warming

■ Global Warming Countermeasures

[(a)JICA Tsukuba, (b)Ministry of the Environment, (c)Approx. 2 months, (d) 17 participants from 16 countries]

The purpose of this course is to acquire the appropriate knowledge to address the climate change. The course includes a compendium about climate change, technology for greenhouse gas emission reduction, vulnerability assessment and adaptation, greenhouse gas inventories, and energy-saving technologies.

Healthcare

■ Research in Tropical Medicine I

[(a)JICA Chugoku, (b)Tottori University, (c)Approx. 4.3 months, (d) 9 participants from 8 countries]

The target group for this course is participants from countries with arid/ semiarid regions. The purpose is to learn about water resource management technology for agriculture in arid regions, effective utilization plan of water resources, and environmental impact assessment concerning water resources.

Fisheries Resource Management/ Fisheries-Rural Development

■ Planning of Fisheries Community Development

[(a)JICA Yokohama, (b)IC Net Ltd., (c)Approx. 2.5 months, (d) 9 participants from 9 countries]

The target group for this course is administrative officers in charge of fisheries and community development. The purpose is to learn the mechanisms for sustainable development of fishery communities while taking into consideration the local characteristics.

■ Marine Farming for Stock Enhancement

[(a)JICA Shikoku, (b)Kochi University, (c)Approx. 4.5 months, (d) 6 participants from 6 countries]

This course seeks personnel engaged in research and/or educational activities in fisheries. It's purpose is to teach stock enhancement technologies of marine resources while taking into consideration biodiversity.

Agricultural Development/ Rural Development

■ Irrigation Water Resources in Arid & Semi-Arid Region and E.I.A. for Sustainable Development II

[(a)JICA Chugoku, (b)Tottori University, (c)Approx. 4.3 months, (d) 9 participants from 8 countries]

The target group for this course is participants from countries with arid/ semiarid regions. The purpose is to learn about water resource management technology for agriculture in arid regions, effective utilization plan of water resources, and environmental impact assessment concerning water resources.

Water Resource/ Disaster Management/ Climate

■ Integrated Water Resources Management

[(a)JICA Tokyo, (b)Japan Water Agency, (c)Approx. 1 month, (d) 10 participants from 10 countries]

This course seeks those from Asian monsoon regions. It teaches institutional design/ management planning and operations required for integrated water resource management, focusing on water shortages.

■ Meteorology

[(a)JICA Tokyo, (b)Meteorological Office, (c)Approx. 3 months, (d) 7 members from 7 countries]

The course focuses on meteorological services. It's purpose the study of meteorological satellite images, weather information, numerical weather prediction, and a basic overview of meteorology.

■ Disaster Mitigation, Preparedness and Restoration for Infrastructure

[(a)JICA Osaka, (b)Japan Construction Training Center Foundation, (c)Approx. 2.5 months, (d) 8 members from 7 countries]

This course seeks administration officers who are in charge of disaster restoration activities and who have expertise concerning social infrastructure such as rivers and road. The purpose is to equip trainees with knowledge of disaster prevention and disaster recovery systems, in order to address earthquakes/ tsunami/ typhoon/ volcanic eruption.

Preservation of the Natural Environment/ Ecosystem

■ Maintenance and Conservation of the Coral Reef Ecosystem in Asia/ Pacific Region

[(a)JICA Okinawa, (b)Ministry of the Environment, (c)Approx. 2 months, (d) 6 members from 6 countries]

This course seeks administration officers involved in conservation of coral reef ecosystems. It teaches management techniques for the improvement of local methods.

■ Conservation and Sustainable Management of Mangrove Ecosystems

[(a)JICA Okinawa, (b)International Society for Mangrove Ecosystems, (c)Approx. 2.7 months, (d) 5 members from 5 countries]

This course targets specialists engaged in mangrove conservation and rehabilitation. It teaches conservation and rehabilitation technology/ methods of the mangrove ecosystems.

■ Integrated Basin Management for Lake Environment

[(a)JICA Osaka (b)International Lake Environment Committee Foundation, (c)Approx. 2.5 months, (d) 9 members from 8 countries]

This course seeks those from officials in charge of water quality management in lakes, wetlands and tributary rivers. It teaches the mechanisms of water pollution, methods of water management, and methods for water quality monitoring.

■ Forest Management through Coexistence

[(a)JICA Obihiro, (b)Japan Overseas Forestry Consultants Association, (c)Approx. 2.7 months, (d) 11 participants from 11 countries]

This course seeks forest administration officials. The course focuses on coexistence of forest conservation and human activities.

