



30 years of Japan-Vietnam  
Diplomatic Relation

# Linking Economic Growth and Poverty Reduction

Large-Scale Infrastructure in the Context of Vietnam's CPRGS



**GRIPS Development Forum**  
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**Linking Economic Growth and Poverty Reduction**  
**—Large-Scale Infrastructure in the Context of Vietnam's CPRGS—**

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## Acronyms and Abbreviations

ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
AusAID	Australian Agency for International Development
BOT	Build-Operate-Transfer
CEPIZA	Can Tho Export Processing and Industrial Zones Authority
CG	Consultative Group
CHCs	Commune Health Centers
CPRGS	Comprehensive Poverty Reduction and Growth Strategy
DFID	Department for International Development (United Kingdom)
DHCs	District Health Centers
EIA	Environmental Impact Assessment
EVN	Electricity of Vietnam
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMS	Greater Mekong Subregion
GSO	General Statistics Office
ICARD	Information Center for Agriculture and Rural Development
IDCJ	International Development Center of Japan
IDS	Institute for Development Studies
IEC	Information, Education, and Communication
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
IZ(s)	Industrial Zone (s)
JBIC	Japan Bank for International Cooperation
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JOICFP	Japanese Organization for International Cooperation in Family Planning
MARD	Ministry of Agriculture and Rural Development
MCH/FP	Maternal Child Health and Family Planning
MDGs	Millennium Development Goals
MIGA	Multilateral Investment Guarantee Agency
MOH	Ministry of Health (Vietnam)
MOT	Ministry of Transport (Vietnam)
MPI	Ministry of Planning and Investment (Vietnam)
NGO	Non-governmental organizations
ODA	Official Development Assistance
PIP	Public Investment Program
PMU	Project Management Unit
RH	Reproductive Health
RT	Rural Transport
SIDA	Swedish International Development Cooperation Agency
SOE(s)	State-owned Enterprise(s)
TDSI	Transport Development and Strategy Institute
USBTA	United State Bilateral Trade Agreement
UNDP	United Nations Development Programme
VHLSS	Viet Nam Household Living Standards Surveys
VLSS	Viet Nam Living Standards Surveys
WTO	World Trade Organization

## Preface

This study responds to the initiative by the Government of Vietnam to expand the Comprehensive Poverty Reduction and Growth Strategy (CPRGS) to include the role of large-scale infrastructure in economic growth and poverty reduction. This initiative is based on the agreement at the 2002 Consultative Group (CG) Meeting for Vietnam (held in Hanoi), and the government plans to present a new chapter of CPRGS (on large-scale infrastructure development and poverty reduction) at the 2003 CG Meeting scheduled for December 2-3, 2003, after consulting with various stakeholders concerned.

The study aims at providing an intellectual input to the current effort by the government on the expansion of CPRGS, and is built on the government-donor partnership. While the expansion of CPRGS itself has been conducted under the ownership of the Vietnamese government, several donors (which are actively involved in the country's infrastructure development) have expressed their willingness to assist the government in parallel—particularly in the area of establishing an analytical framework regarding how large-scale infrastructure can contribute to sustainable growth and poverty reduction in Vietnam.

The study was conducted by the GRIPS Development Forum\* under the initiative of the Government of Japan and with the financial support of JBIC, in close coordination with the Government of Vietnam (through the Ministry of Planning and Investment) and the World Bank, the Asian Development Bank (ADB), UK (DFID), and Australia (AusAID).

The study has greatly benefited from collaboration by the concerned partners. The GRIPS study team expresses its deep appreciation to the Government of Vietnam (MPI, MoT, MoH, EVN), provincial authorities, and donors including the World Bank, ADB, Japan (Embassy of Japan, JBIC, JICA), UK (DFID), Australia (AusAID), researchers, consultants (ALMEC) and NGOs (JOICFP) for their valuable advices and research support.

The Concept Paper for this study was distributed at the mid-term CG Meeting in Sapa in June 2003, and its preliminary findings were presented at the workshop on large-scale infrastructure, held in Hanoi in September 2003. (See <http://www.grips.ac.jp/forum-e/> for the main points discussed at the workshop.)

While the views in the document are closely coordinated with the above partners, the final responsibility rests with GRIPS Development Forum.

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\* The GRIPS Development Forum is an independent policy research unit within the National Graduate Institute for Policy Studies (Japan). The study team included: Izumi Ohno (team leader), Yumiko Niiya (researcher) and Asuka Suzuki (research assistant). The study team received support from national consultants, CONCETTI (contracted by JBIC). Kenichi Ohno provided general advice to the team.

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# Chapter 1. Overview and Introduction

## 1-1. Objective

The main objective of this study is to analyze the role of large-scale infrastructure in economic growth and poverty reduction in the context of Vietnam, with special attention to various channels and linkages among infrastructure, growth and poverty reduction. The study focuses on large-scale infrastructure (which benefiting many (or more than one) provinces) in the transport and power sectors, in view of their core function as economic and industrial infrastructure to promote economic growth.

More specifically, the paper is designed to:

- Develop an analytical framework for assessing the role of large-scale infrastructure in the poverty-reducing growth process;
- Clarify various linkages among infrastructure, growth, and poverty reduction in the Vietnamese context, based on case analyses;
- Suggest their implications for the country's future development challenges; and
- Highlight key issues, considered essential for Vietnam's future strategic planning of infrastructure development and donor partnership.

The study does not intend to propose prioritization among individual projects or develop an infrastructure investment strategy. It is understood that these tasks would be handled separately by the Vietnamese Government under its future cycles of strategic planning.

## 1-2. Economic Growth and Poverty Reduction

There is broad consensus that growth is essential to sustained poverty reduction, although it may not be a sufficient condition. At the same time, recognizing that recent discussions on pro-poor growth tend to be narrowly focused on direct poverty-targeting measures, there has been increased awareness of the need to analyze how to generate a dynamic growth process, while ensuring social equity ("inclusive growth") in the country-specific context<sup>1</sup>.

To achieve sustainable growth and poverty reduction, interaction among the following three channels is critically important:

### ***Box1-1: Three Channels of Pro-Poor Growth***

- (1) Direct channel, which impacts the poor directly (such as programs for basic health, sanitation, education, and rural roads);
- (2) Market channel (or “trickle down”), where growth helps the poor via economic linkages (such as inter-sectoral and inter-regional labor migration, increased demand, reinvestment through formal, informal and internal finance); and
- (3) Policy channel, which supplements the market channel and guides the development process toward greater equality (through subsidies, fiscal transfer, public investment, and proper design of trade, investment and financial policies and so on).

<sup>1</sup> For example, the PRSP progress report presented at the 2002 World Bank Annual Meeting [IMF/World Bank 2002] notes the importance of in-depth, country-specific understanding of sources of growth, elements which make growth pro-poor, and concrete policies which make pro-poor growth possible. The PRSP Unit of the World Bank (PRMPR) is currently organizing a series of studies around these topics.

Infrastructure can play a vital role in each of these channels. For example, basic rural infrastructure can address poverty problems through the direct channel. Large-scale infrastructure can contribute to growth and poverty reduction through the policy channel, but also serve as a pre-condition for realizing the market channel and affect the patterns and quality of growth. In fact, there has been increased recognition of the critical role of infrastructure investment for economic growth, as well as its linkages with the provision of social services and the attainment of the Millennium Development Goals (MDGs) [Box 1-2]. Furthermore, greater attention is being paid to the importance of addressing infrastructure needs, particularly in the context of improving the investment climate in respective developing countries and the living conditions of their peoples<sup>2</sup>.

The Vietnamese government is keenly aware of the importance of growth promotion in poverty reduction and recognizes the interaction of the channels noted above. The CPRGS has set an economic target of 7.5% of annual growth for 2001-2005 and proposes priority policies and resource requirements to achieve this goal (policy channel). At the same time, the CPRGS and the Public Investment Program (PIP) include the national targeted program for poverty reduction, and the government plans to double its funding, compared to the 1996-2000 period (direct channel) [SRV 2002a, SRV 2002b].

***Box1-2 : Infrastructure and MDGs***

**Statement by Mr. Shengman Zhang, Managing Director of the World Bank**

I know of no country that has achieved continuous development without a corresponding development of infrastructure. It would be like trying to drive a car without gas. It is hard to imagine poor people being able to link up with technology and markets if they do not have access to modern energy sources such as electricity. Another link is more indirect, but just as important, particularly from the perspective of the Millennium Development Goals: access to clean water and sanitation services contributes to reduction in child mortality. In addition, reliable transport services tend to facilitate access to schools and increase enrollment.

Thus, infrastructure development, economic growth, and poverty reduction are all connected, although causes and effects may vary. Looked at another way, to the extent that the Millennium Development Goals are ultimately about improving human welfare, we must pay attention to both social development issues and infrastructure investment needs. The two mutually reinforce each other.

(Quoted from “The Bank should Invigorate Infrastructure Lending: Interview with World Bank Managing Director Shengman Zhang” in the World Bank Newsletter, *Transition*.)

Source: World Bank [2003a], *Transition* (The Newsletter About Reforming Economies), Volume 14, No. 1-3, pp.1-3, <http://www.worldbank.org/transitionnewsletter>.

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<sup>2</sup> These points were emphasized at the 2003 Spring Meeting of the World Bank/IMF Development Committee (held in Washington D.C., April 2003). More recently, the Executive Board of the World Bank approved a new infrastructure action plan in July 2003. In the OECD, DAC Network on Poverty Reduction (POVNET) also plans to include infrastructure in the 2003-05 work program.

### 1-3. Analytical Framework for Assessing the Role of Large-Scale Infrastructure

It has long been recognized that infrastructure contributes to economic development by increasing productivity of firms and individuals and by enhancing the quality of life. In particular, large-scale infrastructure generates significant structural changes in national and regional economy.

Compared with small-scale infrastructure whose beneficiaries are clustered narrowly around the project site, the impact of large-scale infrastructure is much broader and more complex. It takes time to emerge fully and depends on supporting policies and the supply of other infrastructure. A comprehensive view is required to study its effect on income and employment generation. Moreover, large-scale infrastructure involves large expenditure flows. Additionally, the mode of its utilization and management affects the efficiency and the effectiveness of the infrastructure services.

Economically, large-scale infrastructure is part of investment. As such, investment has two different impacts on the economy, one through the *supply-side effect* of increasing the capital stock and the other through the *demand-side effect* of providing additional effective demand. Due to the special properties arising from its nature as "public goods," the supply-side effect of large-scale infrastructure investment should be construed as contributing to general productivity enhancement. For example, transport and energy infrastructures are intermediate inputs for firm production, and they raise the productivity of other factors. With respect to social service delivery, they contribute to improving the productivity of health workers and equipment. Consumption of infrastructure services also enhances the welfare of poor people. Furthermore, large-scale infrastructure contributes to economic growth that may provide private and public resources to reduce poverty.

Largely due to the multiplicity of linkage effects, a methodology for quantitative analysis of its poverty impacts is yet to be established. Thus, this study relies primarily on qualitative analysis.

#### *Linkage Effects of Large-Scale Infrastructure*

To analyze the linkage effects of large-scale infrastructure, it is important to recognize the *first round impacts* and the *broader and more general impacts* (realized through fiscal and private spending channels) on poverty reduction [see Figures 2-1 ~ 2-4 in Chapter 2].

In the first round, there are two initial impacts of development of large-scale infrastructure that could lead to poverty reduction through economic growth. These are the supply-side and the demand-side effects.

- (1) *On the supply side*, improved infrastructure services in terms of costs, availability, and reliability could create, at least, two types of linkage effects:
  - *Investment-inducement effect*: This is a channel through which new investment is generated by enhanced business climate. Attraction of FDI and domestic investment could promote industrial growth, and generate jobs and income at the newly invested firms and in related industries/services (through increased procurement of local inputs and services).
  - *Regional economy activation effect*: This is a channel through which new economic opportunities are opened up, and productivity of the existing economic activities is enhanced (even without additional investment). For example, better access to markets and information could generate jobs and income in rural households through improved agricultural productivity, diversification of agricultural products, and promotion of off-farm industry in rural areas, etc.
- (2) *On the demand side*, it is possible to expect the effective demand effect of infrastructure construction. This is a channel through which jobs and income are generated by implementing the project itself. For example, effective demand from construction work could generate jobs and income during the construction period — directly and indirectly (through the procurement of local inputs and services).

(3) *In the social dimension*, better infrastructure services (particularly, the availability of transport and power supply) could increase access to basic social/public services and thus improve the living conditions of the poor.

Moreover, the impact of large-scale infrastructure should be understood in a broader and more general context. In the subsequent rounds, *fiscal revenue and multiplier effects* can be created. Increased fiscal revenues (through growth) could generate additional budget for pro-poor targeted programs that improve the living conditions of the poor. Private spending could also generate multiple-round impacts. This virtuous circle makes poverty reduction sustainable. (However, it should be noted that the extent and feasibility of creating such a virtuous circle depend on the government's commitment and capacity to effectively implement pro-poor programs, as well as country-specific initial conditions.)

#### **1-4. Linkages among Infrastructure, Growth and Poverty Reduction**

##### ***Specific Features of Vietnam***

Vietnam's experiences in the early 1990s confirm that robust growth had raised government revenue, with the result that by the mid-1990s public expenditure on infrastructure, education, and health had risen sharply. Furthermore, because per capita GDP had increased substantially, real per capita government expenditure also increased (e.g., nearly twice as high in 1994 as in 1989). Greater fiscal revenue, together with increased aid flows, has enabled the government to intensify its efforts in growth promotion and poverty reduction, especially since the mid-1990s.

As the results of the latest VHLSS 2002 show, Vietnam continues to make progress in improving the living standards of the population. Between 1998 and 2002, poverty has further declined in both rural and urban areas. The percentage of population living below the poverty line decreased from 37% (in 1998) to 29% (in 2002). In all regions, household incomes of the poorest quintile increased, compared to those of 1999. Three regions—North East, South Central Coast, and Mekong Delta — have experienced a large reduction of poverty incidence. Despite such progress, poverty remains a largely rural phenomenon in Vietnam. Furthermore, the rate of reduction in rural poverty is slower than that of urban poverty, and urban-rural inequality tends to increase.

The existing studies suggest that despite several weaknesses, Vietnam has an extensive safety net by poor country standards. Public social expenditures are more equally distributed than household expenditures, playing an important re-distributive role. Other studies indicate that in Vietnam the poor and the rich are not static groups. A high proportion of the population is clustered around the poverty line. While this implies their vulnerability to shocks, it also means that even small increases in mean per capita expenditure will be quite effective in moving a large number of households over the poverty line. This suggests the effectiveness of creating income "opportunity," including "trickle-down" effects through backward and forward linkages.

##### ***Findings of Case Analyses***

Case studies of selected large-scale infrastructure projects—particularly national highways and power generation and transmission constructed in the 1990s—confirm their important role in recent poverty-reducing growth in Vietnam. On the basis of the case analyses, it is fair to say that such trunk infrastructure has helped: (i) the creation of sources of growth; and (ii) the spreading of linkages between growth centers and their surrounding rural areas, particularly through the investment-inducement effect and rural-economy activation effect. A large number of the Vietnamese population has participated in and benefited from such processes. Thus, large-scale infrastructure (trunk roads and major power production) provides the foundations on which economic growth for the formal, non-farm economy is built.

**Box1-3 : Selected Large-Scale Infrastructure Projects for Case Studies**

- (1) Improvement of National Highway No.5 and the expansion of Hai Phong Port (funded by Japan/JBIC and Taiwan, completed in 2000);
- (2) Construction of the My Thuan Bridge (funded by Australia/AusAID, completed in 2000) and the improvement of National Highway No.1 (co-financed by the World Bank, the ADB, and Japan/JBIC), with particular focus on the southern Ho Chi Minh City-Can Tho section (completed in 1999); and,
- (3) Development of overall power supply capacity and regional electrification, including the construction of the North-South 500kv transmission line (financed by the Vietnamese government, completed in 1994).

Cases for this paper's analysis are selected from the large-scale infrastructure projects in the transport and power sectors, which were recently completed and are under operation:

In addition, three complementary analyses are conducted, in order to obtain diverse perspectives of linkages among infrastructure, growth and poverty reduction, including:

- (4) Accessibility and road network, in light of "economic distance" and "connectivity" to markets (based on the UK/DFID experience of rural road projects in Hung Yen and Lai Chau provinces);
- (5) Accessibility and road network, in light of access to social service delivery (based on the experience of Japan/JICA-supported reproductive health project in Nghe An province); and
- (6) Effective demand of highway construction (based on Japan/JBIC-funded National Highway No.18).

The main findings of the case analyses are as follows.

**(1) Hanoi-Hai Phong northern transport corridor—linking two centers, attracting investment and diffusing growth to rural areas.**

In the north, the improvement of National Highway No.5 (NH5) and the expansion of the Hai Phong Port, together with other infrastructure, has strengthened the Hanoi-Hai Phong transport corridor. Travel time between the two centers—Hanoi and Hai Phong—was cut by half (from 3.5-4 hours to 1.5-2 hours), and the traffic volume on NH5 doubled during 1999-2003. The volume of container cargo handled at the Hai Phong Port increased by 50% during the period 2001-2002. The corridor has reinforced the link between two growth centers and in particular, has enhanced the access of Hanoi (largest city in the north) to global markets by improving land and sea transport. After 2000, FDI to major industrial zones (i.e., Thang Long, Noi Bai, Sai Dong B, Nomura-Haiphong Industrial Zones) increased significantly, and is now becoming a driving force of industrial output in the north. As of mid-2003, the four IZs accounted for about 85% of the entire FDI to northern IZs, both in terms of the number of projects and registered capital. Two-thirds of these investments came in or after 2000. A recent firm survey also suggests that nearly 90% of new FDI to the north would not have been realized without the improvement of the two transport facilities.

Moreover, this growth has spread to neighboring areas (particularly Hung Yen and Hai Duong), and the rural economy has experienced major structural transformation. Domestic investment to these areas has increased, and rural households have diversified their agricultural production. In this connection, it is important to recognize the link between feeder roads and trunk roads in enhancing the activation of the rural economy. The transport corridor has spurred tourism in Ha Long Bay by pushing up demand for tourism (e.g., day trips) and facilitating business. The number of tourists (both Vietnamese and foreign) quadrupled from 1995 to 2002, with a sharp increase from 2000. During 1995-2001, tourism turnover increased by more than five times (with a 45% increase from 2000 to 2001 alone).

All these effects contributed to the creation of new employment and income for workers at factories and hotels (direct jobs), and for the transport industry and services (indirect jobs). Industrial FDI has created a large number of direct jobs. As of mid-2003, FDI firms at the four major IZs employed a total

of 14,000 workers. Workers receive higher salaries than before, an important income source for their households. Increased cargo volume at Hai Phong Port has stimulated demand for transport industry and services, and truck drivers in Hai Phong city receive higher incomes and heavier workloads. Rural households now enjoy higher disposable income, and their purchasing power appears to have increased. The existing data also indicate that from 1995 to 2000, most of the provinces along the Hanoi-Hai Phong corridor achieved faster growth in per capita income and reduction in the number of poor households, compared to the average for the Red River Delta or the whole country. Nevertheless, FDI contribution to the total industrial labor force remains small relative to its contribution to industrial output. This is partly because most FDI firms are in the early stages of operations, and greater impacts can be expected in the future. (Also, the figure may partly reflect redundant labor at inefficient firms, especially large SOEs.) At the same time, developing supporting industries is a major challenge for Vietnam's industrialization.

**(2) My Thuan Bridge and National Highway No.1—linking two centers, opening up and activating the Mekong Delta economy.**

In the Mekong Delta, the construction of the My Thuan Bridge and the improvement of National Highway No.1 (NH1) have greatly changed the nature and volume of the economic linkage between Ho Chi Minh City (the largest city in Vietnam) and Can Tho (the commercial center of the entire Mekong Delta). After the opening of the My Thuan Bridge in 2000, travel time between the two centers was reduced from 4.5-5 hours to 3.5 hours (with the time for crossing the Tien River being cut from 32 to 5-6 minutes, and further time reduction thanks to road improvement). Freight and passenger movement has significantly increased, as shown by the doubling of traffic volume at the My Thuan Bridge between 1999-2001. Can Tho is the fastest growing province in the Mekong Delta, and its industrial growth has accelerated, particularly from 2000. Can Tho province currently has three industrial zones (Tra Noc I and II, and Hung Phu Industrial Zones). Altogether they boast about 80 firms (including about 20 FDI firms), employing 13,000 workers. Easier transport has also promoted tourism development in Can Tho, particularly since 2000.

Moreover, the available data suggest broader impacts brought about by the improved land transport, namely, strengthened function of NH1 as the main artery linking HCMC and the Delta cities, and spreading of benefits to the provinces beyond NH1 (e.g., An Giang) and to the area where improvement has not yet taken place (e.g., south to Can Tho). It is expected that the proposed Can Tho bridge will further stimulate economic dynamism in the Mekong Delta. As the Can Tho economy is activated, its effect will be felt throughout the Mekong Delta region, in both the provinces through which NH1 passes and in those through which it does not.

The pattern and nature of investment attraction in Can Tho is distinct from that observed in the northern transport corridor. In Can Tho, industrialization is natural resources-based, linked with the local economy (e.g., agriculture and fishery production). There are many Vietnamese enterprises engaged in food processing manufacturing in industrial zones. In fact, provinces in the Mekong Delta appear to be growing by taking advantage of their respective resource potentials. As the latest VHLSS 2002 shows, the Mekong Delta has achieved major poverty reduction and growth in per capita income (particularly agriculture and fishery income) during 1998-2002. Although this cannot be attributed solely to the Bridge and NH1, it is fair to say that the two large-scale infrastructures projects have, at least, accelerated poverty-reducing growth in this region.

