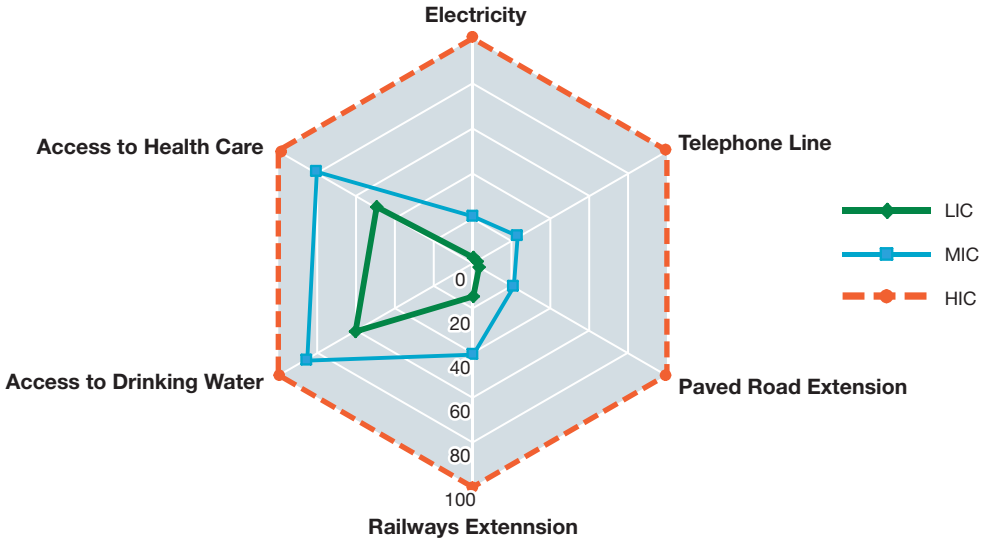
5 For People in Asia, Africa, ... : Reducing the Infra Gap

The level of infrastructure stocks is extremely low in the developing world, and a glaring gap exists between the developing and the developed countries. Admittedly, it is not exactly easy to standardize the quantitative comparison between countries, given the wide difference in population density and distribution that determines the stock level and distribution of physical infrastructure. After converting to dollar terms, a very rough comparison can be made between three income-level groupings of countries. The average total stock in dollars among the low-income and the middle-income groups are one-thirteenth and one-tenth, respectively, of the average among high-income group. As shown in the figure below, the gap in stocks is much more pronounced in economic infrastructure such as energy and transport than in social infrastructure like water and sewerage.

According to the World Bank estimate, the annual demand for infrastructure investment in the developing world amounts to US$233 billion, and annual operation and maintenance requires a further US$232 billion (World Bank Policy Research Paper 3102). The total development and recurrent expenditure requirements amount to as much as 5.5% of the aggregated GNPs of the developing world. ODA can finance only 10% of this huge requirement. According to the Bank, annual private investment in infrastructure is around US$60 billion, nearly halved compared to its peak period. In other words, the availability of finance is far too small to reduce the infra gap between the developing and the developed world.

Slums along Railways (Jakarta, Indonesia)

Comparison of Average Stock Levels between Three Income-Level Groupings



Source : Calculated from Fay, M. and Yepes, T., 2003.
Note : Holding the average per infrastructure sub-sector of high-income countries as 100, indexes are calculated for the respective average among two groups of developing countries (39 low-income, 50 middle-income and 25 high-income countries).