(a) The name of JICA domestic office in charge of the Training Course.

(b) Implementing Partner.

(c) Duration (FY2006).

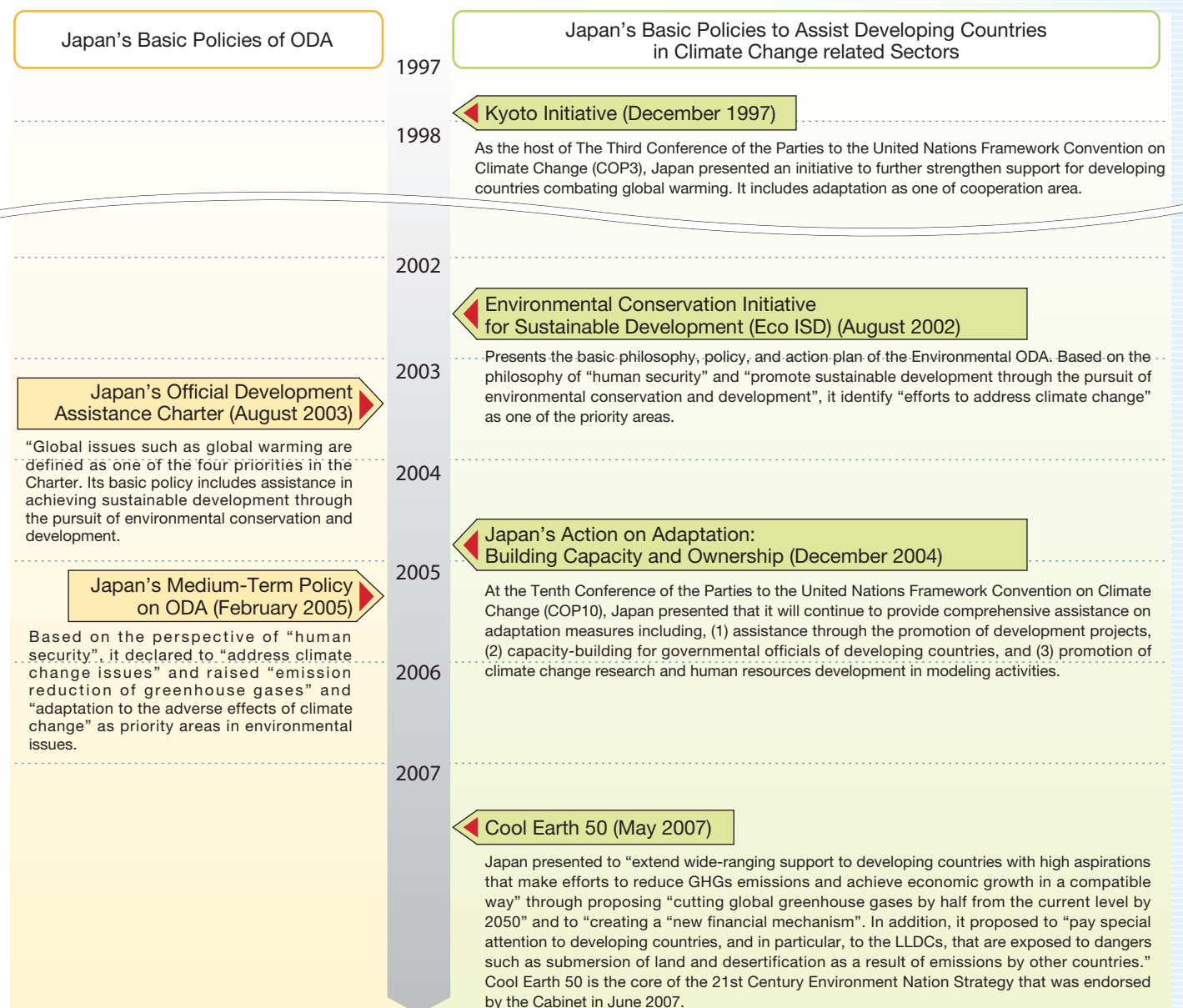
(d) The number of the Participants.

The Japanese Government's Policies Related to Adaptation to Climate Change through ODA

Japan has recognized at an early stage that climate change is one of the most critical issues in assistance to developing countries, and reflected the issue in the relevant basic policies to promote necessary activities. The major basic policies regarding Japanese assistance to developing countries, in particular those concerning climate change are listed in the table below. These policies focus on reduction of greenhouse gases as well as adaptation to the adverse effects of climate change, including building capacity and human resource development.