**(3) North-South 500kv Transmission Line—achieving system stability, sustaining high economic growth and improving living standards in the 2nd half of the 1990s.**

The North-South 500kv Transmission Line was completed in 1994. By transferring low-cost, surplus electricity generated by the Hoa Binh hydropower plant, it has contributed to mitigating power shortages in the central region and the fast-growing south (which often had to rely on costly diesel-fired generation). After its operation began in 1994, the demand for electricity in the south and central region jumped about 20%. For example, when the Vietnamese economy recorded dynamic growth in 1996-97

at 8.8% in real terms (particularly with the south growing at 9.2%), the electricity transferred from the north supported about 20% of the electricity demand for the south and about three-fourth of that for the central region (to satisfy the demand of industrial, residential, and service or other sectors). The transfer of electricity from the north to the south continued until 1999-2000 when large-scale exploitation of natural gas potential began in the south, and when the capacity of thermal power plants such as Phu My and Ba Ria expanded in the late 1990s, utilizing offshore natural gas.

Particularly in the south, electricity transfer through the 500kv Transmission Line and the subsequent increase in the power generation capacity of the region allowed rapid expansion of the electricity network. Thanks to this network expansion, power supply conditions have significantly improved, bringing substantial benefits to firm production and rural electrification. In fact, firms in HCMC and its vicinity report major improvements in power conditions, including the achievement of substantial elimination of blackouts (since 2000) and more stable and cheaper supply of electricity to firms. The latest VHLSS 2002 data also confirm important progress in rural electrification in the south. During 1998-2002, among the lowest income group, the ratio of households using electricity increased from 54% to 72%.

At present, the 500kv Transmission Line provides system stability and shifts electricity between regions at peak times. Future investments should take account of cost factors (for transferring bulk power between regions) and be made in the overall plan so that generation capacity in the north and the south could roughly balance and satisfy the projected demand in each region.

In addition, the following analyses offer complementary perspectives on the linkage effects.

**(4) Improving "connectivity" to markets—road network and accessibility in rural areas.**

A comparative analysis of Hung Yen and Lai Chau provinces confirms the usefulness of different levels of roads and their vital importance (as a road network) in connecting commune residents to markets, information, education and health services, and improving local livelihoods. Generally, local people attach high value to commune roads because they provide key links to opportunities—through their connection to national, provincial, and district roads. At the same time, the analysis reveals inter- and intra-provincial variations in income and resource-mobilization ability. "Economic distance" and "connectivity" to markets and services are key determinants for such variations, along with the availability of productive assets.

Road development has had critical impacts in Hung Yen, in terms of both social and economic benefits. Situated close to Hanoi and NH5 to Hai Phong Port, the rural population of Hung Yen has benefited substantially from the growth of the region. Lai Chau has also benefited from improved road network, but the province is less able to take full advantage of the opportunities that improved road access can bring. This is partly because Lai Chau is located in the remote Northwest of Vietnam and still lacks basic infrastructure services and access to markets. Furthermore, Hung Yen has greater ability to mobilize resources for infrastructure development (e.g., from commune budgets and the people's contributions) than Lai Chau which primarily depends on the central government budget for rural transport investment. Benefits are not equitably distributed within communes either, with the better-off households more likely to capture the opportunities to increase their income. All these remind that there are certain disadvantaged groups (or the "chronic" poor) which are less likely to participate in the recent broad-based growth.

**(5) Improving user access to social services—through the strengthened function of road network.**

Trunk roads constitute an indispensable part of the road network, together with rural roads improving user access to social services. There are several factors that critically determine user access to social services. These include ensuring physical access, improving the quality of social service delivery, and providing education for users (changing people's awareness of social service needs), etc. In particular, the latter two require the effective implementation of national and/or regional programs based on

community participation. The role of the road network—particularly the contribution of large-scale infrastructure—in improving social service delivery should be understood within this broad context.

The experience of the Reproductive Health Project (ongoing) in Nghe An province suggests the complementary nature of different levels of roads to improve the provision of (or access to) information and services, from the viewpoint of both service providers and users. Trunk roads and inter-commune roads (connecting district capitals and commune centers) facilitate communication and knowledge sharing among health workers, project staff and stakeholders, and thus are indispensable for service providers and project staff engaging in regional (or even national) health care programs. Inter-commune roads and inter-hamlet roads are essential to providing core services to commune residents, services such as basic health care (e.g., contraceptive methods, pre-natal check-ups, delivery attendance at community health centers) and access to information, for example, through IEC (Information, Education and Communication) seminars and consultation with health workers.

**(6) Creating effective demand for highway construction—off-farm job and income opportunities.**

In the construction of highways, a number of simple works can be carried out economically by locally-recruited manual labor (e.g., route clearance, earth digging and piling, manual transporting of materials, making road tallies, planting and maintaining grass). The employment of local farmers for such unskilled works contributes to job and income generation in the surrounding rural areas, particularly during off-farm seasons.

The ongoing improvement of NH18 covers approximately 129km between the Noi Bai International Airport (in Soc Son district, Hanoi city) and Cua Ong town (Quang Ninh province), including the construction of the Pha Lai Bridge. The construction works commenced in October 1999 and have been largely completed, with exception of the Noi Bai-Bac Ninh section. According to estimates by the Project Management Unit, the works have so far involved 3,650 unskilled workers (31 days per assignment), in addition to 2,934 skilled workers (normally, fixed-term assignment for the average period of 667 days). Most of the unskilled workers have been engaged in the NH18 works for 24 months or longer, implying that many work repeatedly. A recent interview survey with unskilled workers at the construction site (Noi Bai-Bac Ninh section) also confirms that: (i) off-farm activities are an important source of their family incomes (on average, accounting for 68% of annual cash incomes of their households); (ii) income from the NH18 construction works occupies significant part of their family incomes; and (iii) thanks to the beginning of NH18 construction, off-farm job and income opportunities have greatly increased. These rural households use the resulting additional income for routine expenses, education, family savings, etc.

***Cross-cutting Issues***

In most cases, the initial impacts of large-scale infrastructure are not necessarily on the poorest segments of the population (except for social service delivery in (5) above). Many of those employed at FDI factories and hotels are graduates of upper secondary schools or higher. But, given the fact that the majority of the Vietnamese population is clustered around the poverty line, it is important to increase wages and disposable income because this would reduce their vulnerability to risks and raise their purchasing power. This, in turn, would stimulate consumption demand for a variety of goods, including those produced by the poor (through the multiplier effect), and create new markets for agricultural products, industrial products, and services. In fact, the case analyses suggest that such a "virtuous cycle" of broad-based growth is emerging in the provinces along the northern transport corridor and in the Mekong Delta region.

The analyses of the regional economy activation effect also confirm a vital role of trunk infrastructure in promoting income diversification and off-farm employment. Infrastructure network (both large and small, trunk and rural) is a key determinant for "economic distance" and "connectivity" to markets and serves as a pre-condition for realizing poverty-reducing growth in rural areas. This is so particularly in the context of Vietnam, where the majority of the population belongs to the "transient" poor (people



below and just above the poverty line) and the creation of income "opportunities" through "trickle-down" effects appears to be effective.

Moreover, it is important to connect remote areas with power grids, and trunk roads with feeder roads to achieve poverty-reducing growth. Greater attention should be given to the synergy of networking between large and small, trunk and rural infrastructure. To maximize the gains of each level of infrastructure requires a planned approach that adequately invests in both areas and ensures "connectivity." One way of seeking balanced investment decisions (between growth and poverty reduction) might be to incorporate a "network" perspective into investment planning and prioritization.

But, the physical improvement of infrastructure alone is not enough. Case studies suggest the importance of complementary policies and measures to realize and spread the benefits of large-scale infrastructure, such as the enabling investment climate, agricultural policies to promote diversification and research and extension, and deregulation of transport and distribution services.

Case studies have also found potentially negative externalities associated with large-scale infrastructure. In particular, road safety is becoming an emerging social problem. Improved infrastructure, rapid motorization, and increasing traffic densities (largely motorcycle user) are all contributing to a high level of road-related fatalities. Regarding resettlement, experience shows that if properly handled, affected families (e.g., by relocation) could sufficiently enjoy the benefits of development of large-scale infrastructure. But, the implementation of resettlement and land acquisition has turned out to be often time-consuming, affecting the progress of construction work. Since the poor are more likely to be vulnerable to adverse consequences, it is important to strengthen capacity of government agencies responsible for social and environmental monitoring so that proper safeguards can be taken throughout the planning, construction, and operation of projects.

## 1-5. Future Role of Large-Scale Infrastructure and Aid Partnership in Vietnam

### *Vietnam's Development Challenges and the Role of Infrastructure*

As Vietnam continues to make progress in poverty-reducing growth, it must fine-tune its development strategy to respond to new challenges. Infrastructure should be treated as an integral part of overall development strategy and attention should be paid to its complementarity with other policies. The government must play a leading role in articulating a development vision and clarifying the role of large-scale infrastructure in it.

The future role of large-scale infrastructure must be considered in light of the following development challenges.

- (1) Enhancing competitiveness in the globalized economy
- (2) Promoting rural development, particularly by creating off-farm employment
- (3) Strengthening the effectiveness of poverty-targeted measures.

To fully exploit its potential for labor-intensive export manufacturing, efforts must be geared to raising productivity and international competitiveness. This is so particularly as Vietnam's international integration is proceeding very rapidly (with USBTA, AFTA and WTO accession). As the existing surveys show, despite major improvements, investors perceive Vietnam's infrastructure conditions, both physical and qualitative, to be insufficient compared to those of its East Asian neighbors. Since efficient infrastructure is a key element of trade logistics and facilitation, continued progress in this area is indispensable. At the same time, there are other investment bottlenecks such as difficulty in procuring local parts, problems with business practices and inconsistent FDI policies. Thus, it is necessary to take an integral approach to improve the investment climate and treat infrastructure as part of a national strategy to strengthen industrial competitiveness.

Moreover, to sustain gains in poverty reduction, Vietnam needs to make greater efforts in stimulating off-farm employment and urban employment growth, creating "economic opportunities" for the majority of the population. Here, rural infrastructure (e.g., roads, irrigation, electricity) can make direct contributions to improving the productivity of rural households, and large-scale infrastructure (such as trunk roads) can complement this by helping provide linkage to markets. Nevertheless, this should not mask the fact that there exist certain groups (or the "chronic" poor) severely constrained from participating in new economic opportunities. To ensure wider benefits and broad-based growth, it is important for the government and other agencies to design the effective poverty-targeting programs.

The three channels for pro-poor growth will be of differing importance to the "chronic" poor in the remote areas and the "transient" poor in the better-off areas<sup>3</sup>. The "chronic" poor are unlikely to benefit from economic growth directly. Consequently direct interventions aimed at improving local economic opportunities (transfer of agricultural technology, rural roads, etc.) are the most appropriate to help achieve equitable growth. In addition, social safety net or "policy" channel interventions should also be adopted (e.g., subsidies, fiscal transfer, etc.) to redistribute the gains from growth in the wider economy to poorer areas so that basic services are securely provided.

In the better-off areas (where there are large numbers of the "transient" poor), interventions that enable poor households to improve their economic linkages with domestic and external markets and support for non-farm diversification are most relevant. Put another way, to enable a "trickle down" to take effect, the formal economy needs to be made accessible to the poor. This is the most likely route for bringing the most benefit to the large segment of the population who have already benefited from Vietnam's growth but now need to be assisted to make the next step from farm to non-farm, and informal to formal employment.

### ***Key Issues for Future Strategic Planning***

As this paper shows, the links and channels through which large-scale infrastructure promotes economic growth and poverty reduction has been clearly established. The perceived dichotomy between growth and poverty should be avoided because infrastructure provides a platform for both. The government needs to articulate a shared vision for the role of infrastructure, under an overall development strategy.

In this sense, it is important to strengthen the link between large-scale infrastructure investments and future strategic planning, so that development toward shared and equitable growth, environmental sustainability and macroeconomic stability will be realized. In doing so, it is necessary to ensure the provision of efficient and effective infrastructure services — through investment planning, regulation, financing, etc. On the basis of Vietnam's past experience, three issues merit special attention.

- (1) Complementarities among infrastructure, social investment and institutions: Human capital is essential to ensure the development effectiveness of infrastructure investment (affecting the productivity of labor and firms). It is also necessary to address the potentially negative environmental and social aspects of infrastructure projects by taking proper safeguard measures throughout planning, construction, and operation of projects. Moreover, there exist institutional complementarities. There is a need to pay attention to not only physical, but also the service and management aspects (such as pricing, competition, and accessibility by the poor) of infrastructure development — because the latter affects the efficiency of infrastructure services and the distribution of benefits of improved infrastructure to the society (including the poor). Institutional reforms must be implemented in parallel.

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<sup>3</sup> The broad categorization of the chronic and transient poor is by no means definitive. There are varying levels of types and periodicities of poverty defined by a number of factors, such as access to opportunities and vulnerability.

- (2) Spatial dimension of infrastructure development: To ensure rapid but equitable economic growth, there is a need for continued efforts in developing and deepening linkages between growth centers and adjoining rural areas, so that benefits of growth are widely spread. Consequently, it is essential to ensure that the areas in which there is a concentration of poor people located near the "growth centers" are well connected to these markets and non-farm opportunities, if the "economic growth and trickle down" channel is to be effective for the "transient" poor. This implies the importance of incorporating the spatial dimension into development vision in a pro-active manner. It also requires strategic planning and better coordination of infrastructure investments at the national, sub-national, and regional levels, under the broadly shared vision.

At the same time, in view of inter- and intra-provincial variations in the poverty situation, there is a need to: (i) address the poorer provinces funding shortfalls; and (ii) carefully design projects and programs so that the interventions can benefit the "chronic" poor living in the poorest remote areas, in an inclusive manner. Such variations also suggest a need for taking different approaches to rural road development between the areas where the "transient" poor live and where the "chronic" poor are concentrated.

- (3) Policies and measures to maximize the effectiveness of infrastructure investments. In light of their significant fiscal implications, it is important to give due attention to the issues specific to sector policies and project management—particularly, selection criteria, financing, maintenance, and the regulatory framework for infrastructure investments and operations. This is essential to ensure the sustainability of investments in large-scale infrastructure. Continued capacity building efforts are necessary to promote the following measures:
- Measures to ensure appropriate resource allocation (e.g., selection and allocation procedures, recurrent financing);
  - Measures to make inputs into large-scale infrastructure effective (e.g., mobilization of diverse resources, sector policies, the network effect, operations and maintenance); and
  - Measures to mitigate its possible negative impacts (e.g., addressing environmental and social impacts).

In particular, it is vital to establish proper project selection criteria, so that infrastructure investment can be prioritized and planned consistently with the development vision. This point is crucial because future investment decisions on infrastructure will become more difficult, as the marginal returns to investment tend to diminish with the progress in trunk infrastructure development. Such selection criteria should take account of two aspects: (i) the infrastructure "network," i.e., how to maximize synergy effects of different levels of infrastructure; and (ii) a proper balance of economic vs. social and poverty concerns. Ideally, a system should be developed, where the proposed projects would be ranked based on the most relevant criteria and priority be given to the best-ranked investments under the budget constraints. This is far from easy task. Concerted efforts are needed to identify such criteria and establish a practical mechanism for incorporating them in the PIP process.

It is also important to pay attention to measures to promote foreign investment and mobilize private financing for infrastructure development. At the same time, in the areas where the private sector is unlikely to participate but which have significant implications for social and economic development, public funds and ODA may be utilized.

### ***Toward Enhanced Government-Donor Partnership***

Vietnam is a country where government-donor partnership (including NGOs) is active. There are many areas where the government-donor partnership can be fruitful to achieve effective and sustainable investments in large-scale infrastructure. This is so especially because complementary measures are needed to enhance the impacts of large-scale infrastructure—for example, by developing rural roads, investing in human capitals, enhancing the investment climate, and building capacity in areas of project

planning and selection, maintenance and operations, and institutional and sector policies. In addition, there are certain groups which are severely constrained from participating in the growth process. For those groups, targeted interventions are necessary, and it is important to support such poverty-targeted programs.

In this regard, aid partnership will be useful in supporting the government's efforts, with each partner playing a complementary role based on its strength(s). In doing so, it is essential that the diversity of aid modalities be recognized according to the nature and the size of specific activities. For example, in the case of investments in large-scale infrastructure, project-based management appears to be generally appropriate because these projects involve large financial resources and require careful monitoring from engineering, social, and environmental aspects. The situations can be different for targeted interventions, which are relatively small in size and can be more effectively managed on the basis of programs. The "best mix" of aid modalities should be sought—consistent with the nature and the size of interventions—under a shared development vision and strategies for promoting growth and poverty reduction.

## Chapter 2. Analytical Framework for Assessing the Role of Large-Scale Infrastructure

This chapter explains the approach and analytical framework adopted in this study in order to assess the role of large-scale infrastructure in achieving sustainable growth and poverty reduction. Due consideration is given to the interaction among the three channels noted in Chapter 1. It is also designed to provide a basis for the subsequent case analyses.

### 2-1. The Approach

The study focuses on large-scale infrastructure (benefiting more than one province) in the transport and power sectors, in view of their core function as economic and industrial infrastructure to promote economic growth. This type of infrastructure primarily corresponds to the group "A" projects classified in the PIP. Moreover, the transport and power sectors account for the largest share of public investment and donor assistance in Vietnam.

Economically, large-scale infrastructure is a part of investment. As such, investment has two different impacts on the economy, one through the *supply-side effect* of increasing the capital stock and the other through the *demand-side effect* of providing additional effective demand. However, as distinct from machine and equipment, investment in large-scale infrastructure exhibits the following properties arising from its nature as "public goods."

- Low excludability or congestion in use (up to some limits)
- A high degree of indivisibility
- Large initial investment
- Complex and indirect effects on production (less direct than private capital)
- Often built by public investment and ODA, especially in low-income countries

Let the production function be:

$$(1) Y = A \cdot F(L, K) + u$$

where Y, L, K are output, labor and capital, A is efficiency and u is a random shock. Due to the special properties noted above, large-scale infrastructure investment should be construed as contributing to the upward shift in A rather than a regular accumulation of K.

On the demand side, let the national income-expenditure equality be:

$$(2) Y = C_p + C_g + I_p + I_g + (X - M)$$

where  $C_p$ ,  $C_g$  are private and government consumption,  $I_p$  and  $I_g$  are private and government investment, and X and M are exports and imports. Construction of large-scale infrastructure belongs to  $I_p$  or  $I_g$ , depending on the source of funding. As  $I_p$  or  $I_g$  is increased as an autonomous spending, it will trigger the usual Keynesian multiplier effect.

Furthermore, large-scale infrastructure has a more direct effect on the provision of health and education services. If equation (1) above is re-interpreted as the production function of such services, better infrastructure will improve the productivity of available medical staff or equipment by expanding the production possibility frontier (i.e., raising A).

Transport and energy, like other infrastructure services, are intermediate inputs. This is particularly the case for investments in large-scale infrastructure. They make possible other activities that increase productivity and enhance the welfare of poor people, and they contribute to economic growth that may provide private and public resources to reduce poverty. Other political, socioeconomic, and cultural

***Box 2-1: A Review of Infrastructure's Impact on Economic Development***

Kessides (1996) defines infrastructure as: "the long-lived engineered structures, equipment and facilities, and the services they provide, that are used both in economic production and by households." He summarizes economic benefits from infrastructure in the context of developing countries as follows:

*Infrastructure contributes to economic development both by increasing productivity and by providing amenities that enhance the quality of life.* The services generated by infrastructure investment lead to growth in the production of *firms* in two ways:

- (i) infrastructure services are *intermediate* inputs to production, and any reduction in these input costs raises the profitability of production, permitting higher levels of output, income, and/or employment;
- (ii) infrastructure services *raise the productivity of other factors* (labor and other capital)—for example, by permitting the transition from manual to electrical machinery, reducing workers' commuting time, and improving information flows through electronic data exchange.

Both effects contribute to economic growth by stimulating aggregate supply as well as demand.

The consumption of infrastructure services *by households* contributes to economic welfare because many of these services, notably clean water and sanitation, create environmental amenities, while others (recreational transport, residential telecommunications) are valued items of consumption in their own right. Also, these services provide access to jobs and other consumption opportunities, and promote the health of individuals.

*All of the above contributions of infrastructure to economic growth and the quality of life, which are long recognized in economic theory, derive not from the mere existence or creation of the physical facilities but from their efficient operation and the value that users perceive from the services generated.*

Source: Kessides [1996], "A Review of Infrastructure's Impact on Economic Development" in *Infrastructure and the Complexity of Economic Development*.

factors are likely to be important determinants of the poverty impact of transport and energy investments [ADB 2001a].

The study relies primarily on qualitative analysis. Largely due to the multiplicity of linkage effects, a methodology for quantitative analysis in this area has yet to be established. The existing literature on poverty impacts of infrastructure<sup>4</sup> is confined to: (i) the evaluation of rural infrastructure (where direct linkages can be traced through econometric analysis of household survey data); and (ii) aggregate, macroeconomic models, typically using the Computable General Equilibrium (CGE) model. It is expected that a fuller, quantitative analysis would be conducted in the subsequent stages, if judged necessary.