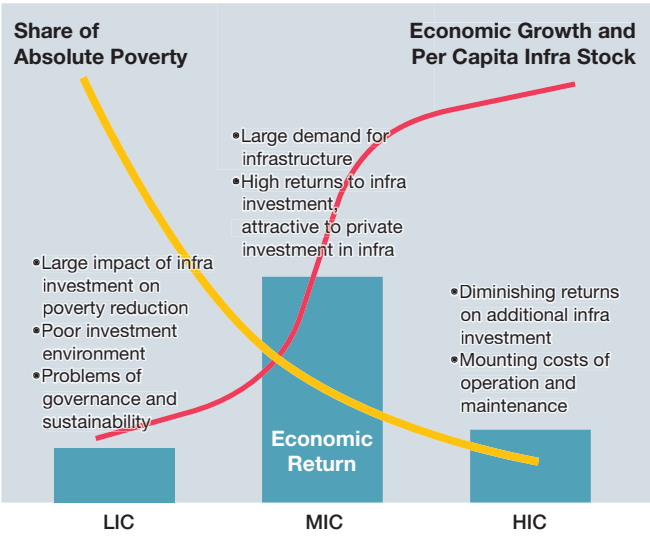
Different Needs for Infrastructure Development

Undeniably, there is a huge and growing demand for infrastructure development in the developing world. However, the infrastructure requirements vary widely from one country to another and from one region to another in a given country. The need for infrastructure changes apace with economic growth, urbanization, motorization and transformation of economic structure. It is necessary to understand the different needs, and various social and economic trends and circumstances affecting thereof, before launching economic and technical cooperation for a given country.

Low-income countries have a large share of rural population, and are under-equipped with basic social infrastructure like water, energy and sanitation. Therefore, these countries have been investing sizably in social infrastructure, the value of which equal those in middle-income or high-income countries. This tendency was especially pronounced in the former centrally planned economies. Low-income countries also invested in irrigation development to improve the agricultural productivity of large rural population. Despite these efforts in the past, their demand for new infrastructure is yet very large. One of the reasons is, of course, that they had to begin from the lowest level of infra stock, but another equally important reason lies in the fact that the available infrastructure is failing to function properly. The effective command area of an irrigation scheme shrinks, because years of poor operation and maintenance have reduced the volume of water intake and the efficiency of water distribution. The failure to collect water charges leads to the shortfalls of pipeline maintenance at a water supply plant, resulting in its inefficient operation. Elsewhere, the transport capacity of a constructed road continues to drop, because no attempt has been made to repave it. Taking these common occurrences into consideration, one may say that the investment in new physical facilities must be matched with concomitant increase of expenditure on operation and maintenance. Even then, one must admit, the budget allocation on operation and maintenance nearly always falls far short of requirement in low-income countries. It is more important and realistic to assume the limitation of operation and maintenance capacity as given, before planning new investments in infrastructure. The increased investment in social infrastructure alone does not have positive impacts on economic growth and cannot ensure even the sustainability of the invested facility itself. It is essential to keep a favorable balance between the social and the economic infrastructure investment. Low-income countries are usually less urbanized and contain a large land area of low population density. The cost of providing people with equal access to infra-services is much greater in sparsely populated areas than in heavily populated urban areas. It is necessary for donors to find suitable ways to finance infrastructure development, and operation and maintenance thereof.

Middle-income countries have a rapidly growing demand for large-scale infrastructure investment apace with on-going urbanization, motorization and industrialization. At the takeoff stage of development, the returns on economic infrastructure investment are high. This makes it more realistic for these countries to expect the private investment in infrastructure. From the viewpoint of donors, it will be necessary to provide technical cooperation on various institutional measures and development of business models that provide catalytic functions needed to create a favorable investment climate for private investors. Middle-income countries are generally more in need of building technical and technological capacity for infrastructure development than of obtaining financial assistance. This is in sharp contrast to low-income countries that lack both technology and finance and require the integrated approach in technical cooperation, including environmental impact assessment. Middle-income countries require more finely-tuned high-level technical cooperation, especially on incentives and policy tools for attracting private sector interests in infrastructure development.

Conceptual Pattern of Infrastructure Development and Economic Growth



To give a schematic summary, the impact of infrastructure investment on economic growth follows a logistic curve. Namely, the impact is low in the initial stage of economic development, and gradually rises with the progress of economic development. After the threshold of takeoff, the economic impact picks up and continues to grow rapidly throughout the period of high economic growth. After a certain level of infrastructure stock is reached as in a developed country, the marginal utility of infrastructure investment begins to decline gradually.