Ethiopia: Elevated steel water tank



In addition to the policies listed above, the Japanese government has been actively promoting its assistance in various sectors closely relevant to adaptation, including the Initiative for Disaster Reduction through ODA (January 2005), Health and Development Initiative (HDI) (June 2005), and the Water and Sanitation Broad Partnership Initiative (WASABI) (March 2006). JICA's assistance is also carried out in accordance with these policies of Japan.

Source: <http://www.mofa.go.jp/>

JICA Approach to Adaptation Measures

Adaptation Assistance under the concept of Human Security

From the view point of “human security”, JICA promotes adaptation to climate change in developing countries. “Human security” is a philosophy of Japan’s Official Development Assistance Charter and one of the basic perspectives in carrying out JICA’s activities.

It is difficult for most developing countries to deal adequately with disasters caused by climatic conditions. Therefore, there is a high concern that developing countries will be more adversely affected by future climate change than developed countries. Moreover, socially vulnerable group will be the most vulnerable to adverse effects of climate change. JICA tries to realize human security by enhancing social resilience to climate change through implementation of adaptation measures and empowerment of individuals.

In order to protect the lives and livelihoods of socially vulnerable group, the risks of climate change need to be minimized. To this end, risk prevention and alleviation through developing and utilizing the potential ability of individuals and the society is quite important, on the premise that external technical and financial assistance may not sufficiently cover all sectors.

Adaptation Assistance based on Capacity Development

The vulnerability to the impacts of climate change is proportional to the degree of external forces by climate change and to the resilience of the communities concerned. Communities with stronger resilience are less vulnerable to a given external shock. It is necessary, therefore, to strengthen resilience of communities concerned in order to reduce their vulnerability. This is the basic idea of adaptation, and it is JICA’s role to assist developing countries to strengthen their resilience so that eventually they can adapt to climate change by themselves, i.e., Capacity Development Assistance. Social resilience consists of various elements including human resources, knowledge, technology, information, social institutions, and infrastructure. In order to carry out appropriate adaptation assistance, it is necessary to integrate these diverse elements, considering the regional characteristics, and to emphasize the ownership of developing countries. JICA has abundant know-how to achieve these goals that has been accumulated through a number of participatory projects in the past.

Effective Approach for Adaptation Assistance

There are three approaches as follows which are considered effective in assisting capacity development for adaptation measures. JICA conducts its cooperation by using these approaches in accordance with the characteristics of the issues and the regions concerned.

“Community Empowerment” Approach

To develop and establish systems and mechanisms to address and solve actual problems by including the support of local people and authorities, through actions in specific regions

“Core Function Development” Approach

To assist human resource development, technology dissemination and/or research and development through key governmental units or agencies