## **2-2. Analytical Framework**

It is widely acknowledged that investment in infrastructure services can contribute to sustainable growth by<sup>5</sup>:

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<sup>4</sup> The following literature contains comprehensive review of the survey of the existing studies: C. Willoughby, "Infrastructure and Pro-Poor Growth: Implications of Recent Research" revised draft [December 1, 2002]; D. Booth, L. Hanmer, and E. Lovell, Poverty and Transport, ODI [June 2000]; ADB "Assessing the Impact of Transport and Energy Infrastructure on Poverty Reduction," Interim (Stage 1) Report [2001].

<sup>5</sup> Quoted from DFID [2002], *Making Connections: Infrastructure for Poverty Reduction*, p.6 (adapted from Booth et al 2000).

- Reducing transaction costs and facilitating trade flows within and across borders<sup>6</sup>.
- Enabling economic actors—individuals, firms, governments—to respond to new types of demand in different places.
- Lowering the costs of inputs used in the production of almost all goods and services.
- Opening up new opportunities for entrepreneurs, or making existing business more profitable.
- Creating employment, including works (both as social protection and as a counter-cyclical policy in times of recession).
- Enhancing human capital, for example, by improving access to schools and health centers.
- Improving environmental conditions, which link to improved livelihoods, better health and reduced vulnerability of the poor.

On the other hand, there is very little empirical work concerning the impacts of large-scale transport and energy investments in poverty. In this sense, while focusing on rural infrastructure, the recent works by IFPRI [S. Fan, L. Zhang, and X. Zhang 2002] and ADB [I. Ali and E. Pernia 2003, A. Balisacan, E. Pernia, and A. Asra 2002, B. Prakash 2003] shed important light on methodologies and analytical frameworks for capturing the multiplicity and endogenous nature of linkage effects [see Appendices for methodologies for integrating poverty impact assessment in the economic analysis of projects, and an analytical framework for the links between rural poverty and infrastructure]. Building on such preceding works, this study uses the following analytical framework to clarify various linkages through which large-scale infrastructure can/did contribute to sustainable growth and poverty reduction in Vietnam.

To analyze the linkage effects of large-scale infrastructure, it is important to recognize *the first round impacts* and the *broader and more general impacts* (realized through fiscal and private spending channels) on poverty reduction.

In the first round, there are two initial impacts of the development of large-scale infrastructure that could lead to poverty reduction through economic growth. These are the supply-side and the demand-side effects on the economy.

- On the supply side, *improved infrastructure services* in terms of costs, availability and reliability could create at least two types of linkage effects: (i) *investment-inducement effect*; and (ii) *regional economy activation effect*. By promoting market creation and expansion, enhanced services could attract FDI and domestic investment and expand output and productivity of rural/urban economies. These could result in job and income generation—both directly and indirectly<sup>7</sup>.
- On the demand side, it is possible to expect an effective demand effect of infrastructure construction which, by increasing procurement of local inputs and labor force, could promote output expansion of rural/urban economies, thus generating jobs and income<sup>8</sup>.

*In the social dimension*, better infrastructure services (particularly, with the availability of transport and power supply) could increase access to basic social/public services and thus improve the living

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<sup>6</sup> The recent World Bank study on the trade and logistics [Carruthers and Bajpai 2002] also highlights the importance of logistics costs in influencing the location of enterprises—both between countries and between regions within countries.

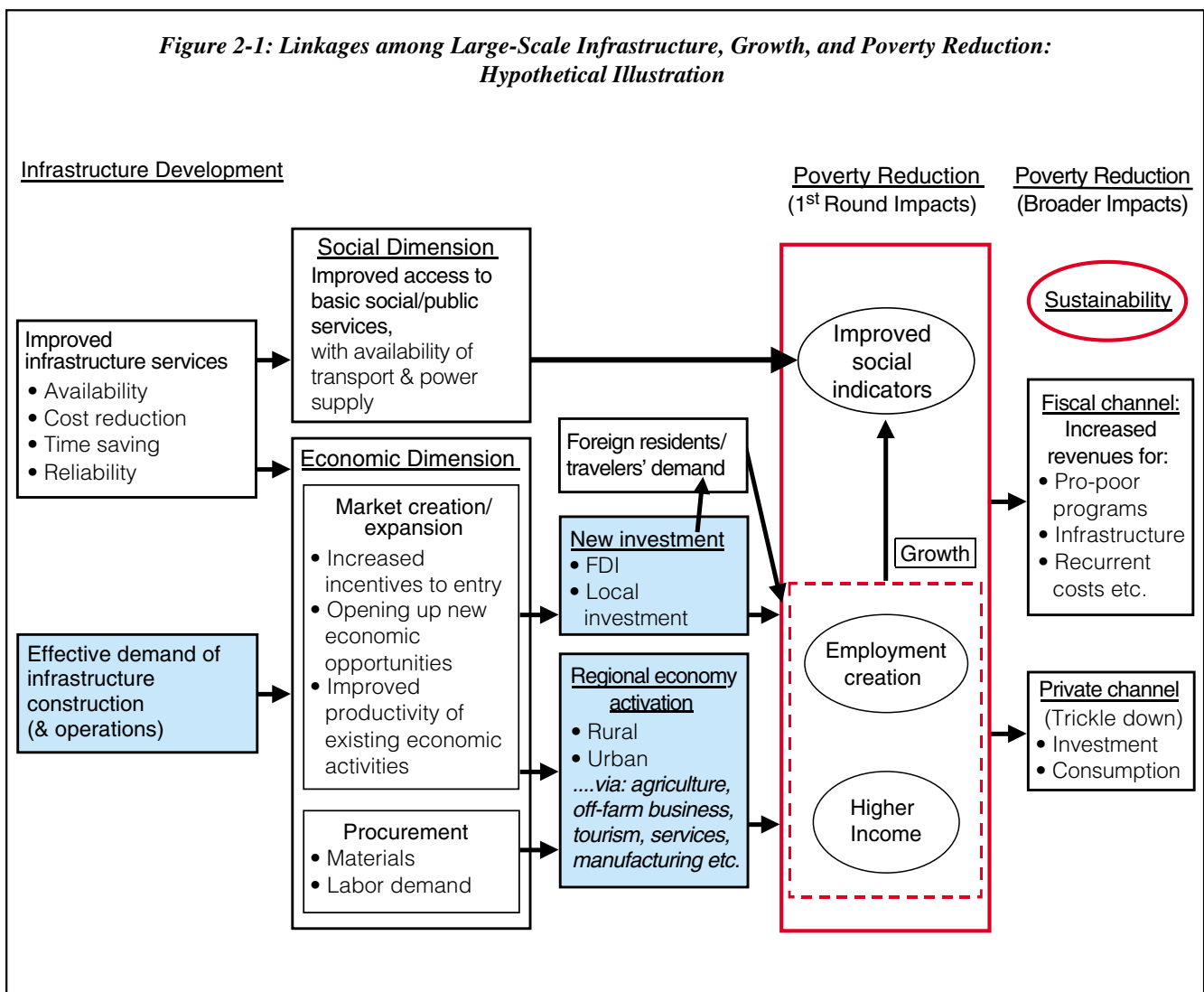
<sup>7</sup> Indirect benefits of national infrastructure to poverty reduction are well recognized in *Making Connections* [DFID 2002]. The report also proposes a 'joined-up' approach to infrastructure services by linking the national level to the local level.

<sup>8</sup> In general, public works on transport infrastructure has been used to reduce poverty through providing employment in recessions or in area of extreme need. Booth et al. [2002] contains examples of direct and indirect impacts of labor-based works (pp.44-45).

conditions of the poor.

Moreover, the impact of large-scale infrastructure should be understood in a broader and more general context. In the subsequent rounds, fiscal revenue and multiplier effects can be created<sup>9</sup>. Increased fiscal revenues (through economic growth as explained in the above (i)-(ii)) could generate additional budget for pro-poor targeted programs that improve the living conditions of the poor. Private spending could also generate multiple-round impacts. This virtuous circle makes poverty reduction sustainable. The extent and feasibility of creating such a virtuous circle depend on the government's commitment and capacity to effectively implement pro-poor programs, as well as country-specific initial conditions (e.g., asset distribution, educational level, social structure).

Figure 2-1 indicates such linkages schematically. Some of these possible linkages are further developed in Figures 2-2 ~ 2-4. In Chapters 3-4, the relevance and the extent of respective linkage effects are examined in the context of Vietnam, through case analyses.



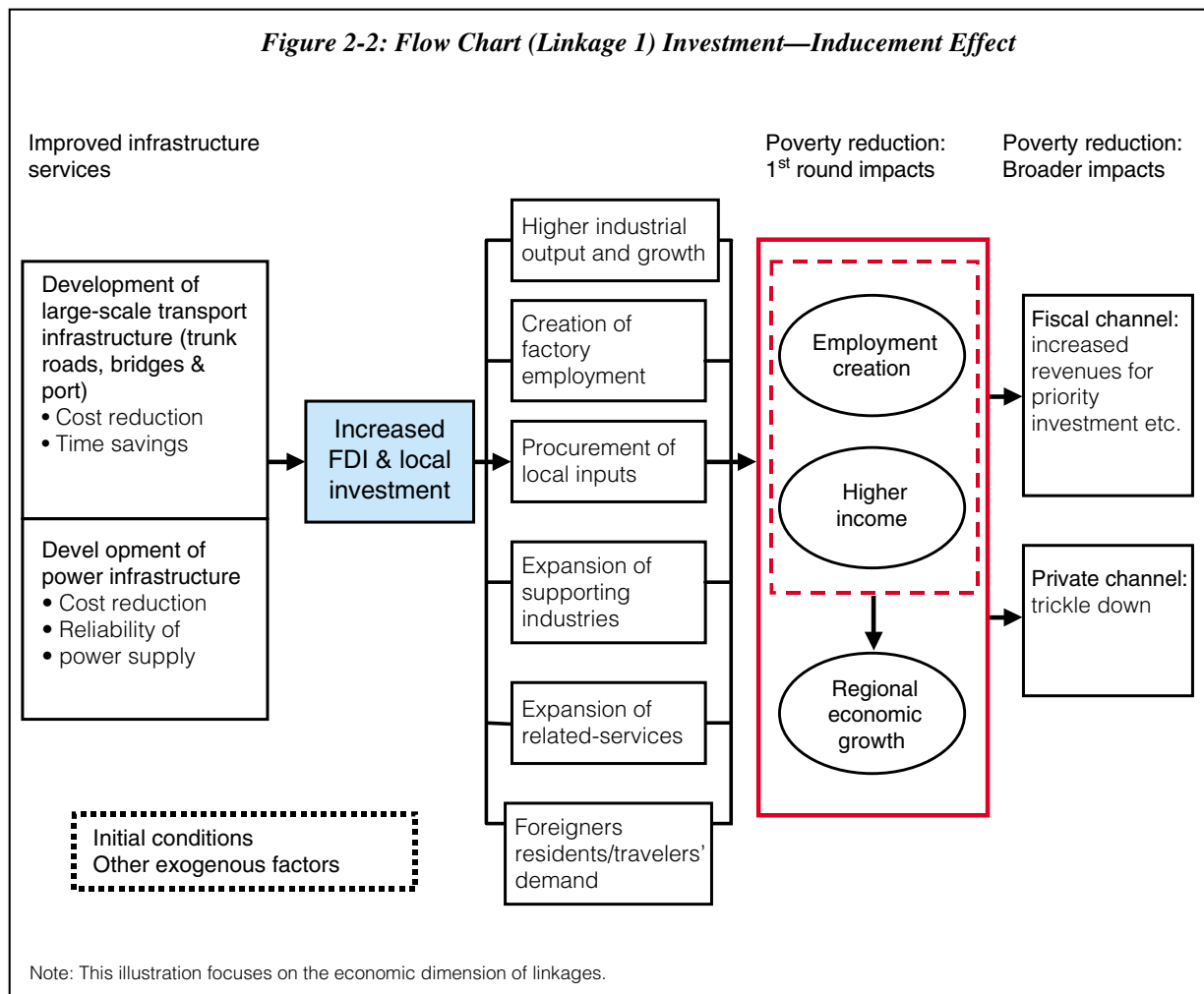
<sup>9</sup> Ishikawa [2002] argues the need to balance the two sets of expenditures for poverty reduction, i.e., (i) "pro-poor targeted"; and (ii) "broad-based growth." In the latter, the expenditures contribute to GDP growth first and then poverty reduction, by way of increased savings, which are channeled through the fiscal and financial systems to address specific needs including poverty reduction. Klein et al. [2001] also states that these two are complements and that growth (with FDI as a key ingredient) is needed to fund the government's pro-poor programs.



**Linkage 1: Investment-inducement Effect (FDI and Domestic Investment)**

This is a channel through which new investment is generated by an enhanced business climate, as the result of improved infrastructure services. For example, attraction of FDI and domestic investment could generate: (i) jobs and income at the newly invested firms; and (ii) jobs and income in related industries/services, through increased procurement of local inputs and services<sup>10</sup>.

Moreover, FDI could induce a *foreigners' demand effect*. For example, increased demand derived from foreign residents and travelers could promote such business activities as hotels, tourism, commercial activities, real estate, and generate jobs and income.



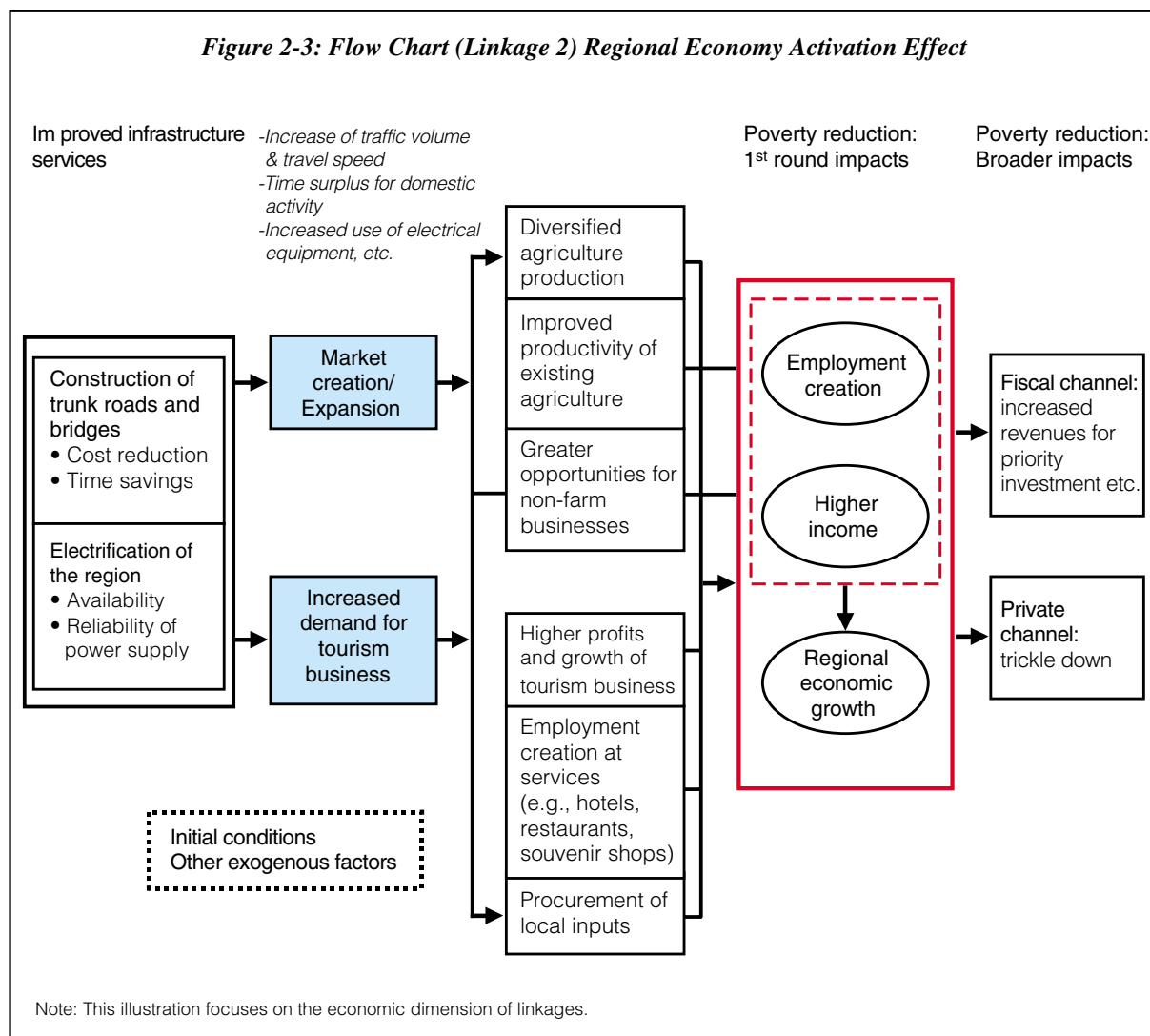
<sup>10</sup> In assessing the effects of FDI on poverty reduction, Aaron [1999] notes the need to draw a distinction between its direct and indirect impacts. While direct impacts can be measured by job and income generation, indirect impacts may not be quantifiable because they cover the benefits transmitted through linkages (backward and forward), spillovers, and demonstration effects and may even include improved human capital formation, technology transfer, community development, fiscal contribution, and so on.

**Linkage 2: Regional Economy Activation Effect**

This is a channel through which new economic opportunities are opened up, and productivity of the existing economic activities is enhanced (even without additional investment), as the result of improved infrastructure services. For example, better access to markets and information could generate jobs and income in rural households through improved agricultural productivity, diversification of agricultural products, and promotion of off-farm industry in rural areas, etc. Moreover, time and cost savings in transport, the reliable supply of electricity could benefit (price- and time-sensitive) tourism-related services, which are labor-intensive and likely to have spillover effects.

Furthermore, stimulation of urban-rural economic activities (e.g., increased urban demand, labor migration to urban areas, and increased investment from urban to rural areas) could promote job and income generation.

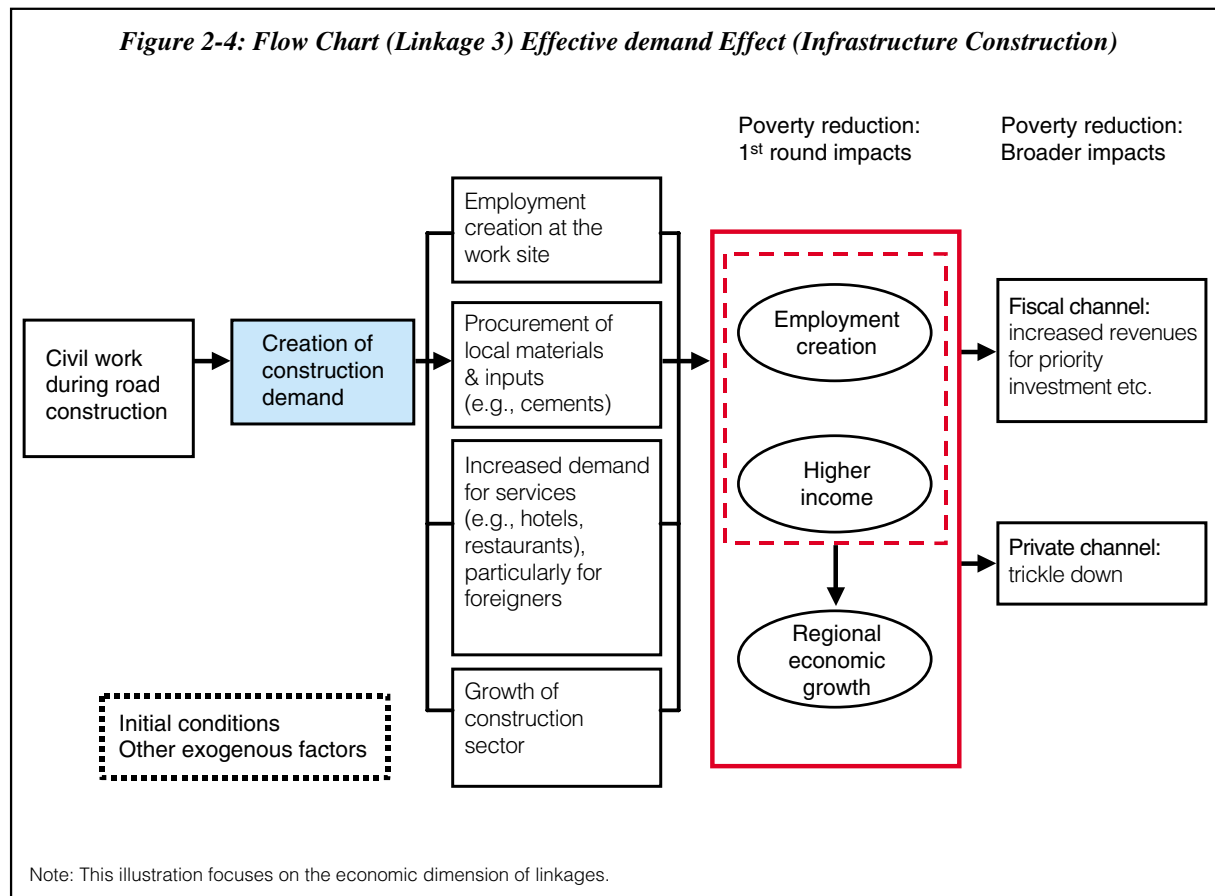
All these factors suggest the potential importance of the spatial dimension of infrastructure investments, which could affect industrial location, the patterns of promotion and diffusion of growth centers, balanced regional development, and so on.