Infrastructure Requirements in Asia

Adding to the typology of infrastructure needs by stage of economic development in the previous page, it is worth pointing out specific needs in some Asian countries that have reached a higher stage of development.

Cooperation for Cross-Border Infrastructure Development

Along with accelerating globalization, cross-border infrastructure is assuming an important role, as in FTA and other regional blocs. ASEAN countries have renewed their interest in the development of Asian Highway and other cross-border infrastructure. By strengthening the economic and social ties in their region, they are aiming to raise their collective international competitiveness and boost their economic growth. They are hoping that the proposed cross-border transport network will give decisive impetus to the growth of lower-income member countries (Myanmar, Cambodia, Laos and Vietnam). External donors are expected to aid their collective undertaking of infrastructure development. Given the expected complexity of programming project proposals to satisfy several countries, it will be necessary to provide appropriate technical cooperation to ensure effective cross-border coordination as well.

Reduction of Regional Disparities and Environmental Conservation

Middle-income countries tend to choose a pro-growth development path, partly because that was the choice they made to reach the present stage of development. As a result, they are likely to face the worsening problems of regional disparities and environmental deterioration. It is increasingly necessary to provide high-level intellectual cooperation on the issues that they have been neglectful of but must be made fully aware of its gravity in order to act. Regarding the environmental issue, furthermore, high-level intellectual cooperation might provide attractive seeds of business chances for the private sector, like the recent case related to the carbon dioxide emission barter arrangement. Middle-income countries have successfully attained economic development, but some of their regions have been completely left out from the benefits of rapid economic growth. Levels of per capita income in the poorer regions are reported to be only one-sixth or one-seventh of the advanced metropolitan region in Thailand and Malaysia. Poor regions are increasingly left behind because their poorly developed infrastructure drives away private investors to more advanced regions. Moreover, pro-growth governments tend to concentrate their infrastructure investment in the urban sector. External financing of infrastructure investment is necessary to make poorest regions rise above the poverty line. Coupled with appropriate fiscal incentives, the combination of better infrastructure and lower wages are likely to tip the balance and attract private investors.

- *Technical cooperation is needed on the capacity development of those organizations that regulate and control various activities of the private sector. (Answers to the questionnaire in Thailand)*

High-Level Technical Cooperation

Those countries that have reached a higher stage of development have many issues to address to, in addition to the question of infra gap reduction. Some of these issues involve the application of advanced technology to solve the problems, as mentioned in the preceding paragraph regarding the environmental issue. High-level intellectual cooperation is needed, for example, on asset management systems for the accumulated infrastructure stock, resource recycling systems, infrastructure sub-sectors that require the application of ITS technology, project management, fiscal, financial and other institutional or organizational reforms, and so on. In some areas, technical partnership or collaboration is more apt to describe the nature of cooperation.

- *We need technical assistance on the safety standards for infrastructure development and management. (Answer to the questionnaire in the Philippines)*
- *Technical assistance need be changed to technical collaboration. (Answer to the questionnaire in Thailand)*
- *We request the follow-up on the operation and maintenance system developed by assistance. (Answer to the questionnaire in Malaysia)*
- *Technical assistance projects of product quality management and project cycle management became useful models. (Answer to the questionnaire in the Philippines)*

ASEAN Highway Network Plan

Source : ASEAN Transport Cooperation Framework Plan (ASEAN Secretariat, 1999)