“Policies and Institution Development” Approach

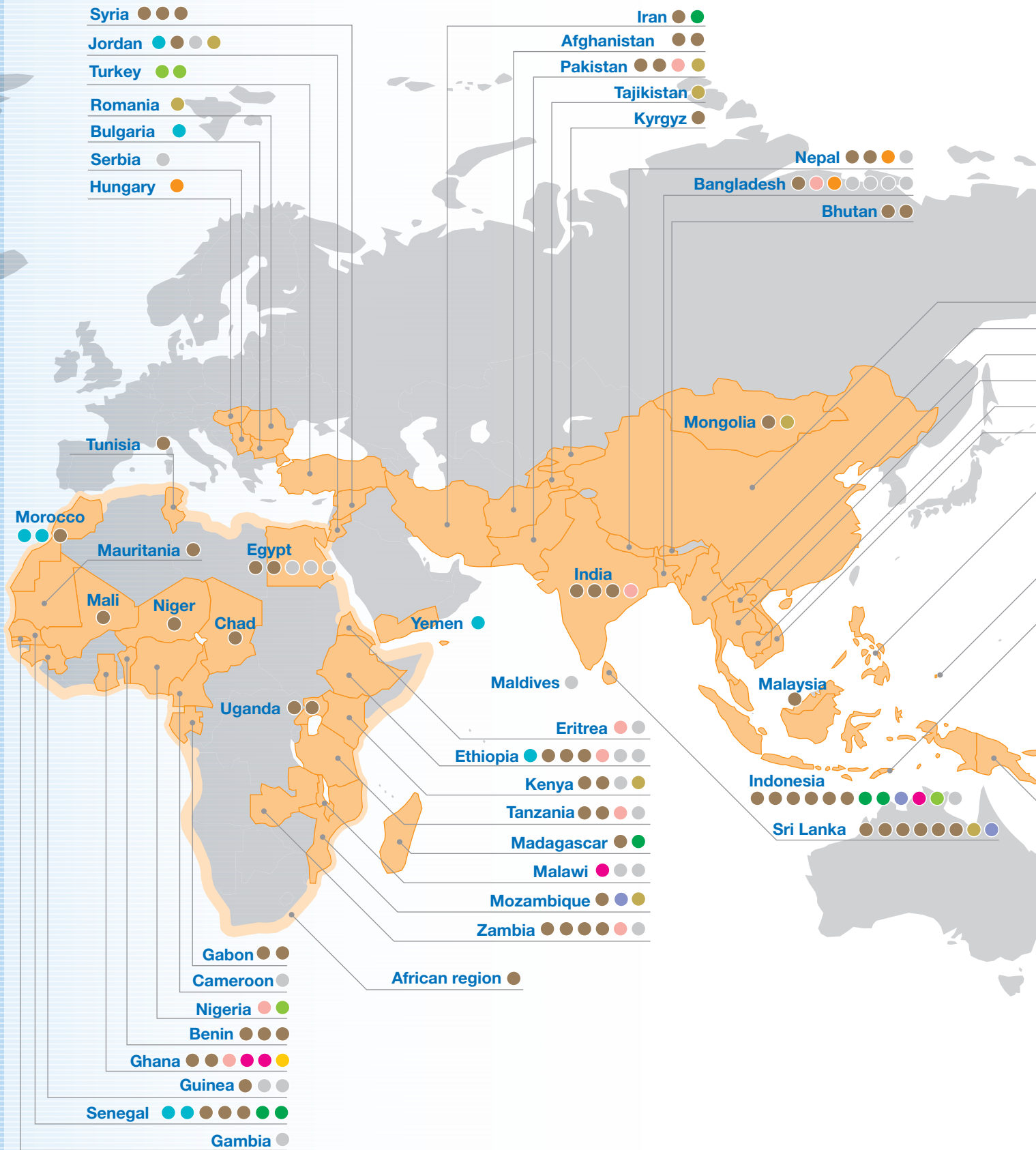
To assist in establishing national policies and regulations, as well as their implementation and enforcement