**Linkage 3: Effective Demand Effect of Infrastructure Construction**

This is a channel through which jobs and income are generated by implementing the project itself. For example, effective demand from construction work could generate jobs and income during the construction period—directly and indirectly (through the procurement of local inputs and services). Similarly, it is possible to expect effective demand during the operations and maintenance period.

While the majority of jobs and income generated through this channel is for the duration of construction only, income gained in such projects can become the initial capital required to break out of the poverty trap.



**Fiscal revenue and multiplier effects**

It is important to note that the above linkages are only the first-round impacts. Once injected into the economy, these stimuli will have broader spillover effects through fiscal and private spending channels. These effects do not stay in the initial localities but are likely to spread to wider areas, even the entire nation.

Expenditure propagation can occur through increased fiscal revenue generated by greater income and economic activity. The use of additional revenue by the authorities will set off the next round of impacts, including enhanced social programs, more public investment, salary increases for public servants, and so on. In fact, Vietnam's experiences in the early 1990s confirm that robust growth had raised government revenue, with the result that by the mid-1990s public expenditure on infrastructure, education, and health had become much higher.

Another crucial channel for expenditure propagation is the multiplier effect, as described in basic macroeconomics. All new income generated directly or indirectly by infrastructure construction, as discussed above, will induce a second, third, ... etc. round of spending whose cumulative magnitude depends on the marginal propensities of "leakages" (saving and imports). This will typically be several times the initial impact. If the population spends a large part of new income on domestically produced goods and services, the multiplier effect will be all the greater. The additional fiscal spending noted above also enters this multiplier process [see Box 2-2].

In the context of poverty reduction, the crucial coefficient here is how much of new income is spent on the items produced by the poor (the marginal propensity to consume can be divided into that on poor-produced goods and services and the rest). If this coefficient is high, the poor will enjoy a larger share of benefits from overall growth. In developing countries where the markets for the rich and the poor are severely segmented, new income only buys luxuries imported from abroad. But in Vietnam, additional income seems to be directed to locally made food, clothing and housing, as well as modern manufactured products.

**Box 2-2: Rich's Consumption Behavior and the Income Multiplier**

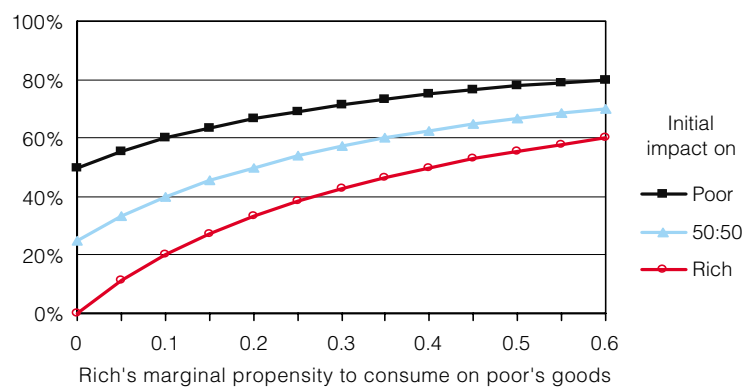
Consider the Keynesian income multiplier in elementary macroeconomics, but add the assumption of two population groups: rich and poor. Each group spends income on the goods produced by the rich or the goods produced by the poor, and the remainder goes to saving or the purchase of imports ("leakage"). Even with the same pattern of income inequality, the ultimate incidence of income increase will differ significantly depending on how the two groups allocate their income.

For the purpose of numerical illustration, assume the following marginal propensities\*.

	On poor's goods	On rich's goods	Leakage (saving & imports)	Sum
Poor's spending	0.6	0.2	0.2	1.0
Rich's spending	$x$	$0.8 - x$	0.2	1.0

The ultimate income of the poor is a function of  $x$  (rich's spending on poor's goods) as well as the location of initial injection of autonomous expenditure (public spending, ODA, FDI, etc.). The graph below shows that, if the rich's consumption pattern is similar to that of the poor (i.e.,  $x$  is high), a large income increase accrues to the poor regardless of the location of initial impact. Hence, both growth acceleration and pro-poor measures are effective in poverty reduction. In contrast, if the rich buy very little from the poor (i.e.,  $x$  is low), not only the final income increase of the poor is low but also the location of initial income injection matters greatly. In this case, public policy must target the poor directly in order to raise their income, since the "trickle-down" is severely limited. More generally, growth policy can reduce poverty automatically if the population is relatively homogeneous in consumption, while that is not the case in a country where the rich and the poor are sharply divided in life style. Although the detailed analysis correlating the production and spending patterns of different income groups is not available, it is suspected that Vietnam is a relatively homogeneous country compared with developing countries in Africa or Latin America with similar income levels.

Simulation: Poor's Share in Income Increase



Note: \*We set the marginal propensities to leak to 0.2 for both groups, which means that the overall income multiplier is always five. This is for the convenience of illustration only, and other parameter values can be easily accommodated with similar conclusions. Note that this propensity must be nonzero for both groups to have a converging multiplier.

Source: Prepared by the study team.

## Chapter 3. Specific Features in the Vietnamese Context

In the analysis of linkages among large-scale infrastructure, growth and poverty reduction, it is critically important to understand the features specific to Vietnam. These include: (i) the patterns and sources of growth and poverty reduction; and (ii) progress of infrastructure development over the last decade.

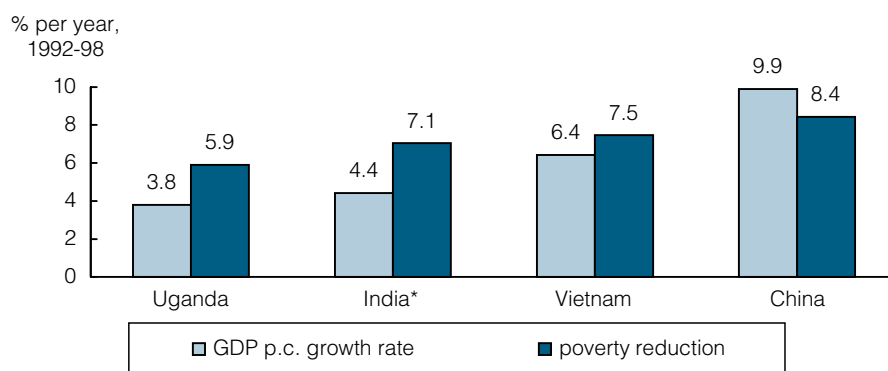
### 3-1. Patterns and Sources of Growth and Poverty Reduction

Vietnam is frequently cited as one of the successful globalizers which has achieved rapid and fairly equitable growth during the past decade<sup>11</sup>. As the result of high and sustained economic growth, the country has already halved income poverty during the past decade and achieved one of the important goals in MDGs [Box 3-1].

#### **Box 3-1: Vietnam's Achievement in Poverty Reduction**

As Vietnam has integrated, it has had a large increase in per capita income and no significant change in inequality. Thus, the income of the poor has risen dramatically and the level of absolute poverty has been cut in half in 10 years. Among the very poorest households, survey evidence shows that 98% became better off during the 1990s. This improved well-being is not just a matter of income. Child labor has declined and school enrollment has increased. Vietnam's export directly provided income-earning opportunities for poor people: exports included labor-intensive products such as footwear and rice, which is produced by most low-income farmers.

Poverty reduction in Uganda, India, Vietnam, and China closely related to growth



Note: \* India poverty reduction figure is for 1993-99.

Source: World Bank [2002a], *Globalization, Growth, and Poverty: Building an Inclusive World Economy*, World Bank Policy and Research Report, p.6.

The findings of two VLSS (conducted in 1993 and 1998) provide valuable insights into the nexus between growth and poverty reduction in Vietnam. Also, the preliminary results of the latest VHLSS (conducted in 2001-2002 and currently being analyzed) are useful to understand the trends of growth and poverty reduction after the late 1990s periods, when the large-scale infrastructure projects (under consideration in this study) have been put into operations. The latest VHLSS 2002 shows further progress in improving the living standards and reducing poverty [see Box 3-2].

<sup>11</sup> For example, see World Bank [2002a], *Globalization, Growth, and Poverty: Building an Inclusive World Economy*.

The full results of the latest survey are not yet available; but, according to the foregoing two VLSS, three aspects are particularly noteworthy<sup>12</sup>.

***The patterns and sources of growth in the past:***

- During 1993-98, the main source of poverty reduction was rapid growth, particularly from agricultural liberalization, improved agricultural productivity and diversification of on-farm activities. The favorable terms of trade for primary agricultural commodities also provided a supportive environment. Average household incomes in the agricultural sector grew by 61% (pp. viii-ix, p.41).

***Likely sources of growth in the future:***

- The rural sector will continue to dominate employment in Vietnam over the short- to medium-term. However, Vietnam might not be able to replicate the success of agricultural diversification of the 1990s, which is now reaching its limits (p. 41, p.148).
- In the future, the sources of growth are likely to be different from those in the 1990s. Greater reliance will need to be placed on two other areas of growth, i.e., (i) off-farm employment and services in rural areas; and (ii) urban employment. These must play a relatively more important role in poverty reduction in Vietnam (p.41, p.148).
- Vietnam's human capital (and also its availability of labor relative to land) is very high compared to other countries in East Asia. Vietnam has untapped export potential in labor-intensive manufacturing<sup>13</sup>. In terms of resource endowments, it satisfies the preconditions to replicate the manufacturing export and employment success of other East Asian nations (p.147, p.166).

***The nature of poverty:***

- In Vietnam, the poor and the rich are not static groups, and their living standards vary over time (with such exceptions as ethnic minorities)<sup>14</sup>. A high proportion of the population is clustered just around the poverty line. While this suggests their vulnerability to shocks, it also means that even small increases in mean per capita expenditure will be quite effective in moving a large number of households over the poverty line (p.101, p.173) [see Box 3-2].
- Although the incidence and depth of poverty have declined in both rural and urban areas, urban areas have grown faster than rural ones (except the Red River Delta). The inequality in Vietnam is almost entirely due to the widening gap between rural and urban areas, rather than due to inequality rising within either rural or urban areas (pp.69-73). The latest VHLSS 2002 shows that urban-rural inequality is expanding. (Between 1998 and 2002, the rate of reduction of poverty in rural area was 5.4% against the urban figure of 6.1%.)

<sup>12</sup> The below are primarily drawn from *VDR2000: Attacking Poverty* (Poverty Working Group 1999). The corresponding pages are indicated in the parentheses.

<sup>13</sup> It is estimated in *VDR2000* that if Vietnam were to exploit fully its comparative advantages, manufacturing exports would represent around 25% of its current GDP and up to 1.6 million more jobs could be created in labor-intensive export manufacturing in the next three to five years.

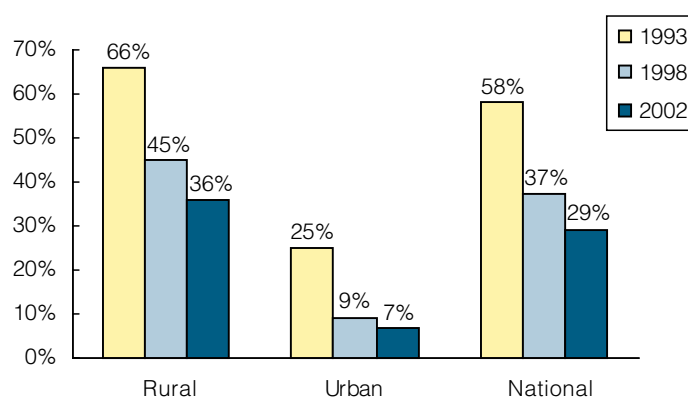
<sup>14</sup> Only about 40% of households were in the same expenditure quintile in the two periods of VLSS (1993, 98).

**Box 3-2: Continued Progress in Poverty Reduction and Growth  
Preliminary Results of VHLSS 2002**

The preliminary results of VHLSS 2002, published by the General Statistics Office (GSO), show Vietnam's continued progress in reducing poverty and improving the living standards of the population.

Between 1998 and 2002, poverty has further declined in both rural and urban areas. The percentage of the population living below the total poverty line has decreased from 37% to 29%. Rural poverty has declined from 45% to 36%. Three regions have experienced a large reduction of poverty incidence, the North East (from 58% to 38%), the South Central Coast (from 35% to 25%), and the Mekong Delta (37% to 23%). On the other hand, some increase in poverty incidence has been observed in Ho Chi Minh City and its vicinity (from 8% to 11%). In all regions, household incomes of the poorest quintile increased, compared to those of 1999.

Vietnam's Poverty Incidence (as measured by per capita expenditure)



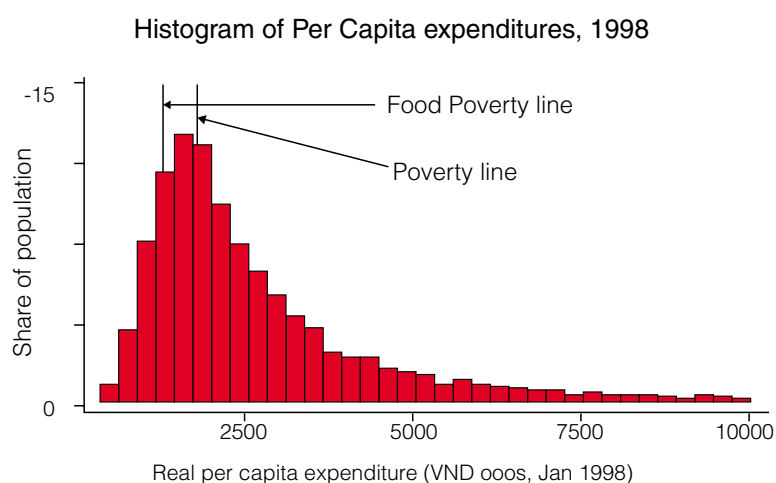
Source: GSO and World Bank estimates based on VLSS 93, VLSS 98 and GSO [2003b] based on VHLSS 2002.

Note: In VHLSS 2002, the survey sample was selected based on the areas covered in the Population and Housing Census 1999. The sample size was greatly expanded from the previous surveys, comprising of 75,000 households representing the whole country, urban and rural areas, and 61 provinces/cities (expenditure data were compiled, based on the sample of 30,000 households).



**Box 3-3: Opportunities vs. Vulnerability**

In Vietnam, a high proportion of the population is clustered just around the poverty line. Moreover, the poor and the rich are not static groups. Both quantitative and qualitative data indicate that the poverty status of households fluctuates over time. The Transition Matrices (based on the VLSS data) indicate that: (i) many more households moved out of poverty than moved into it between 1993 and 1998; but (ii) the direction of movement is not entirely one way\*. There has been movement amongst all three categories, as shown in the table below.

**Poverty Transition Matrices for Vietnam, 1993 to 1998**

(% of panel households)

Poverty Status in 1993	Poverty Status in 1998			Total
	Very Poor	Poor	Non Poor	
Very Poor	8.2	7.6	7.1	22.8
Poor	3.5	9.4	20.3	33.3
Non Poor	0.8	4.0	39.2	43.9
Total	12.4	21.0	66.6	100.0

Source: Elaborated by the study team, based on the World Bank (*Vietnam Development Report 2000, Vietnam Attacking Poverty*). The original data are based on VLSS 93 and VLSS 98.

Notes: 1) Dark shaded cells indicate the percentage of panel households whose poverty status did not change between 1993 and 1998.

2) \* About 4300 of the same households were included in both VLSS 93 and VLSS 98, allowing a panel analysis of how individual households' living standards have changed over time. Note, however, that the above table may overstate transitions due to measurement errors in household expenditures.

3) Poverty status is defined as: the very poor (those below the food poverty line), the poor (those below the total poverty line), and the non-poor (those above the total poverty line).

As stated in the CPRGS, Vietnam has long accorded high priority to social equity. The data suggest that public social expenditures are more equally distributed than household expenditures, playing an important re-distributive role<sup>15</sup>. When compared with other countries at similar levels of income, Vietnam's social indicators are much better, as seen by the adult literacy rate of 93 % and the infant and child (under five) mortality rate of 34 per 1,000 live births [2000 data, World Bank 2003c]. Moreover, the Vietnamese government has eight national poverty programs targeted at ethnic minority groups in the mountainous areas and poor families in remote areas (or those under the "static" poverty) [SRV 2002a]. All these factors may suggest the effectiveness of creating income "opportunity" in reducing

<sup>15</sup> *Vietnam Public Expenditure Review 2000* notes that based on the VLSS 1998 data, the poorest quintile receives 26% of primary education expenditures, a 6% point jump from 1992/93 [Government of Vietnam- Donor Working Group 2000].

poverty, and thus the importance of "trickle-down" effects through backward and forward linkages.

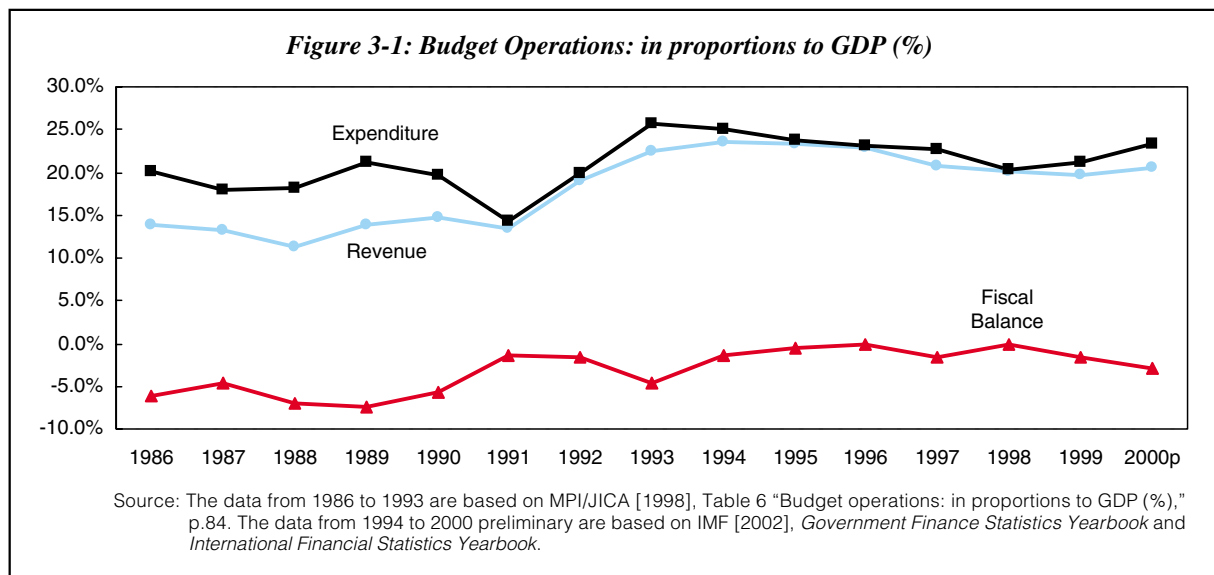
In sum, in order to sustain the past gains in poverty reduction, Vietnam needs to make greater efforts in stimulating off-farm employment and urban employment growth, creating "opportunities" for the majority of population. Moreover, to fully exploit its potential for labor-intensive export manufacturing, efforts must be geared to raising productivity and international competitiveness. This is particularly important as Vietnam's international integration is proceeding very rapidly (such as USBTA, AFTA and WTO accession). At the same time, the government must be conscious of the need to respond to emerging social problems in the growth process.

### 3-2. Past Progress in Large-Scale Infrastructure Development

Vietnam's experiences in the early 1990s confirm the importance of overall growth in generating fiscal revenue and (as a result) allowing for increased public expenditure on infrastructure, education, and health, etc. Thanks to high growth and initial reforms of the tax system, government revenue increased rapidly after 1991. As Figure 3-1 shows, government expenditure as a share of GDP became much higher in 1994 than in 1989. Furthermore, because per capita GDP increased substantially during this period, with real per capita government expenditure nearly twice as high in 1994 as in 1989<sup>16</sup>.

Greater fiscal revenue, together with increased aid flows, has enabled the government to intensify its efforts in growth promotion and poverty reduction, especially since the mid-1990s.

Over the last decade, the Vietnamese government has consistently placed high priority on the

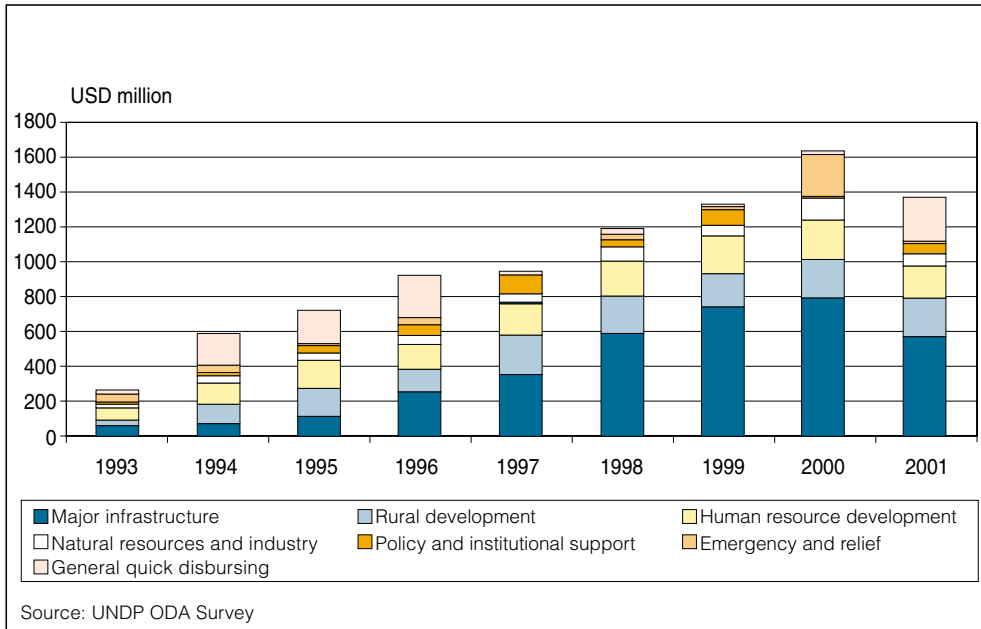


rehabilitation and development of national infrastructure, such as trunk roads, ports, airports and power supply, as well as local infrastructure, allocating substantial amounts of public investment to this end. During 1996-2000, about 40% of the total public investment (state budget, state credit, and SOE investment) was directed to transport and power infrastructure<sup>17</sup>. Moreover, since 1996/97, major infrastructure has received the largest proportion of ODA, particularly in the transport and energy sectors [Figures 3-2, 3-3].