Pattern of Infrastructure Investment and Economic Growth by Development Stage

		Low Income	Lower Middle Income	Higher Middle Income	Hign Income
Urbanization (%)		30	49		78
Poverty Ratio (%)		35	17		0
Per Capita Infra Stock ($)		730	1,245		9,342
Expected Infrastructure Needs		Social infrastructure and Economic Infrastructure for Primary Industry: • water resources development, irrigation, drinking water, sewerage, health care, and education • roads & bridges, and energy	Urban Infrastructure and Industrial Infrastructure: • water and sewerage • roads, airports, ports, communication, and energy • environmental conservation	High-Tech Infrastructure, Safety- and Amenity- Related Infrastructure and Facility Renewal: • flood and landslide control, sewerage, waste matter treatment • traffic control, distribution facilities, asset management • environmental conservation, recycling	
Expected Technical Needs		(Establishment of Core System)	(Systems Integration, Efficiency Improvement)	(Absorption of Advanced Technology, Reduction of External Diseconomies)	
Institutions & Organizations Planning		• Development of Basic Systems: law, taxation, finance, etc.	• Institutional development for financing infra development and for project preparation and implementation • Institutional measures to attract private investment in infrastructure, creation of a favorable climate for industrial investment	• Management of project cycle, and system of operation and maintenance • Methods for evaluating infrastructure investment • Institutional development for financing infra development and for project preparation and implementation	
Infra-related Technology	Implementa-	Preparation of basic information needed for infrastructure development (e.g. maps)	Building standards for infrastructure	• Methods of Impact assessment and Regulation • Consensus building among actors	–
	tion & Construction	Development of basic technical capacity for the sub-sectors mentioned above	Participatory approach	• R&D on construction technology • Participatory approach, social impact consideration	–
	Operation & Maintenance	Development of basic technical capacity for the	• Techniques of operation and maintenance • Database compilation	• Introduction of asset management • Development of management system	–

Source : Used information in Fay, M. and Yepes, T., 2003.
Note : Used Japanese ODA statistics, regarding infrastructure and technical needs.

Actions by JICA

JICA has been increasing its technical cooperation for those countries trapped in an especially large infra gap, including capacity development for better operation and maintenance. For those developing countries that have reached a higher stage of economic development, technical cooperation will be provided on the issue of environmental conservation that involves the application of advanced technology. By noting the different stages of development among recipient countries, JICA provides technical cooperation for the institutional development necessary to attract private investors in infrastructure, thus contributing toward the increase in stock. A variety of training programs are available for capacity development related to infrastructure development and management, including Public-Private Partnership. In addition, technical cooperation will be offered on the fiscal system development to increase the public sector financing of infrastructure development.

Toward a Better Future

This report reviewed the past performance of Japanese ODA, and on the basis of the findings, discussed the issue of pro-people, pro-poor infrastructure services from five focal viewpoints.

Japanese economic and technical cooperation in infrastructure has been heavily directed to Asian countries. Therefore, the discussion mainly focused on major issues found in these countries. The needs for external assistance would be different in other parts of the developing world, reflecting the variations of natural environment, historical and cultural backgrounds, and different manifestations of poverty. An entirely different approach is required to provide economic and technical cooperation to war-torn nations.

What is common to all regions of the developing world is this. In order to provide effective ODA on pro-people infrastructure development, it is necessary to start from the accurate understanding of local needs and conscientiously follow the entire steps discussed in five focal views. In addition to this, it is important to keep asking what is the role expected of infrastructure, and how best individual projects can play out the expected role. Through this process of reexamination, a physical presence of infrastructure becomes an asset which serves to realize people's potentials and ensure the security of human beings on earth.

Abbreviations

ADB	Asian Development Bank
BHN	Basic Human Needs
CDF	Comprehensive Development Framework
DAC	Development Assistance Committee
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GNP	Gross National Product
HIC	High Income Country
IEA	International Energy Agency
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
LIC	Low Income Country
MDGs	Millennium Development Goals
MIC	Middle Income Country
NGO	Non Government Organization
ODA	Official Development Assistance
PPP	Public-Private Partnership
PRSP	Poverty Reduction Strategy Paper
SWAps	Secor Wide Approaches
WB	World Bank

Selected References

ADB /2000 /Annual Report /ADB

ADB /2002 /Impact of Rural Roads on Poverty Reduction: A Case Study-Based Analysis