Examples of Adaptive Measures by Sector

▶ : Adaptive measures that can be carried out by JICA ○ : Content

| | | |
|---|--|--|
| Water resource | ▶ Appropriate development and management of water resources | ○ Assist approach of integrated water resource management, which enhances the appropriate water resources development and management of considering water utilization/ flood control/ water environment comprehensively, under grasping of the potential of water resources |
| | ▶ Safe water supply and sanitary improvement | ○ Assist improvement of water supply facilities and capacity building for their maintenance as well as activities for public awareness of proper sanitation toward improved access to safe water |
| | ▶ Efficient use of water resources | ○ Assist efficient water utilization such as promoting effective irrigation and leakage prevention of water supply system |
| Agriculture rural development | ▶ Development of irrigation facilities | ○ Assist the development of irrigation facilities in regions with problems of constant water shortage and/or with frequent flooding |
| | ▶ Development and introduction of crop variety | ○ Assist development/ introduction of crop varieties for arid/ saline soil, Assist the introduction of floating rice in areas with frequent flooding |
| | ▶ Rural development through local participation approach | ○ Assist infrastructure development for farmers, strengthening resilience against external change, mitigation of impact of climate change on farmers |
| | ▶ Measures against extreme event | ○ Assist disaster countermeasures (e.g. typhoon, hurricanes), stockpile agricultural product in case of disaster, secure protein sources through freshwater aquaculture, and resource management that contributes to the understanding of the impacts of climate change on agricultural resources |
| Forestry/ natural resource conservation | ▶ Breeding of resilient tree variations | ○ Assist development of drought-resistant and pest/disease resilient tree variations and promotion of technology dissemination as measures against increased drought and pests/diseases expansion of distribution (forest breeding) |
| | ▶ Mangrove conservation | ○ Assist conservation project of mangroves/forests, and coral reefs as measures against high tides/ floods attributable to climate change |
| | ▶ Prevention of forest fires | ○ Prevention measures for forest fires caused by changes in rainfall pattern and satellite monitoring of forest fires |
| | ▶ Afforestation in degraded land | ○ Recovery of vegetation in semiarid regions and degraded land |
| | ▶ Human resource development and environmental education, etc. | ○ Assist development of human resources related to conservation of the ecosystems, promotion of environmental education, conservation and management of watershed and wetland, as adaptation measures toward the destruction of ecosystems, decrease of wetland, decrease of river flow caused by climate change |
| Disaster management | ▶ Management of coastal erosion/ high tides | ○ Assist design and construction of bank protection, detached breakwater and jetties, assist planning and implementation of beach nourishment, warning and evacuation activities |
| | ▶ Flood management | ○ Assist design and construction of dikes, guide banks, groynes, flood control basin, assist planning and implementation of warning, evacuation and, flood fighting activities and conservation of upstream basin |
| | ▶ Sediment disaster management | ○ Assist design and construction of prevention works for sediment disaster such as check dams, assist planning and implementation of warning and evacuation activities |
| | ▶ Capacity development for disaster management | ○ Assist capacity development for disaster management to national / local officials in charge of disaster management, as well as the local community |
| Urban-regional development | ▶ Development planning | ○ Assist land use planning and establishment of urban/regional development master plan resilient to the adverse effects of climate change |
| | ▶ Infrastructure development | ○ Assist infrastructure development considering climate change impacts in high risk areas |
| Health | ▶ Malaria control | ○ Measures against infection routes/ source of infection, development of vaccines, establishment of access to anti-malarial agents, distribution of mosquito nets, preventative measures such as house design, prediction of epidemics, warning systems, environmental management and community health improvement, and support for rainfall prediction systems improvement |
| | ▶ Measures against waterborne infectious diseases | ○ Assist improvement of access to safe water |
| | ▶ Improvement of basic capacities against infection diseases | ○ Assist development of surveillance systems, improvement of examination/ diagnostic capacities, strengthening of public awareness activities |
| | ▶ Measures in high risk regions | ○ Design assistance projects considering the impact of climate change in areas with a high risk of vector-borne infectious diseases, with poor hygiene conditions, or with frequent flooding |
| Others | ▶ Capacity development of weather monitoring | ○ Assist capacity improvement in meteorological data collection and analysis, and assist in the establishment of early warning systems |
| | ▶ Capacity development for impact assessment/ vulnerability assessment | ○ Assist in human resource development and in the strengthening of organizations in governmental research institutions that are focused on impact/vulnerability assessment of climate change in individual sectors (such as water resources and agriculture or specific regions and ecosystems of the country), and also assist the policy making on the basis of the capacity development |
| | ▶ Establishment/ strengthening of adaptation policies and institutions | ○ Assist in the establishment of national comprehensive plans, sectoral action plans, urban planning, management plans for coastal regions and river basins, or conservation plans for the wetland ecosystem from the perspective of adaptation. In addition to them, assist capacity development administrative officials in charge of those issues |
| | ▶ Assist improvement of community adaptive capacity | ○ Assist implementation of pilot projects for improving adaptive capacity in community level, dissemination of the results, and assist in integration of the results into the upper-level plan |
| | ▶ Human resource development and awareness raising | ○ Assist in human resource development through the acceptance of trainees and local seminars concerning adaptation to climate change, and assist dissemination and awareness raising for stakeholders |

Introduction of JICA's Assistance Experience in each Sector



JICA's major assistance experiences were introduced in this brochure. Other than these examples, there are also more conventional measures for technical cooperation projects that could be effective in adaptation. This map shows the related JICA's cooperation projects in FY2006 alone, which promoted a wide range of the initiatives around the world.

| | |
|---|-----|
| Water Resource | 12 |
| Agricultural and Rural Development | 107 |
| Forestry and Natural Resource Conservation | 14 |
| Disaster Management | 19 |
| Urban-Regional Development and Transportation | 6 |
| Health-Health Care | 17 |
| Private Sector Development and Tourism | 4 |
| Power and Energy | 1 |
| Energy Conservation | 4 |
| Environmental Management | 9 |
| Grant Aid | 43 |





The analysis and recommendations of this brochure do not necessary reflect the official views of JICA. It is the fruit of a collaborative effort by the study group on “Study on “JICA’s Cooperation Related to Future Assistance for the Adaptation Measures for to Climate Change”.

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10-5 Ichigaya Honmura-cho, Shinjuku-ku, Tokyo 162-8433 Japan

FAX: +81-3-3269-2185 E-mail: iictae@jica.go.jp

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