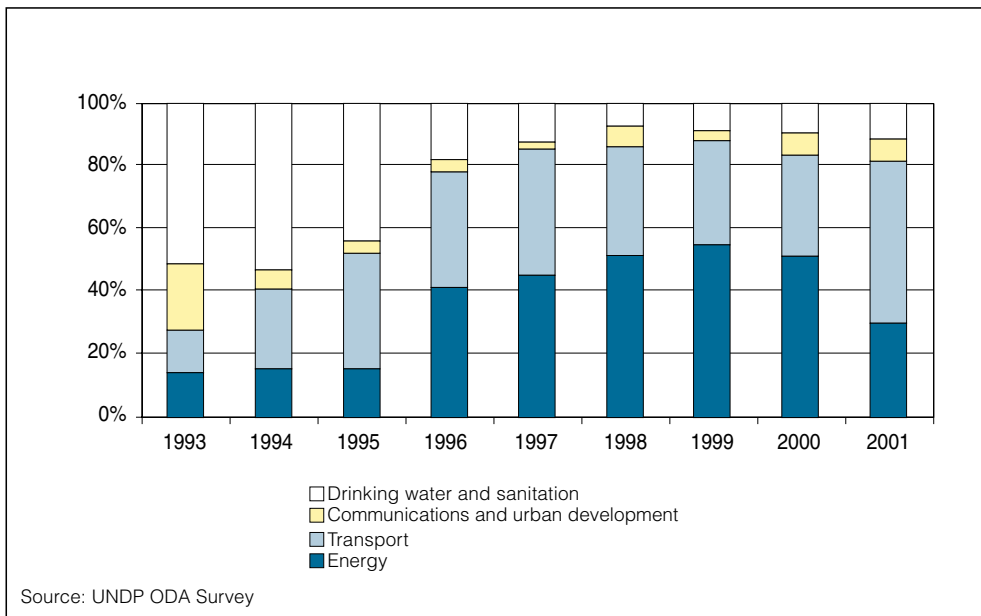
<sup>16</sup> Dollar and Litvack, "Macroeconomic Reform and Poverty Reduction in Vietnam," in World Bank [1998] *Household Welfare and Vietnam's Transition*, Chapter 1, pp.1-28.

<sup>17</sup> During 1996-2000, the public sector was responsible for approximately half of all investment in the country [SRV 2002b]. Here, ODA (which is directed to both state budget and state credit) is counted as public investment. For example, roads constructed by the Ministry of Transport (including ODA) are part of the capital spending of the state budget, while power-generation projects constructed by Electricity of Vietnam (including ODA on-lending) are classified as the state credit.

**Figure 3-2: Broad ODA Trends 1993-2001**



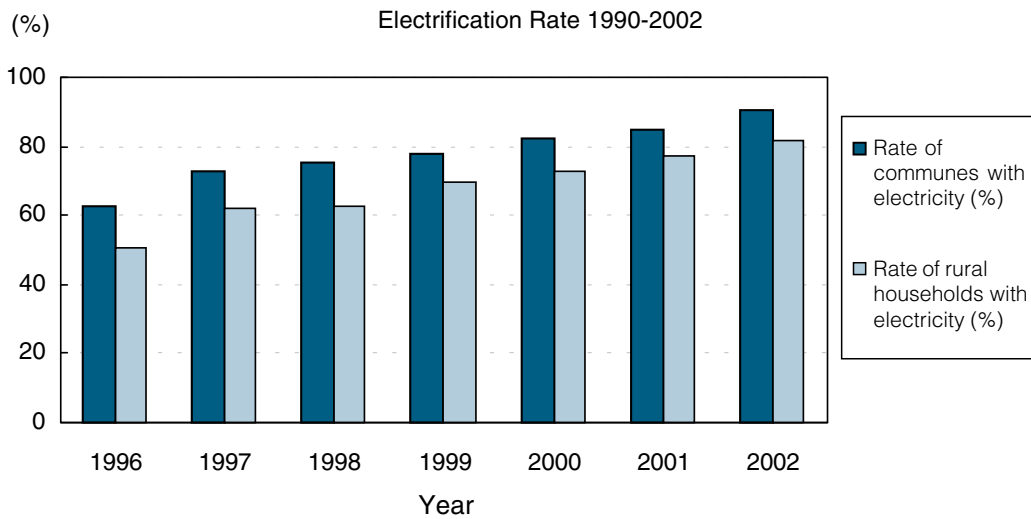
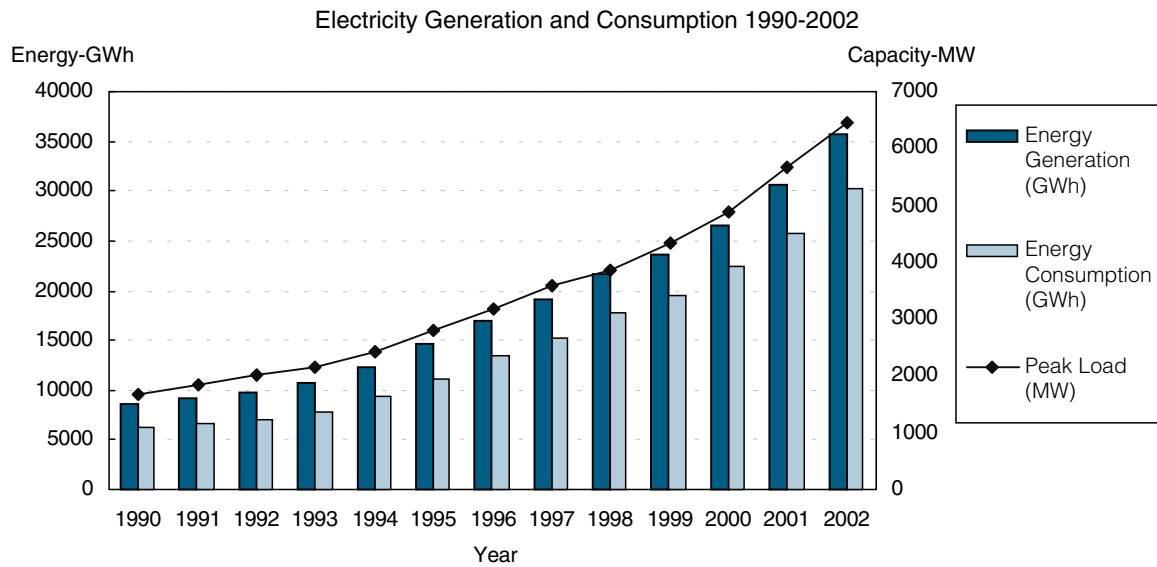
**Figure 3-3: ODA Disbursements for Major Infrastructure**



Source: UNDP [2002], *ODA Flows to Viet Nam*, <http://www.undp.org.vn/undp/fact/ODAflow.pdf>.

Infrastructure development in the 1990s and the resultant improvements in power supply and transportation are shown in Figures 3-4, 3-5 and map.

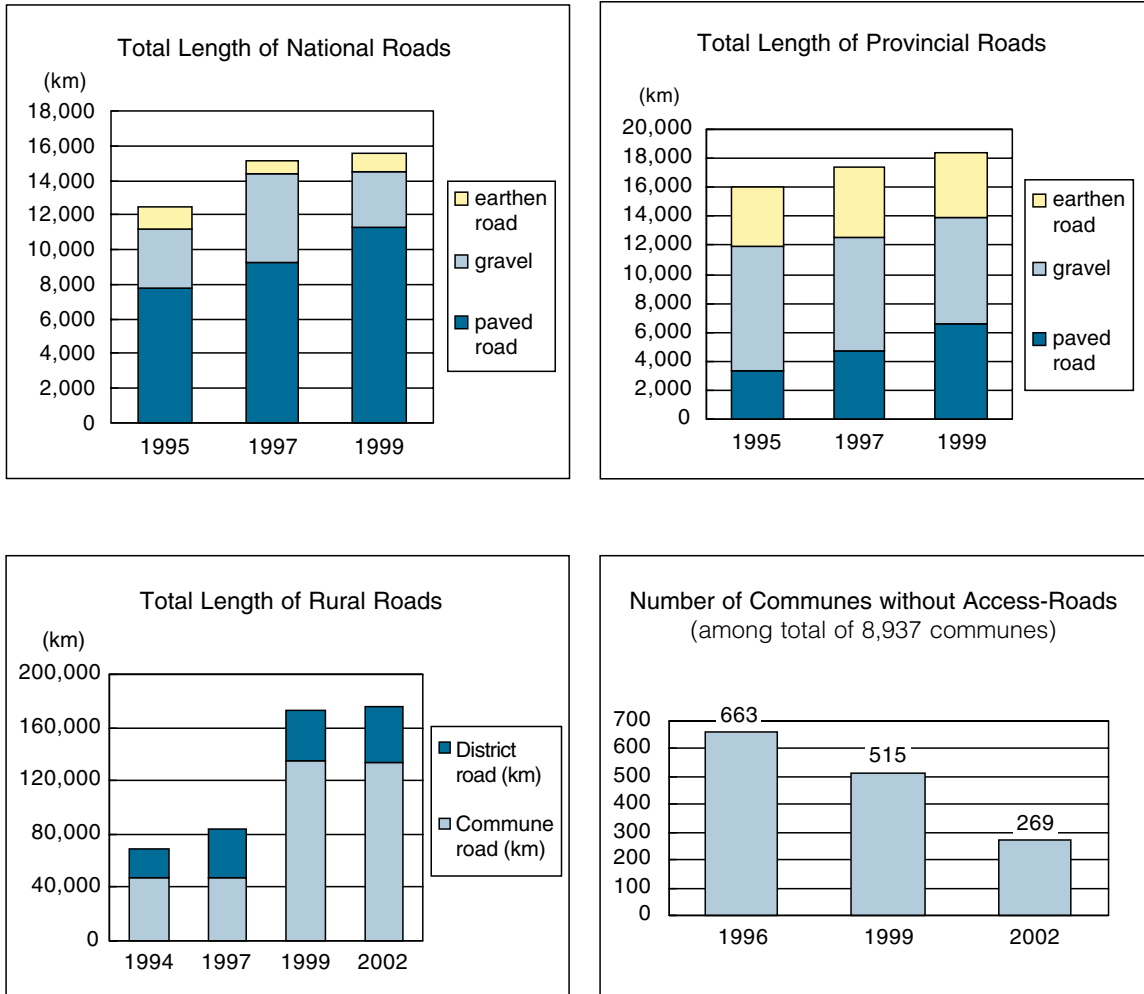
**Figure 3-4: Improvement in Power Infrastructure**



Note: It is estimated by EVN that households with electricity accounted for 13.9% of the total households in 1990.

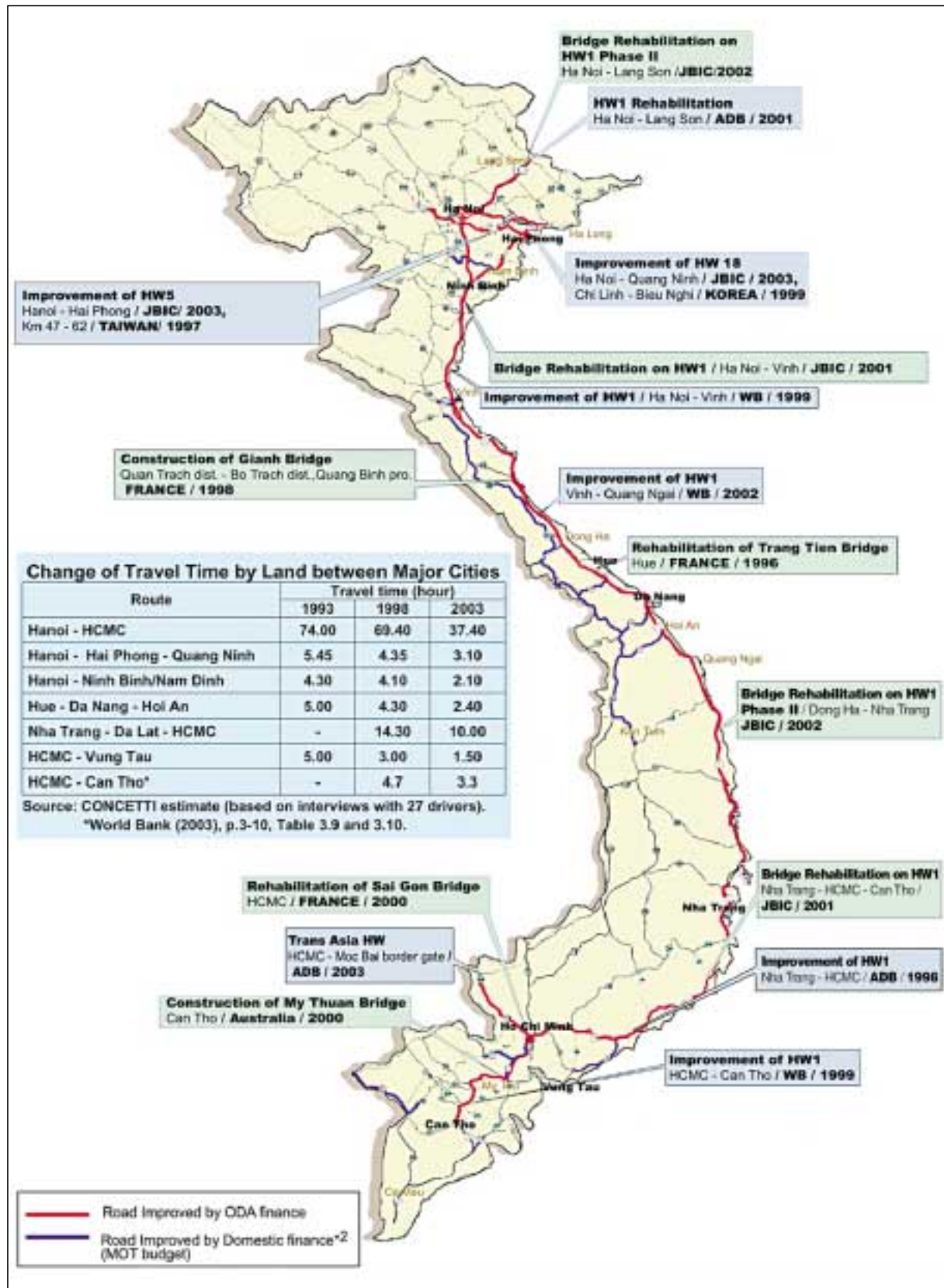
Source: Prepared by CONCETTI based on the data from Electricity of Vietnam.

**Figure 3-5: Improvement in Road Infrastructure**



Source: Prepared by the study team based on the data from the Ministry of Transport, Transport Development and Strategy Institute and Japan International Cooperation Agency.

## Trunk Road Network as of June 2003\*1



Notes: \*1 This map excludes on-going projects.

\*2 This map does not include provincial roads improved by the Provincial People's Committee's own budget.

Source: Prepared by the study team based on the data from Ministry of Transport

## Chapter 4. Linkages among Infrastructure, Growth and Poverty Reduction: Selected Case Analyses

This chapter discusses how large-scale infrastructure has contributed to generating poverty-reducing growth in Vietnam through various linkages, as illustrated in the previous chapter. To this end, an analysis of specific cases is presented.

Special attention is paid to the *supply-side effect*, namely, the investment-inducement effect (FDI and domestic investment) and the regional economy activation effect (agriculture production, tourism promotion etc.). The analysis focuses on three cases of recently completed, large-scale infrastructure projects in the transport and power sectors. All of them are currently under operation:

- Case Study 1: Improvement of National Highway No.5 and the expansion of the Hai Phong Port (funded by Japan/JBIC and Taiwan, completed in 2000);
- Case Study 2: Construction of the My Thuan Bridge (funded by Australia, completed in 2000) and the improvement of National Highway No.1 (co-financed by the World Bank, the ADB, and Japan/JBIC, with the southern Ho Chi Minh City-Can Tho section having been completed in 1999); and
- Case Study 3: Development of overall power supply capacity and regional electrification, including the construction of the North-South 500kv transmission line (financed by the Vietnamese government, completed in 1994).

In addition, the following cases are analyzed to obtain diverse perspectives on the role of large-scale infrastructure in poverty reduction and growth.

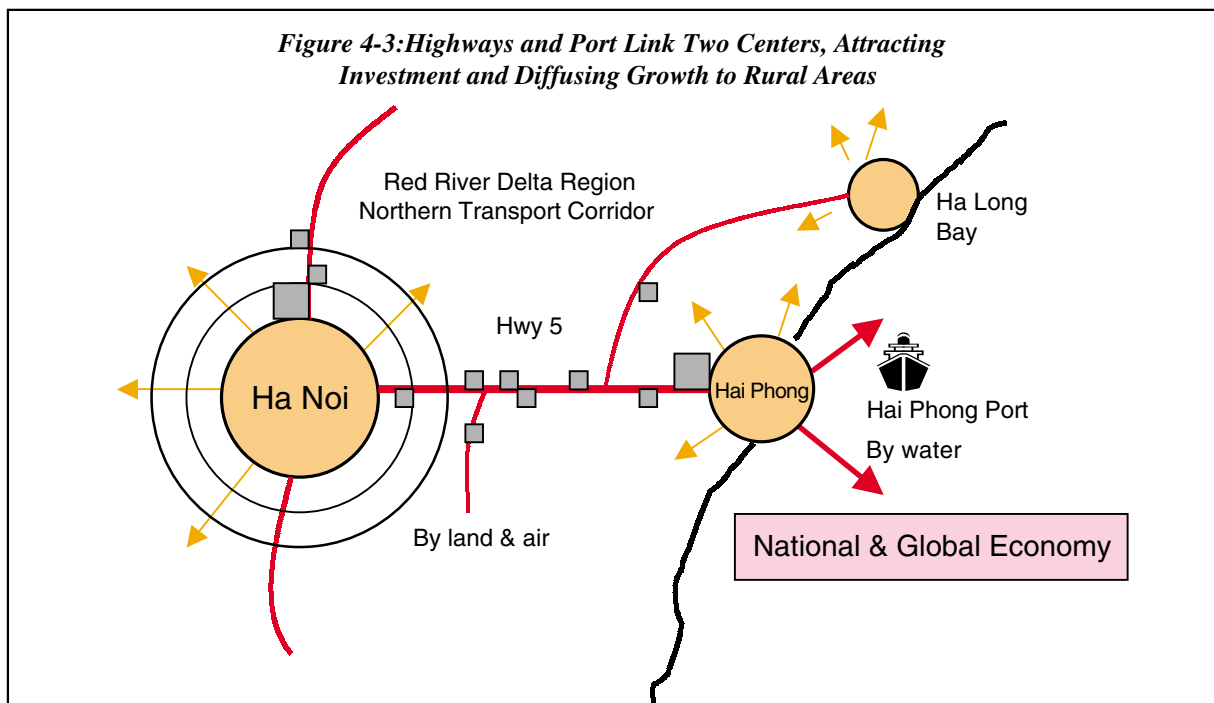
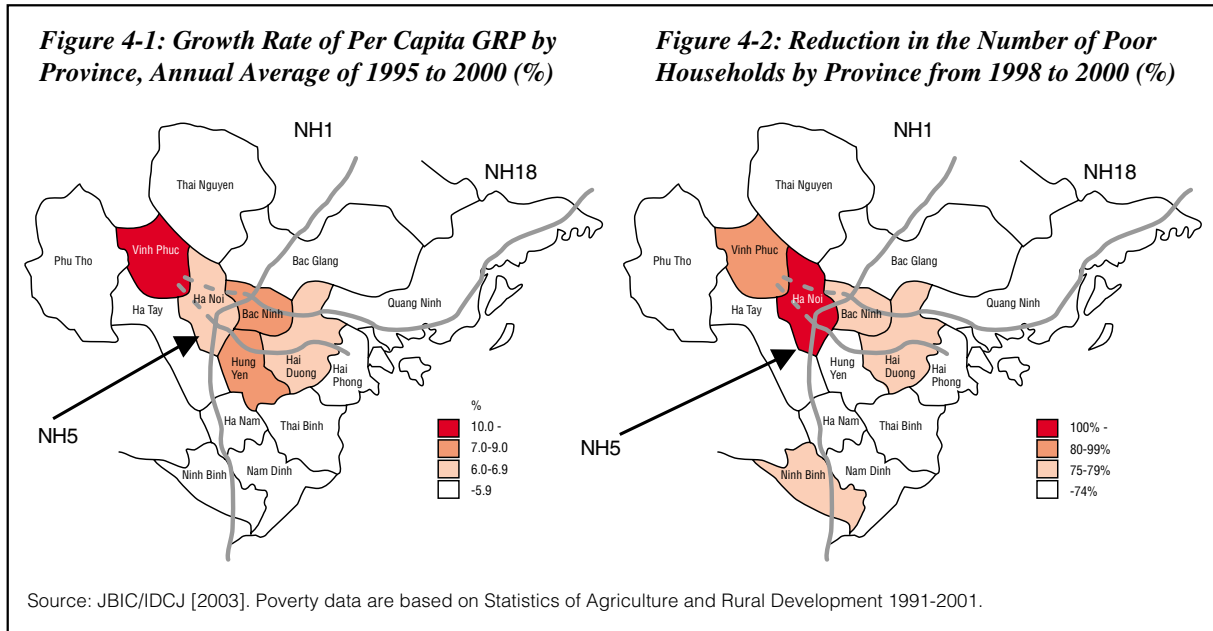
- Case Study 4: Accessibility and road network, in light of "economic distance" and "connectivity" to markets (based on the UK/DFID experience of rural road projects in Hung Yen and Lai Chau provinces);
- Case Study 5: Accessibility and road network, in light of access to social service delivery (based on the experience with the Japan/JICA-supported Reproductive Health Project in the Nghe An province); and
- Case Studies 6: Effective demand for highway construction (based on Japan/JBIC-funded National Highway No.18).