ASEAN Secretariat /1999
ASEAN Transport Cooperation Framework Plan

DAC /2003 /International Development Statistics /OECD

Danny Leipziger, Marianne Fay, Quentin Wodon and Tito Yepes /2003 /Achieving the Millennium Development Goals, The Role of Infrastructure /World Bank

GRIPS (National Graduate Institute for Policy Studies) /2004/ "From Economic Growth to Poverty Reduction: Role of Large Infrastructure Projects in Vietnamese Pro-Growth Strategy for Poverty Reduction" (in Japanese)

IEA /2004 /Oil Market Report

JBIC/UNFPA/2004/"Development of Methodology to Evaluate Infrastructure Projects in the Health Sector" (in Japanese)

JICA/2004/Urban Transportation Study in Ho Chi Minh City (HOUTRANS)

Marianne Fay and Tito Yepes /2003
Investing in Infrastructure: What is needed from 2000 to 2010? /World Bank

UNDP /2002 /Human Development Report

United Nations /Population Statistics (http://esa.un.org/unpp/)

World Bank /2003 /World Development Indicators

World Bank /2003 /The World Bank Annual Report 2001

World Bank /2004 /Global Poverty Monitoring Database (http://www.worldbank.org/research/povmonitor/)

World Bank /1994, 2003 /World Development Report

Board of Audit/1999/Report of Accounts (in Japanese)

Takamasa Akiyama, Suzanne Akiyama, and Naonobu Minato /2003 / "Development Assistance Strategies and the World Bank: Evolution of 50 Years and the Future" (in Japanese) /Chisen-Shokan

Ministry of Foreign Affairs/Q&R on Japanese Economic Cooperation (in Japanese)

This booklet is the report of The Research on the Experience and Perspective of ODA on Infrastructure Development in the Developing Countries, organized by The Social Development Study Department and The Agriculture, Forestry and Fishery Development Study Department of JICA.

Advisory Committee

ARAKI Mitsuya President, The International Development Journal Co.,Ltd.
OHNO Izumi Professor, GRIPS (National Graduate Institute for Policy Studies) Development Forum Project
TAKAHASHI Satoru (Dr.) Professor, Department of Bioproduction and Environment Engineering Tokyo University of Agriculture
TSUNOKAWA Koji (Dr.) Professor, Department of Civil & Environmental Engineering of Saitama University
YOSHIDA Tsuneaki (Dr.) Professor, Department of Development Cooperation of Takushoku University

Support Agencies

Engineering Consulting Firms Association (ECFA), Japan
Infrastructure Development Institute (IDI), Japan
Japan Transport Cooperation Association (JTCA)
Agricultural Development Consultants Association (ADCA), Japan
Membership companies

World Bank Group, Asian Development Bank, United Nations Development Programme, US Agency for International Development, Japan Bank for International Cooperation

Study Team

OKAZAKI Yuji (Director)
HOSHIYAMA Yoshiyuki
KUROYANAGI Toshiyuki
NAKAMURA Akira
KONYA Kenichi
(the Social Development Study Department, JICA.)
Transportation Working Group
(Group leader: KAKUZEN Yodo)
Urban Development Working Group
(Group leader: UMENAGA Satoshi)
Rural and Agricultural Development Working Group
(Group leader: AIBA Manabu)
(the Social Development Study Department and the Agriculture, Forestry and Fishery Development Study Department, JICA.)
SHOYAMA Takashi
WAKUI Tetsuo
IMAI Haruhiko
NARUKAWA Masanori
SHEIKH Mimi
DESSHO Sachiko
KANEKO Motoko
(ALMEC Corporation)

For a better tomorrow for all.
Japan International Cooperation Agency
Shinjuku Maynds Tower Bldg., 7F,
2-1-1, Yoyogi, Shinjuku-ku, Tokyo 151-8558

2004. 3. 31 1800