### 4-1. Case Study 1: Hanoi-Hai Phong Northern Transport Corridor

In recent years, the provinces along the Hanoi-Hai Phong transport corridor have demonstrated dynamic economic performance. Hanoi (the national capital) and Hai Phong (which has the largest international port in the north) have been growth centers in northern Vietnam. With the improvement of National Highway No.5 (NH5, hereinafter) and the expansion of Hai Phong Port, the transport corridor has reinforced the link between the two growth centers, and has enhanced the access of Hanoi to global markets by improving land and sea transport. FDI to major industrial zones has increased significantly, particularly since 2000, driving industrial and export growth in the north. Figure 4-3 shows these effects schematically.

Moreover, this growth has spread to neighboring areas, particularly Hung Yen and Hai Duong provinces (located between the two growth centers), and the rural economy has experienced major structural transformation. Domestic investment in these areas has increased, and rural households have diversified their agricultural production. Faster and more convenient transportation has also spurred demand for tourism in Ha Long Bay. The number of tourists to Quang Ninh province quadrupled from 1995 to 2002.

All these effects contributed to the creation of new employment and higher income for workers at factories and hotels (direct jobs). Rural households now enjoy higher disposable income. The existing data indicate that in recent years, most of the provinces along the Hanoi-Hai Phong corridor achieved faster growth in per capita income and reduction in the number of poor households, compared to the average for the Red River Delta or the whole country [see Figures 4-1, 4-2].





**Box 4-1: Hanoi-Hai Phong Corridor — Impact on Traffic**

National Highway No.5 (NH5, hereinafter) is a 2-lane trunk road of approximately 100km connecting the national capital Hanoi and Hai Phong Port, the largest international port in northern Vietnam. It is one of the most important arteries for traffic flow of export and import goods, as well as of domestically commercialized products. The corridor is considered a crucial element for the competitiveness of northern Vietnam. However, previously, the highway was narrow and deteriorated. The road network in the region was not linked due to rivers without bridges.

Therefore, the Vietnamese government has placed high priority in investing in the corridor to strengthen its transportation capacity. Thanks to the completion of several projects listed below, this purpose has been achieved. Travel time between Hanoi and Hai Phong was cut by half—from 3.5-4 hours (at a speed of 25-28 km/hour) to 1.5-2 hours (at 60 km/hour). After its expansion, Hai Phong port now has a container-specialized port at Chua Ve.

Related donor funding projects Contents of projects	Upgrading NH5				Hai Phong Port Rehabilitation Project
	Km 0-47	Km 47-62	Km 62-93	Km 93-106	
Funding Agency	JBIC	Taiwan	JBIC	JBIC	JBIC
Project Cost	¥8,782 million	US\$34.5 million	¥5,470 million	¥6,709 million	¥3,975 million
Completion Year	1999	1997	1999	2000	2000

Sources: JBIC/IDCJ [2003].

Taiwan-financed project: the Ministry of Transport

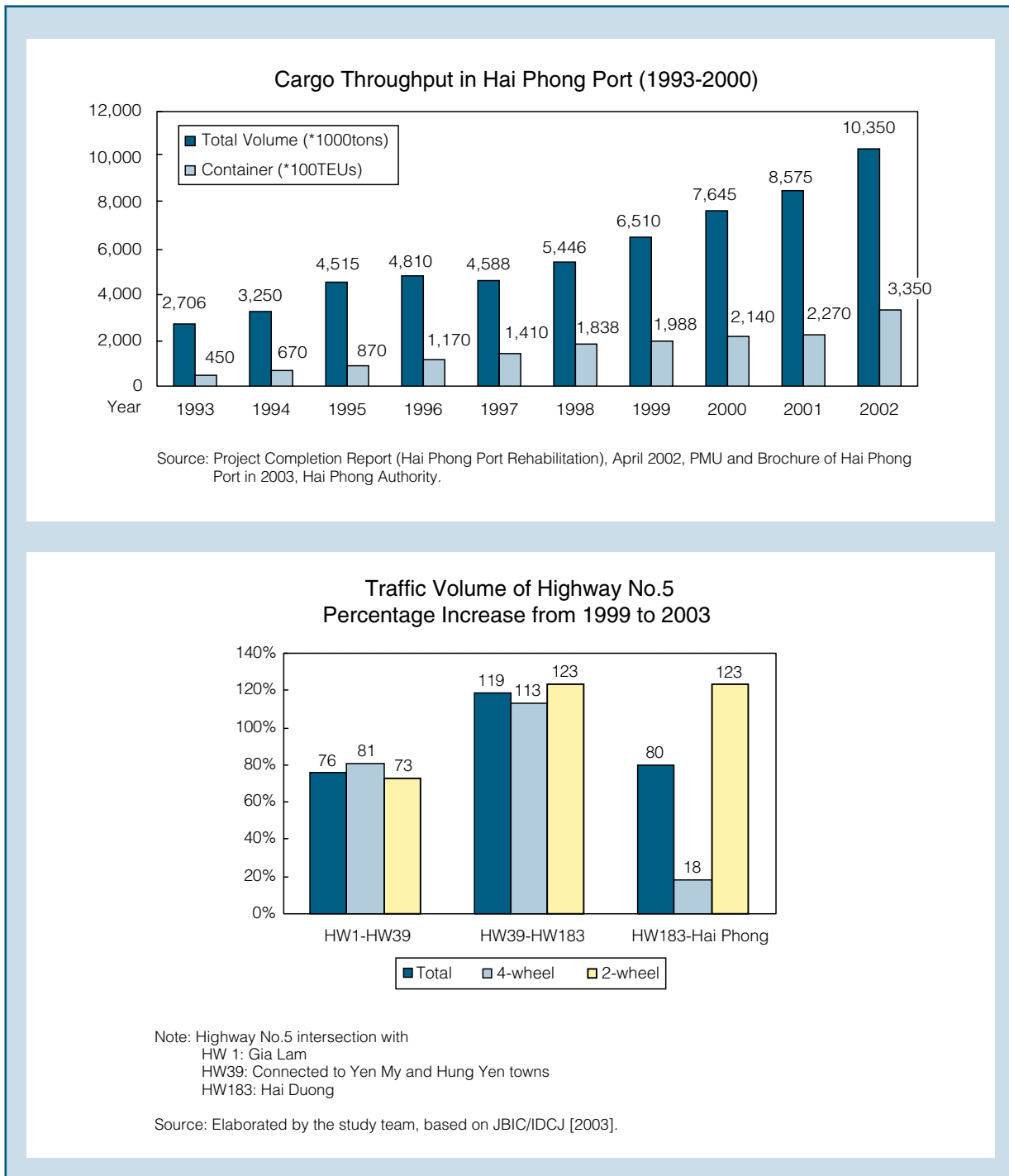
The corridor development has reinforced the transportation network—by improving connections with the other trunk roads (e.g. NH1, NH10 and NH 18) which have also been upgraded—and enabled the expansion of container cargo handling capacity at Hai Phong Port to cope with increased traffic demand. Furthermore, there have been parallel improvements in rural (feeder) roads in the surrounding areas, financed from various sources (e.g., local budget, commune contributions, and donors such as the World Bank, DFID and JBIC).

The traffic count and truck drivers' interview surveys of NH5 and Hai Phong Port (conducted in the JBIC post-evaluation study) show the following:

- Between 1999 and 2003 (“before” and “after” its improvement), the traffic volume along NH5 almost doubled. Especially, the intermediate section (HW39-HW183) has experienced the largest increase of traffic volume by all types of vehicles.
- At present, 64.5% of total traffic uses NH5 exclusively. If the other routes are included, about 85% of total traffic uses NH5.
- 70% of total vehicle traffic is for the main port of Hai Phong. (The statistics of Hai Phong port also show that during 2001-02, the volume of container cargo rose by 1.5 times from 22.7 to 33.5 thousand TEU. (The total volume of cargo increased from 8.6 mil tons to 10.4 mil tons during the same period.)
- Container trucks account for 38% of total vehicles. 47% of the container trucks carry 40 foot containers.
- 32% of total freight (to/from Hai Phong port) is farm produce (e.g., rice and maize).

Also, the provincial data suggest that the volume of exports handled at Hai Phong port increased by 31% from 1999 to 2000 (compared to 17.5% of the overall increase in cargo volume at the port).

According to the JBIC post-evaluation study, EIRR of the NH5 improvement project is estimated at 19.71% (discount rate =12%).



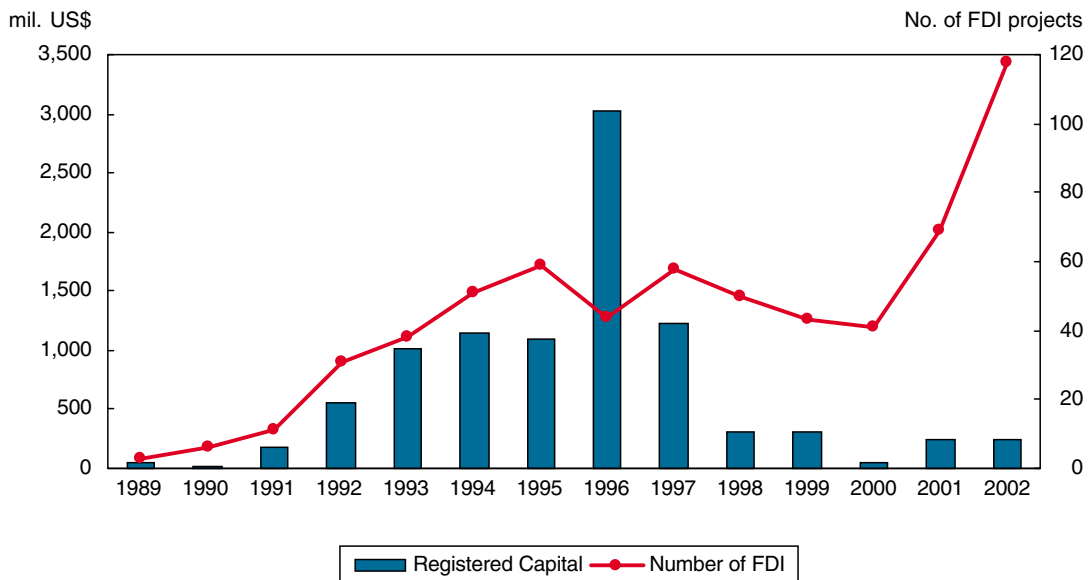
**Rapid Industrial Growth and FDI Attraction: Investment-inducement Effect**

The JBIC-financed post-evaluation study (hereinafter, JBIC/IDCJ study) on the upgrading of NH5 and the rehabilitation of Hai Phong Port<sup>18</sup> provides useful insights on the nature and extent of the dynamic transformation in the four provinces along this transport corridor (i.e., Hanoi, Hung Yen, Hai Duong, and Hai Phong). This study finds that increased industrial output and FDI attraction, and the resultant job creation and higher income are major benefits realized by the improved transport infrastructure.

<sup>18</sup> *Impact Assessment of Transport Infrastructure Projects in Northern Vietnam*, prepared by International Development Center of Japan (IDCJ) for JBIC. The post-evaluation focused on the two transport projects. The draft report was presented at the June 12, 2003 workshop in Hanoi, and finalized in July 2003.

**Industrial output growth.** In all of the four provinces, FDI contribution to industrial production has increased. In 2001, FDI firms accounted for over 30% of industrial output in Hanoi and nearly half of that in Hai Phong. Hanoi and Hai Phong are the most popular destination for FDI. However, Hung Yen and Hai Duong also started attracting FDI, particularly after 2000, when NH5 began to be practically in use. In Hung Yen, FDI firms are dominant producers, accounting for over 70% of the provincial industrial output. Domestic investment has also increased. In Hung Yen, out of the 33 newly registered domestic investment projects (total of the 1995-2000 period), 20 projects were registered in 2000.

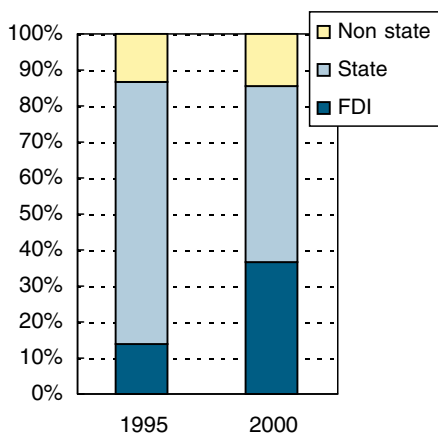
**Figure 4-4: Trend of FDI Inflow to the Four Provinces along Highway No.5**



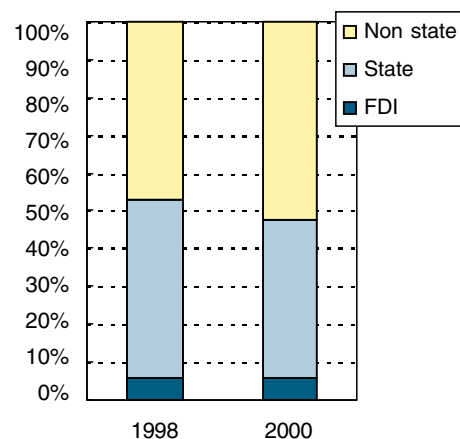
Note: The figure includes non-industrial FDI.

Source: MPI [quoted from JBIC/IDCJ, 2003].

**Figure 4-5: Structure of Industrial Gross Output of the 4 Provinces by Ownership**



**Figure 4-6: Structure of Industrial Labor Forces of the 4 Provinces by Ownership**



Source: DPIs of Hanoi, Hung Yen, Hai Duong and Hai Phong Peoples Committees, General Statistical Office.

The existence of well-developed infrastructure is a key determinant of business location. All of the four major industrial zones (IZs) in the north—Thang Long (JV of Japan and Vietnam, registered in 1997), Nomura-Hai Phong (JV of Japan and Vietnam, registered in 1994), Noi Bai (JV of Malaysia and Vietnam, registered in 1994), and Sai Dong B (JV of Korea and Vietnam, registered in 1996)—are located between Hanoi and Hai Phong cities. As of June 2003, the four IZs have attracted 98 FDI projects—equal to 85% (in terms of the number of projects) and 86% (in terms of registered capital) of FDI in the northern IZs. Two-thirds of these firms entered the zones in or after 2000 [MPI data].

Table 4-1 shows the number of FDI projects in the four IZs. Although negatively affected by the Asian financial crises, these IZs started to attract investors again from 2000, when basic transport infrastructure connecting the zones and their surrounding areas was completed. In Hung Yen and Hai Duong provinces, both FDI projects and local firms are concentrated along NH5 [see Appendix for the location of industrial zones in Hanoi and its vicinity].

**Table 4-1: Number of FDI in Major Industrial Zones alongside Highway No.5**

	Thang Long IP	Noi Bai IZ	Nomura- Hai Phong IZ	Sai Dong B*
1993				1
1994			1	1
1995				5
1996	1		3	1
1997	1	3	1	1
1998				
1999			2	1
2000	2			3
2001	6	2	5	4
2002	13	2	12	5
2003	N.A.	N.A.	4	2

Notes: 1) \*Excluding the expansion by two companies in 2002-03.  
 2) The data are as of March 2003. These are slightly different from MPI data on FDI (e.g., licensed year), but the trend and magnitude are largely consistent.  
 3) According to the MPI data (as of June 2003), there are 1 new project in Thang Long IP, 1 project in Noi Bai IZ, and 8 projects in Nomura Hai Phong IZ in 2003.

Source: JBIC/IDCJ [2003].

As Table 4-2 shows, NH5 and the Hai Phong port are frequently used by FDI firms. A recent interview survey with over 70 FDI firm managers<sup>19</sup> suggests that nearly 90% of new investments would not have been realized without the improvement of the two transport facilities. This survey also indicates major benefits realized by the improved transport infrastructure, including: (i) cost reduction in transporting imported inputs; (ii) time-saving in delivering raw materials and final products; (iii) increased reliability (less variation) in transportation time, leading to improved coordination of production and sales schedule; and (iv) business facilitation, e.g., by making one-day business trips between Hanoi and Hai Phong cities much easier.

<sup>19</sup> Based on the results of an interview survey conducted by IDCJ in March 2003, for over 70 managers of FDI enterprises in the northern Vietnam.

**Table 4-2: Use of Highway No.5 and Hai Phong Port by FDI in the northern Vietnam**

FDI type	Production site	Main market	Export channel	Import channel	Use of HP port	Use of NH5	Business examples
1	Ha Noi		Hai Phong	Hai Phong	XX	XX	OA products
2	Ha Noi	Local	Hai Phong	Hai Phong	XX	XX	sanitary ware
3	Ha Noi	Local		Hai Phong	XX	X	glass ware
4	Ha Noi		Internet				Software
5	Ha Noi		Noi Bai	Hai Phong	X	X	electronic parts
6	Hai Phong		Hai Phong	Hai Phong	XX		clothes, bags
7	Hai Phong	Local		Hai Phong	XX	X	glass container
8	Hai Phong	Local	Hai Phong	Hai Phong	XXX	XX	heavy metal structure
9	Hai Phong		Noi Bai	Noi Bai		XX	jewelry
10	Vinh Phuc	Local		Hai Phong	X	X	motorbike

Note: X shows frequency of use.

Source: JBIC/IDCJ [2003], based on FDI firm survey in March 2003.

**Job and income generation.** Industrial FDI has created a large number of direct jobs. As of mid-2003, FDI firms at the four IZs employed a total of 14,000 workers. Many of them plan to hire more staff in the near future, to 20,000 by end-2003. According to a questionnaire survey of employers at major IZs (including the above four), most of the workers are graduates of upper secondary schools or higher. Over 80% of the workers responded that income from foreign firms is significant for their household income (with 45% of the workers answering "very" significant)<sup>20</sup>. On average, income from FDI firms occupies about half of their total household income. Current income from foreign firms is higher than previous income (regardless of type of previous jobs).

**Table 4-3: Employees Survey at FDI Firms**

Current Position			Previous Job Experience		
Factory worker	102	43%	Farming	1	0%
Factory supervisor	9	4%	Handicraft	10	4%
Administration staff	76	32%	Factory employment	26	11%
Manager/professional staff	43	18%	Trade & Service	10	4%
Others	10	4%	Government employee	13	5%
<b>Total</b>	<b>240</b>	<b>100%</b>	Others	47	20%
			No experience	10	4%
			No answer	123	51%
			<b>Total</b>	<b>240</b>	<b>100%</b>
Academic Background			Significance in HH Income		
Secondary school	9	4%	Very significant	107	45%
High school	66	28%	More or less significant	90	38%
Vocational school	34	14%	Not significant	28	12%
Higher education	113	47%	No answer	15	6%
Others	18	8%	<b>Total</b>	<b>240</b>	<b>100%</b>
<b>Total</b>	<b>240</b>	<b>100%</b>			

Source: JBIC/IDCJ [2003] and CONCETTI.

<sup>20</sup> Based on the results of a questionnaire survey conducted by IDCJ/CONCETTI in March 2003, for 240 workers at FDI firms at major industrial zones (in the north).

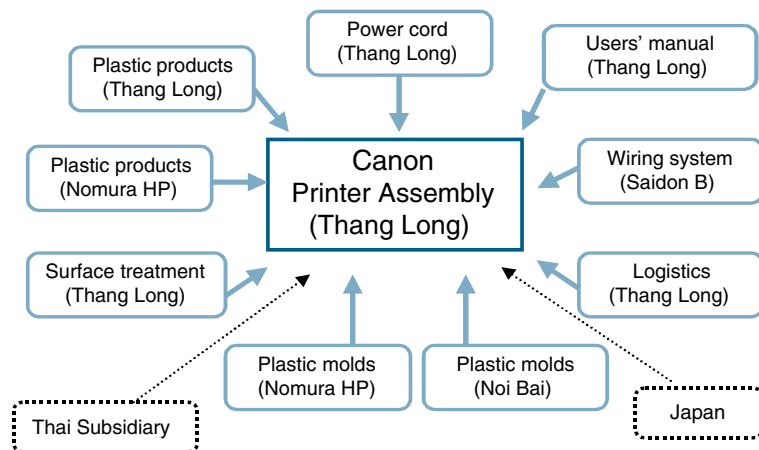
The "Canon Effect" is a good example of a synergetic impact of FDI attraction. Through the promotion of "satellite investment," additional jobs and income are generated. Canon's investment decision in Thang Long Industrial Park cannot be solely attributed to the improved Hanoi-Hai Phong transport corridor, but the existence of well-functioning infrastructure remains one of the key determinants, or even a prerequisite for attracting FDI [see Box 4-2].

In Hai Phong province, direct industrial labor created by FDI firms more than tripled during 1995-2001 (from 3,120 to 10,406 jobs). This corresponds to 8.4% of the provincial industrial labor force in 2001 [Statistical Yearbook of Hai Phong]. Such growth in FDI jobs is impressive, but the figure is small compared to FDI's contribution (45%) to provincial industrial output. Similar trends can be observed in Hanoi, Hung Yen, and Hai Duong. This is partly because most FDI firms are yet to operate on a full-fledged scale. Greater impacts can be expected in the future. (Also, the figure may partly reflect redundant labor at inefficient firms, especially large SOEs.)

The impact on job creation can be larger in the case of domestic investment. In addition to the above major IZs, there exist a number of provincial industrial zones managed by local authorities. The Hai Phong People's Committee has developed 15 industrial zones. In the Hai Phong province, the number of non-state firms (particularly, limited companies) has been increasing rapidly. In 2001, their industrial workers accounted for 59% of the total industrial labor force (compared to 41% in 1995).

**Box 4-2: Satellite Investment of FDI, "Canon Effect"**

In April 2002, Canon opened a printer assembly line in Thang Long Industrial Park. Since then, a variety of parts suppliers has come to invest in northern Vietnam. Some of these FDI firms are located in the same industrial park, but there are others located outside. As of March 2003, Canon employed about 2,000 workers (with further expansion planned). It is roughly estimated that related parts suppliers have created at least 2,000 jobs.



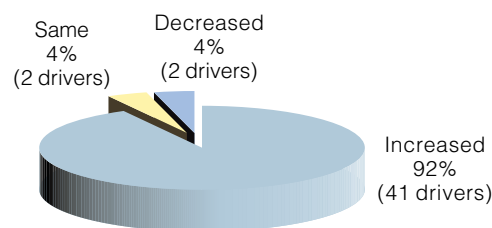
Source: Elaborated by the study team, based on JBIC/IDCJ [2003].

Moreover, increase cargo volume at the Hai Phong Port has expanded opportunities of related-businesses, which in turn have created jobs and income. The development of transport services in Hai Phong is a good example of indirect job and income generation, associated with the investment-inducement effect [see Box 4-3].

**Box 4-3: Indirect Job and Income Generation in Transport Services**

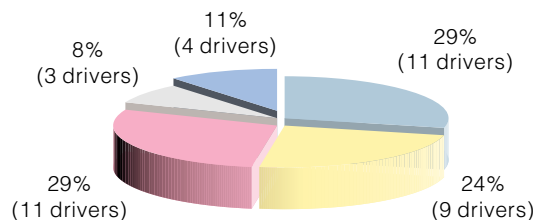
Transport, storage, and communications have been traditionally the most important sub-sector in service industry in Hai Phong (contributing to 14-15% of the provincial GDP). The port expansion gave further stimuli to them. Between 1999 and 2000, this sub-sector grew by 14% (compared to 9% of provincial GDP), and the volume of freight in Hai Phong city rose by 38% (compared to 10% during 1998-1999). The findings of an interview survey of 45 truck drivers around the Hai Phong Port also confirm: (i) significant increase in the volume of transported goods; and (ii) increased workloads and the resultant improvement in their monthly incomes.

**Changes in Volume of Transported Goods Since 2000**



Source: CONCETTI, based on interviews with randomly selected, 45 truck drivers at the Hai Phong Port in August 2003.

**Changes in Monthly Incomes of Truck Drivers Since 2000**



- Significantly increased due to increased workload
- Significantly increased due to low level of previous income
- Significantly increased due to increased workload and previous low income
- Unchanged
- Decreased

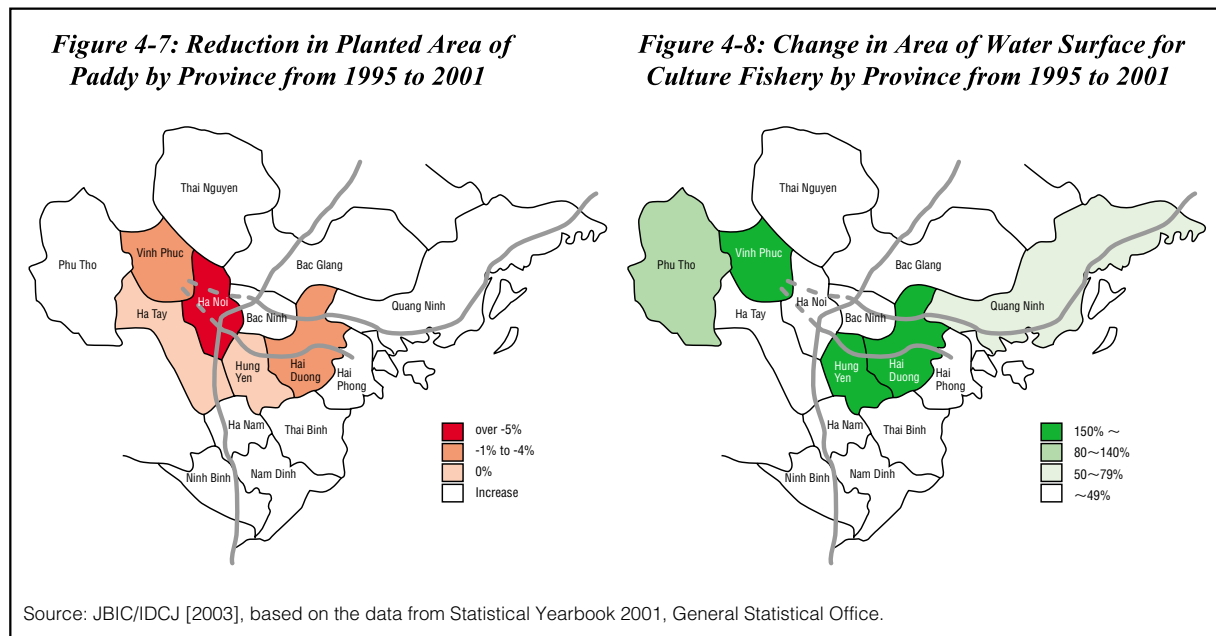
Source: CONCETTI, based on interviews with 38 drivers (of 45) who responded that they have been working at the port before 2000.

The survey also provides the information on changes in unloading time, procedures, and fees. The majority of the interviewed drivers reported shorter time (38 out of 45) and simpler procedures (31 out of 45) for unloading since 2000, thanks to the introduction of modern equipment. At the same time, some drivers commented on changes in the levels and structure of unloading fees, including fee increase (17 of 45).

Source: Prepared by the study team, based on CONCETTI [2003a].

***Agricultural Diversification and Off-Farm Business Expansion: Regional Economic Activation Effect***

In Hung Yen and Hai Duong, rural households have greatly diversified their agricultural production (for example, from rice to fisheries and poultry) and been increasingly engaged in new business opportunities. The statistics show that many farmers transformed paddy fields into ponds for fish farms and expanded fishery production. In Hung Yen, the agricultural share of provincial GDP declined from 52.7% (1995) to 42.7% (2000), and the share of industry increased from 14.5% to 27.3%. Hai Duong (which has a larger industrial base than Hung Yen) has seen rapid growth in the service sector.



**Income generation.** Two rural surveys conducted under the JBIC/IDCJ study provide insights into the process of change. These are: (i) a rural household survey, focusing on around 200 households (randomly selected) in six communes in Hun Yen and Hai Duong<sup>21</sup>, conducted in February-March 2003; and (ii) an interview survey with 54 traders (randomly selected) in local wholesale markets, Duong Cai, Yen My, and Bac markets (in Hun Yen) and Nam Sach market (in Hai Duong), conducted in February-March 2003 [see Appendix for the methodology and main findings of the two surveys].

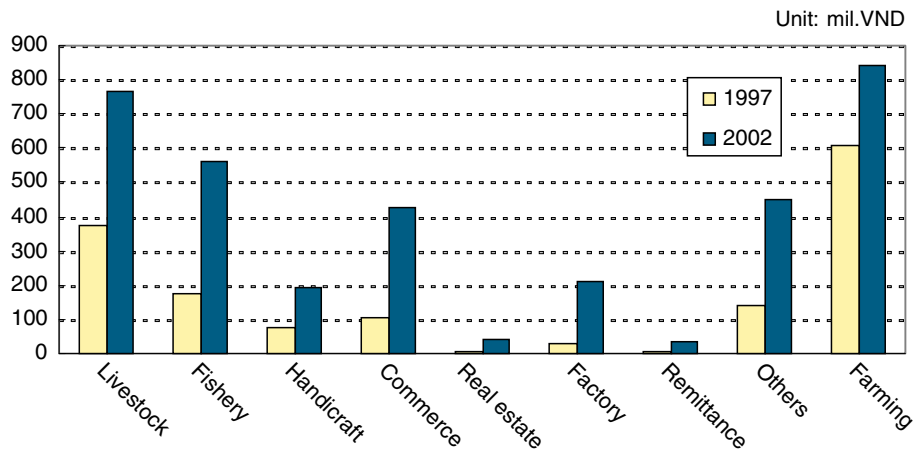
Between 1997 and 2002, per capita income at all the surveyed communes increased, but the growth rate was higher in the five communes along NH5 (at 126% on average, compared to 67% of the An Duc commune). However, the results also suggest that structural transformation has been spreading into all the six communes. This may be partly due to the combined effect of the development of NH5 and nearby feeder roads. In all six communes, the source of income for the surveyed households has diversified. The other findings include:

- Almost half of the households started new economic activities.
- While farming still accounts for the biggest share in the average household income, income from livestock production, fisheries and commerce increased significantly during 1997-2002.
- These farmers started new businesses because they can now expect greater profits and more customers in the local market.
- The information from agricultural extension service—either directly or through TV/radio media—was very useful for households in starting new businesses.

<sup>21</sup> Regarding the rural survey, five among the six surveyed communes are located along (or nearby) NH5 except for the An Duc commune.



**Figure 4-9: Structure of Average Income of the Surveyed Households: 1997-2002**



Note: The sample covers 206 rural households in six communes in Hung Yen and Hai Duong provinces. The rural household survey was conducted during February-March 2003.

Source: JBIC/IDCJ [2003].

**Table 4-4: Per Capita Income at the Surveyed Communes**

	Per capita income 1997	Per capita income 2002	Growth
Lai Vu, HD	1,409	2,885	105%
An Duc, HD	1,447	2,410	67%
Dinh Du, HY	1,668	5,824	249%
Giai Pham, HY	2,103	3,864	84%
Ban Yen Nhan, HY	2,107	4,431	110%
Cam Doai, HD	2,761	5,539	101%
Case communes along HW5	2,011	4,545	126%
Hai Duong Province average	2,962	4,732	60%
Hung Yen Province average	2,455	3,793	55%

Note: GDP per capita of Hung Yen 2000 is substituted for those of 2002 due to availability. Among the six communes surveyed, An Duc commune is located away from NH5.

Source: JBIC/IDCJ [2003].

These findings are consistent with the results of local traders survey. The interviewed traders noted significant changes in the variety and the origin of agricultural products sold in local markets during 1997-2002. Over 50% reported "much more" or "more" variety of products in the markets, and almost 70% of traders noted the diversification of product origins. Most of the farm products come from local areas, particularly Hai Duong and Hung Yen.

It appears that the improvement of trunk roads—together with the development of feeder roads—has promoted the diversification of marketing channels. The interviewed local traders noted the following major important changes: (i) time-saving to access the markets; (ii) increased number of buyers; and (iii) access to greater market opportunities. The surveyed rural households also confirm the expanded opportunities to sell their farm products over the last five years, through the increased number of local retailers, local consumers, and traders visiting rural villages (from other provinces). The importance of road network (trunk and rural roads) in improving the living standards of rural communities is well-documented in the DFID-supported perception study on four communes in Hung Yen province [see Box 4-4].

**Table 4-5: Views of Local Traders about Change in the Markets**

Save time to access the markets			Access to more markets opportunities		
	No. of traders			No. of traders	
Very significant	13	24%	Very significant	8	15%
Significant	27	50%	Significant	22	41%
No Impact	3	6%	No impact	4	7%
Negative impact	2	4%	Negative impact	1	2%
No answer	9	17%	No answer	19	35%
<b>Total</b>	<b>54</b>	<b>100%</b>	<b>Total</b>	<b>54</b>	<b>100%</b>

Increase in the turnover			Reason for the increase in the turnover*		
	No. of traders			No. of traders	
Very significant	4	7%	More purchasing power of local consumers	42	56%
Significant	24	44%	Higher valued products	17	23%
No impact	2	4%	Higher prices of products	11	15%
Negative impact	2	4%	Other reasons	3	4%
No answer	22	41%	No answer	2	3%
<b>Total</b>	<b>54</b>	<b>100%</b>	<b>Total</b>	<b>75</b>	<b>100%</b>

\* more than one answer

Source: JBIC/IDCJ [2003], based on local traders survey in February/March 2003.

**Rising consumers demand.** All the above suggest an emerging "virtuous cycle" in the rural economy. Rural households now enjoy higher disposable income. With increased purchasing power, they have greater consumer demand for a variety of products and services. Thanks to the improved access to cities, members of rural households visit large cities (particularly, Hanoi and Hai Duong) more frequently, for the purposes of leisure, trade, and health care etc. [see Appendix on the rural road network and public bus transport]. Public transport continues to be mainly used for their city visits (by about half of the households); but the motorbike is increasingly becoming a popular means of transportation.

One emerging social aspect of NH5 seems to be traffic accidents. While most of the surveyed households consider NH5 convenient, at the same time, they point out that it is dangerous or difficult to cross. It is reported that the number of traffic accidents along the highway increased from 251 per year (1999) to 376 (2002). (Although the number of accidents continues to rise, less injuries and deaths along NH5 compared to the national average are reported.)

**Box 4-4: Community Perception of Road Network  
Duong Quang Commune, My Hao District, Hung Yen Province:**

Duong Quang commune is located 3km from NH5 running from Hanoi to Hai Phong. Despite its proximity to this major highway, rice cultivation is still the main source of income. The income of residents is constrained by lack of land. On average each resident has only 827m<sup>2</sup> of productive land from which to make a living. There remain 171 poor households out of a total of 1,426 households in the commune.

A district road runs through the commune (upgraded by the World Bank/DFID-supported Rural Transport II project in 2001-2002). Perceptions of the commune are that the access provided by the road network (trunk and local) is a key factor in the development of the commune. Since the rural road was upgraded linking the commune to NH5, the following benefits have been perceived and taken place:

- Incomes have increased at 7% a year over the last 5 years, reaching 3,200,000VND in 2002 (Equivalent to US\$206 at US\$1 =15,500VND).
- Locally generated revenue for the communes own development has increased at 15% per year.
- The economic structure of the commune is transforming. From a rice-based to a mixed-economy including cultivation, livestock rearing, services, and cottage industries. There are more shops, more rice mills, more traders of agricultural produce, more means of transport: 1 truck, 6 mini-buses, 8 cong-nongs (a locally manufactured farm vehicle), 492 motor-bikes, and 1,817 bicycles.
- The commune also has better social infrastructure: primary schools, health clinics, power supplies and the post office have all been upgraded and utilization of these services has increased. Enrollment and graduation rates of school children have increased and primary health care programs reach more children as they can access the commune clinic
- Social life in the commune has also improved thanks to better economic conditions and easier communications. Some villages have mobilized resources from their own villagers to build concrete village roads—to reliably connect themselves to the road network. Villagers also apply rules to protect these roads from overloading and raise maintenance revenues.

*Mr. Kieu Van Do, Duong Xa village:  
"In the past, I had to carry paddy on my shoulders to the Thua market, which is 7 km far away. There were few rice mills in the commune at that time. Now there are 20 rice mills, of which 3 ones at large-scale production run by 15 workers."  
Duong Quang commune, August 2003*

*Mr. Kieu Van Do, Duong Xa village:  
"In the past, when the road network was not upgraded and improved, I had to pay 2,500 vnd for a sack of rice. Now the price is 2,000 vnd, a significant reduction"  
Duong Quang commune, August 2003.*

- Markets have also become far more accessible, reducing costs in the local economy.
- Some people have found jobs in the industrial factories established along NH5. High school students are now motivated to study as they see opportunities for jobs with a higher cash income in industrial factories. The disposable income from this employment has had a notable stimulating effect on local economic activity.
- With better access to information local people are better able to adopt technology and knowledge. They are using improved and higher market value seeds, applying modern techniques in cultivation and rearing livestock—selectively absorbing appropriate innovations for improving their livelihoods.

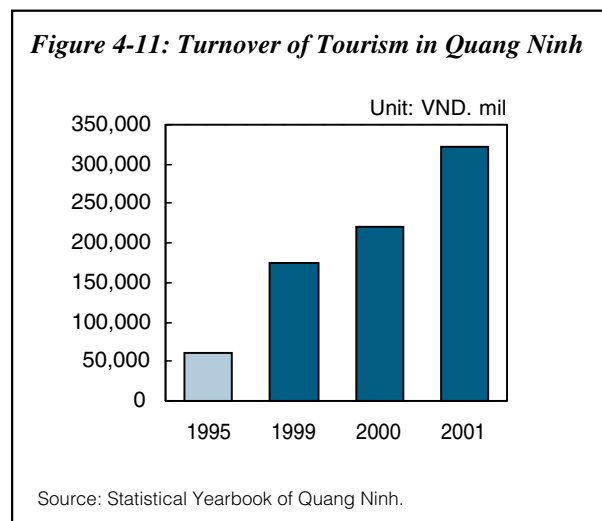
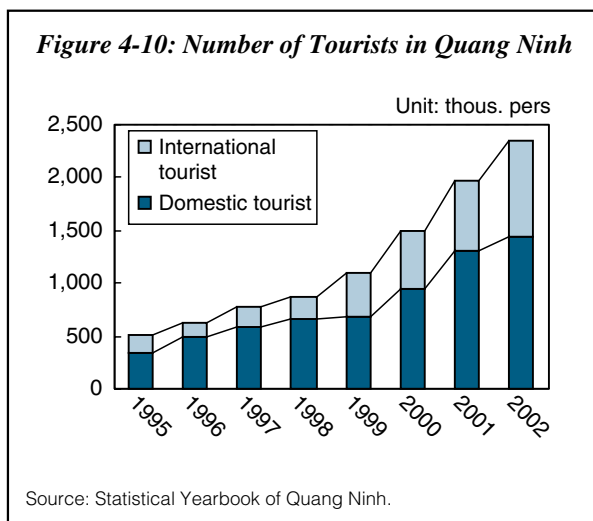
*Mr. Kieu Ngoc Quang, 32 years old, Duong Xa village:  
"Nowadays, price of pig is much higher than before. Mobile agents go house-to-house and buy. In the past, price of pig sold in the commune was 500 vnd/kg lower than that at markets near NH5. Now there is no such difference. "  
Duong Quang commune, August 2003*

Source: Participatory Perception Study, DFID September 2003.

**Booming Tourism in Ha Long Bay: Regional Economy Activation Effect**

With the development of the trunk road network, travel time between Hanoi and Ha Long Bay has been reduced from 5.35 hours (1993) to 3.35 hours (1998), and further down to 2.05 hours (2003)<sup>22</sup>. As travel becomes more convenient and comfortable, demand for Ha Long Bay tourism has surged. Many visitors to Hanoi now make day-trips to Ha Long Bay. The number of tourists (both Vietnamese and foreign) to Quang Ninh province quadrupled from 502,700 (1995) to 2,351,000 (2002), with a sharp increase from 2000. In this regard, the improvement of NH18 (which links Noi Bai international airport to Ha Long city) has also played an important role in tourism promotion, by developing the road network, jointly with NH5.

**Increased sales.** Tourism development, in turn, has stimulated the local economy. The number of hotels increased from 83 (1995) to 130 (1999), and 138 (2001). These new establishments are mainly located in Hon Gai, Bai Chay, and Mong Cai. During 1995-2001, tourism turnover increased by more than five times (with a 45% increase from 2000 to 2001 alone) [Quang Ninh Dept. of Tourism].



Provincial GDP grew at 9.6% per year (on average) during 1996-2000, and even faster at 12% in 2001 and 2002. During 2000-2002, poverty incidence in Quang Ninh province almost halved from 15% to 8%, based on a local standard [Quang Ninh DPI].

The results of an interview survey with selected hotel managers are also consistent with the above trend. The hotel managers responded that hotels received more guests during the last five years and plan to expand their businesses in the future (including staff increases)<sup>23</sup>. They confirm that NH5 and NH18 are serving as the main traveling routes for guests, and are frequently used for their business with partners. They also stressed such benefits that shorter traveling time from the hotel to main cities greatly contributed to: (i) attracting more guests (both domestic and foreign) to the region, with the more convenient transportation; and (ii) facilitating the hotel in terms of procurement of commodities.

**Job and income generation.** Tourism has promoted the creation of local employment. The Department of Tourism in Quang Ninh estimates that direct labor in the tourism sector totals about 9,000. In Bai Chay, for instance, most residents are employed by the hotels there. According to a questionnaire survey on hotel staff, they are mostly local residents (living in the same or neighbor provinces such as

<sup>22</sup> Based on an interview survey with 30 drivers, conducted by CONCETTI in June 2003.

<sup>23</sup> These are the views expressed by the managers of five hotels in Quang Ninh (one 4-star hotel and four 2-star hotels) conducted by CONCETTI in June 2003. Although this is not a sample survey, its findings are consistent with the general trend of tourism in Quang Ninh.

Hai Phong, Hai Duong, Nam Dinh) and graduated from upper secondary school, or have completed higher level of education (such as university and vocational school)<sup>24</sup>. The level of their salary is higher or the same, compared to that of their previous salary. About half of the interviewed staff responded that monthly income is important for themselves and their families.

**Link with the local economy.** Since tourism touches all sectors, it has strong linkages with the domestic economy<sup>25</sup>. The hotel managers stated that food is mostly procured from the same or neighboring provinces and that items such as cosmetics, furniture and fitting are purchased domestically. Tourism has also attracted FDI to the Quang Ninh province. In terms of the number of projects, the share of the tourism and service sector in total FDI increased from 24% (2001) to nearly 50% by end-June, 2003. In terms of the amount of invested capital, this sector accounts for almost 60% of the total FDI in Quang Ninh, as of end-June 2003[Quang Ninh DPI].

*Table 4-6: Employee Survey at Selected Hotels in Quang Ninh*

<b>Current Position</b>		Frequency		<b>Previous Job Experience</b>		Frequency	
Room-serving staff	5	20.0%	Farming	1	4.0%		
Waiter/waitress	3	12.0%	Service	4	16.0%		
Marketing staff	3	12.0%	Government employee	6	24.0%		
Manager	2	8.0%	Others	1	4.0%		
Others	12	48.0%	No job experience	13	52.0%		
<b>Total</b>	<b>25</b>	<b>100.0%</b>	<b>Total</b>	<b>25</b>	<b>100.0%</b>		

\*Note: Others include receptionists, technicians, shop sellers and cashiers.

<b>Academic Background</b>		Frequency		<b>How Does Income Change?</b>		Frequency	
Lower-secondary education	1	40%	Significantly increased	6	24.0%		
Upper-secondary education	13	52.0%	More or less increased	9	36.0%		
Vocational education	2	8.0%	Unchanged	9	36.0%		
Higher education	9	36.0%	No answer	1	4.0%		
<b>Total</b>	<b>25</b>	<b>100.0%</b>	<b>Total</b>	<b>25</b>	<b>100.0%</b>		

Source: CONCETTI (based on interview survey conducted in June 2003).

#### 4-2. Case Study 2: My Thuan Bridge and National Highway No.1

In the Mekong Delta, the construction of the My Thuan Bridge and the improvement of National Highway No.1 (hereinafter, NH1) have greatly changed the nature and volume of the economic linkage between Ho Chi Minh City and Can Tho. Can Tho is the fastest growing province in the Mekong Delta and has been emerging as a growth center in the region. During 2000-2001, provincial GDP and per capita GDP grew at 14.6% and 13.3% per year—much faster than the average of the entire Mekong Delta (8.1% and 6.4% respectively). The industrial sector is driving economic growth, and Can Tho has become the most rapidly industrialized area in this region [see Figures 4-12, 4-13]. Such dynamism in Can Tho was already visible, but the growth rate of industrial production has further accelerated since 2000. More recently, tourism has also been developing rapidly.

As the latest VHLSS 2002 shows, the Mekong Delta region has achieved important progress in poverty reduction and growth in per capita income [see Table 4-7]. Although further analysis is needed, this may be partly attributed to the strengthened economic link between HCMC and the Mekong Delta,

<sup>24</sup> Based on a questionnaire survey on 25 employees of the above five hotels, conducted by CONCETTI in June 2003.

<sup>25</sup> The World Travel & Tourism Council estimates that in Vietnam, the number of indirect jobs created in the sector is 3 times greater than direct jobs [WTTC 2003].

through the two large-scale infrastructure projects.

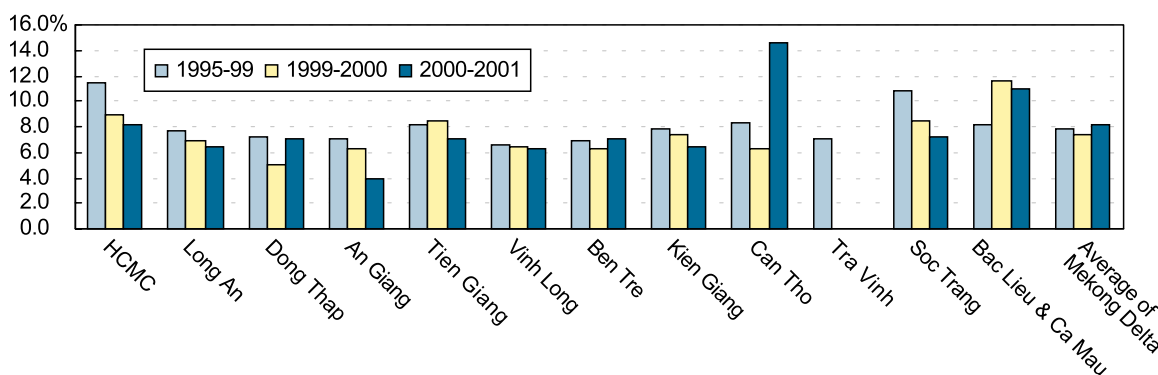
Regarding the impact of the construction of the My Thuan Bridge, useful data and information are available from a series of studies funded by AusAID, under the three-year monitoring program. The

**Table 4-7: Poverty Incidence by Region, 1993-2002 Headcount Index (%)**

Regions	1993	1998	2002
Red River Delta	63	29	23
North East	79	59	38
North West	-	-	69
North Central	75	48	44
South Central Coast	50	35	25
Central Highland	70	52	52
Ho Chi Minh City and Vicinity	33	8	11
Mekong Delta	47	37	23

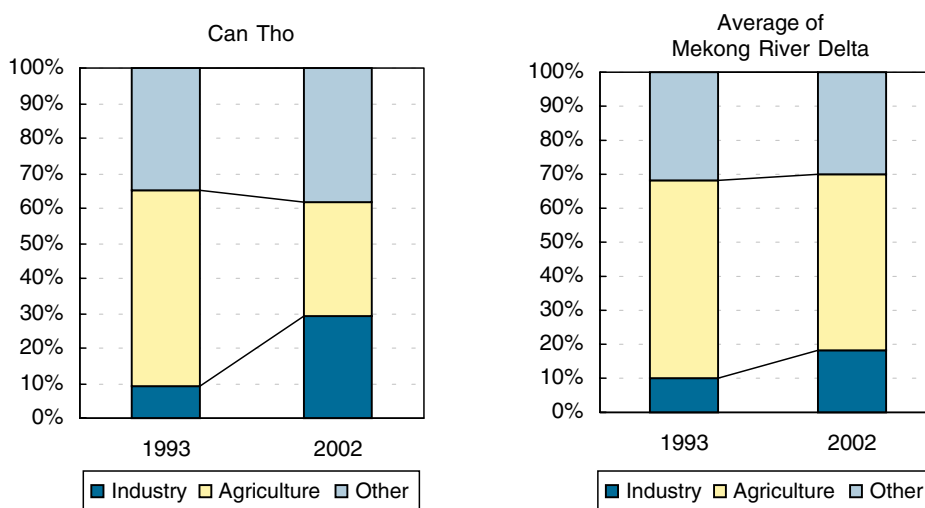
Source: VLSS 1993, VLSS 1998, and VHLSS 2002.

**Figure 4-12: GDP Growth in Mekong Delta from 1995 to 2001 (by province)**



Source: Elaborated by the study team based on AusAID [2003a] p.9, Table 2-3.

**Figure 4-13: GDP Structure Rapid Increase of Industry in Can Tho Province**



Source: Elaborated by the study team based on AusAID [2003b], p.9, Table 2-4.

AusAID Interim Report notes substantial benefits of reduced travel time and improved travel conditions, before and after the opening of the Bridge, and suggests a considerable amount of additional economic and social activity and attendant transport movement. In particular, the report refers to such positive impacts as: (i) the development of industrial zones in the areas between the Tien River and the Hau River; and (ii) a rising number of shops and businesses along the vicinity of the My Thuan Bridge [AusAID 2003a, 2003b].

At the same time, it is also important to assess the impact of the My Thuan Bridge from a broader perspective. The Bridge should be understood more generally to be one crucial link in improving land access between HCMC, which is the largest city in Vietnam, and Can Tho, which is the commercial center of the entire Mekong Delta.

**Box 4-5: My Thuan Bridge and National Highway No.1 — Impact on Traffic**

The Mekong Delta, which accounts for nearly 40% of agricultural production and about one-third of agricultural GDP in Vietnam, is the most important agricultural product base. National Highway No.1 (NH1) is the only road that links the Mekong Delta at the southern end of Vietnam to the remainder of the country. However, the transportation was not smooth due to the degraded road condition and interruption by branches of the Mekong River, which was crossed by ferry. The upgrading of NH1 has been the top priority project in the infrastructure development strategy of Vietnam and the access route to the Mekong Delta was one of the first corridors to benefit from this strategy. Two large-scale infrastructure projects were implemented by external funding. One is the improvement of NH1 from HCMC to Can Tho, and the other is construction of the My Thuan Bridge across the Tien River, as shown in the table below.

The recent studies by AusAID [2003a, 2003b] and the World Bank [2003a] show the following direct

Contents Of projects	Related donor funding projects	Highway Rehabilitation Project	My Thuan Bridge Project
Project Description		Improvement of NH1 from HCMC to Can Tho	Construct a major cable stayed bridge across the Mekong River (Tien Giang) at My Thuan
Funding Agency		World Bank	AusAID
Project Cost		US\$176 million (US\$158.5 million financed by IDA)* <sup>1</sup>	A\$90 million (A\$60 million funded by Australian Government)
Opening to Public Use		September 1999* <sup>2</sup>	May 2000

Notes: 1) This amount includes the improvement of the Hanoi to Vinh (Nghe An Province) section of NH1 under the same project.  
2) During the same period, bridges along the HCMC to Can Tho section were constructed with JBIC funding. Also, the other sections of NH1 were upgraded under the JBIC-and the ADB-financed projects.

Sources: My Thuan Bridge Project: AusAID [2003a, 2003b].  
Highway Rehabilitation Project: World Bank [2002b].

benefits realized by the two large-scale infrastructure projects [see Appendix for the details of their direct impacts].

- Travel time between HCMC and cities in the Mekong Delta was reduced by almost one third. In particular, after the opening of the My Thuan Bridge, the time for crossing the Tien River was cut from 31.6 minutes to 5.5 minutes (at normal traffic speed).
- The current My Thuan Bridge tolls are much lower than the former ferry tolls in real terms. On the other hand, bus fares and freight rates between HCMC, Vinh Long and Can Tho have been reduced only slightly from 1998 to 2003.
- The traffic volume at the bridge almost tripled between 1999 and 2002. Moreover, actual volume is much higher than the original estimates (forecasted in 1995 at the time of appraisal).

- The traffic volume on Can Tho ferry increased steadily during 1996-98; but its growth rate has accelerated since 1999, when the rehabilitated section of HCMC to Can Tho was open to traffic (in September 1999).

According to the World Bank's Implementation Completion Report [2002b], EIRR of the NH1 improvement project (HCMC-Can Tho section) is estimated at 55% (discount rate=10%).

Change in Bus Travel Time and Speed							Change in Truck Travel Time and Speed								
	1998			2003			% increase in speed		1998			2003			% increase in speed
	km	hours	kph	hours	kph	km			Hours	kph	hours	kph			
HCMC to:								HCMC to:							
My Tho	72	2.2	33.2	1.5	47.8	44		My Tho	72	2.3	31.2	1.6	46.3	48	
Vinh Long	136	3.5	38.5	2.7	51.2	33		Vinh Long	136	4.1	33.4	2.8	48.2	44	
Can Tho	169	4.5	37.7	3.2	52.3	39		Can Tho	169	4.9	34.5	3.4	49.6	44	

Source: Elaborated by the study team, based on the World Bank [2003a], p.3-10, Table 3.9 and 3.10.

#### Traffic at My Thuan Bridge, Forecast and Actual

	1999		2002	
	Forecast	Actual (ferry)	Forecast	Actual (bridge)
Motorcycles	3,600	3,120 (-13%)	4,580	10,610 (+132%)
Other vehicles	5,370	3,410 (-36%)	6,770	9,480 (+40%)
Vehicle Occupants	46,360	35,290	64,730	86,770 (+34%)

Source: Elaborated by the study team, based on the AusAID [2003a], p.22, Table 3.4 and AusAID [2003b], p.35, Table 3.13.

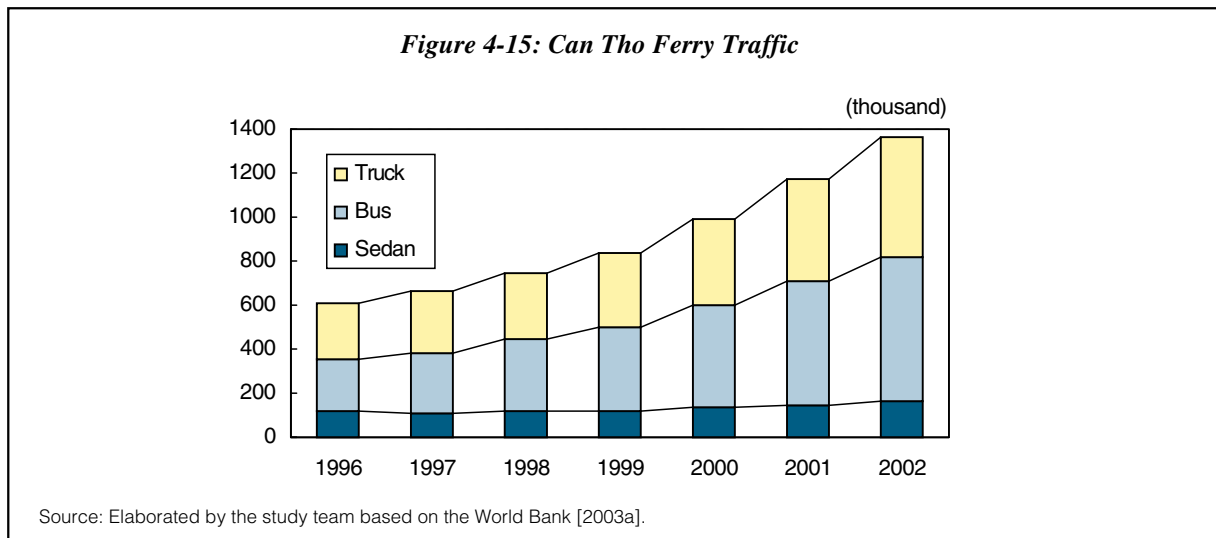
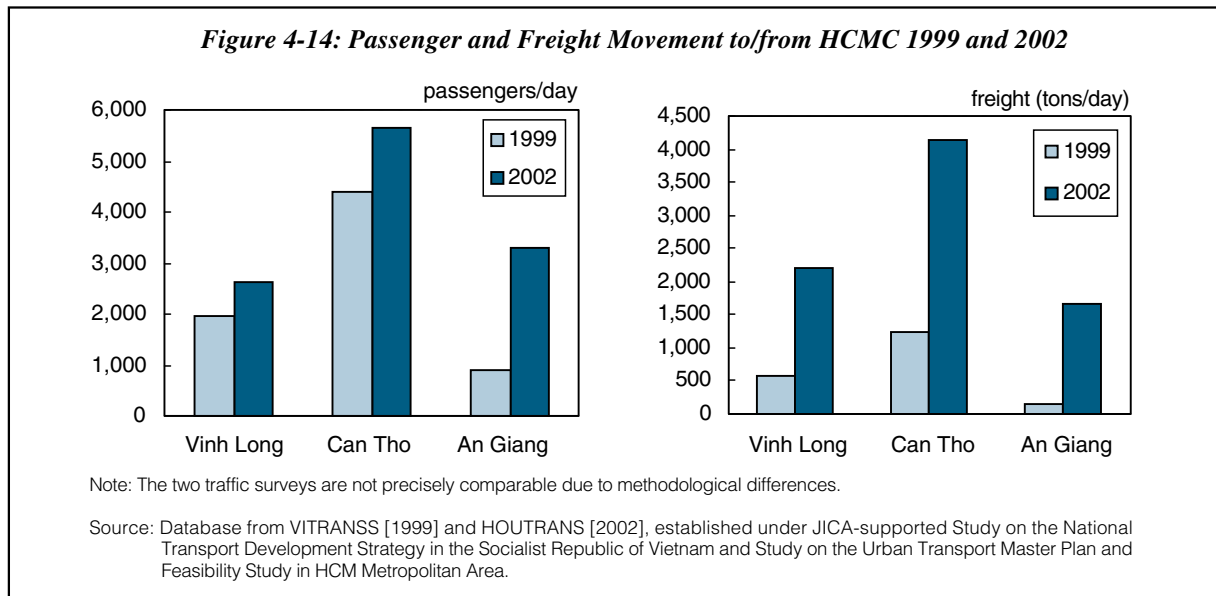
### ***Stronger and Broader Impacts on Traffic Movement in the Mekong Delta***

The available data suggest broader impacts brought about by the upgrading of NH1 and the construction of the My Thuan Bridge in three ways. First, NH1 has strengthened its function as the main artery linking Ho Chi Minh City and the cities in the Mekong Delta. Figure 4-14 compares traffic survey results from 1999 and 2002. Both surveys report passengers and freight movement between HCMC and one of the Delta cities (collected at the exit of HCMC on NH1, based on origin/destination surveys). Road traffic volume, particularly freight movement, increased sharply during 1999-2002 with the growth rates ranging between 230% and 1,080% (significantly higher than the average growth rate of the Mekong Delta, at the annualized rate of 9.9% during 1995-2000)<sup>26</sup>. Data on Can Tho Ferry traffic in Figure 4-15 also confirm the rising traffic volume, although the increase looks less dramatic. All these results imply the strengthened economic link between HCMC and the Mekong Delta, through improved land transport [see also Appendix for the analysis of induced and/or diverted traffic].

Second, the impact of the improved land transport has widely spread to the provinces beyond NH1. The influenced areas are not only alongside NH1 and include even An Giang province. Figure 4-14 clearly shows that not only Vinh Long and Can Tho, but also An Giang has been greatly affected. During

<sup>26</sup> Although the 1999-2002 data and the 1995-2000 data may not be directly comparable, they should be able to show the magnitude and direction of change. The 1995-2000 data are from AusAID [2003a], which calculate on the basis of "road transport tasks" (tonne-kilometers for freight movement).



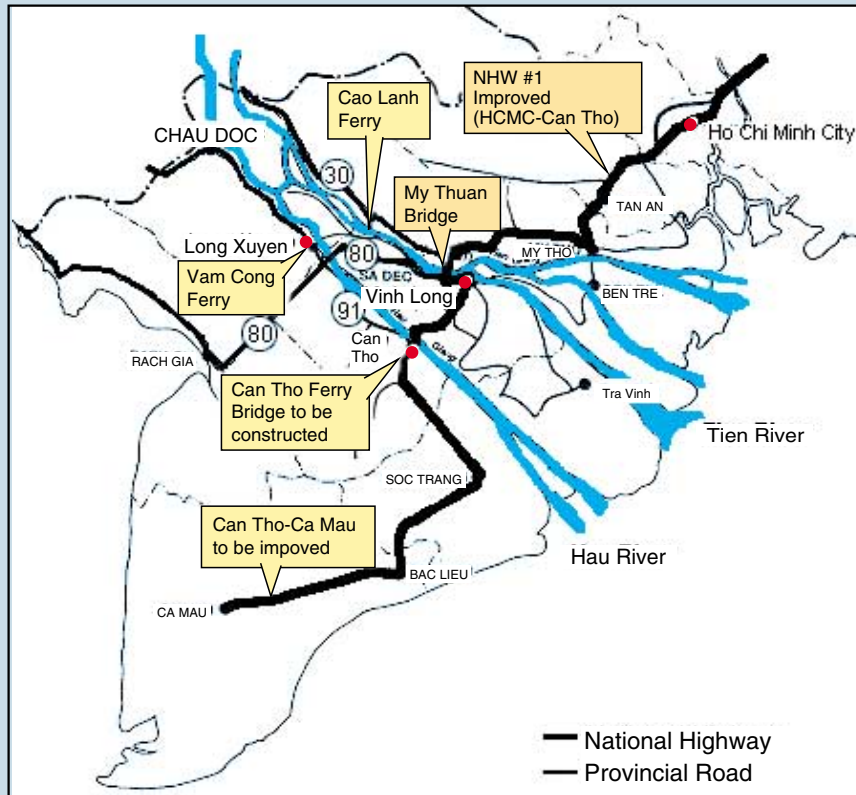


1999-2002, the number of passengers and freight movement between HCMC and An Giang dramatically increased.

NH1 does not pass An Giang. But its provincial capital Long Xuyen is connected to NH1 by three routes [see Figure 4-16 for map]: (i) NH1-Cao Lanh ferry-Vam Cong ferry; (ii) NH1-My Thuan Bridge-Vam Cong ferry; and (iii) NH1-My Thuan Bridge-Can Tho ferry. A recent survey on bus and truck companies shows that bus companies often use the route (ii) and have greatly benefited from the improved NH1 and the construction of the My Thuan Bridge. Also, there is a sign that truck companies are beginning to use Can Tho as hub for their operations on the west bank of the Tien River [see Box 4-6]. It is fair to say that the effects of these two large-scale infrastructure projects have been widely spread throughout the Mekong Delta region and that they have created great opportunities for growth due to the impacts of linking the region with HCMC.

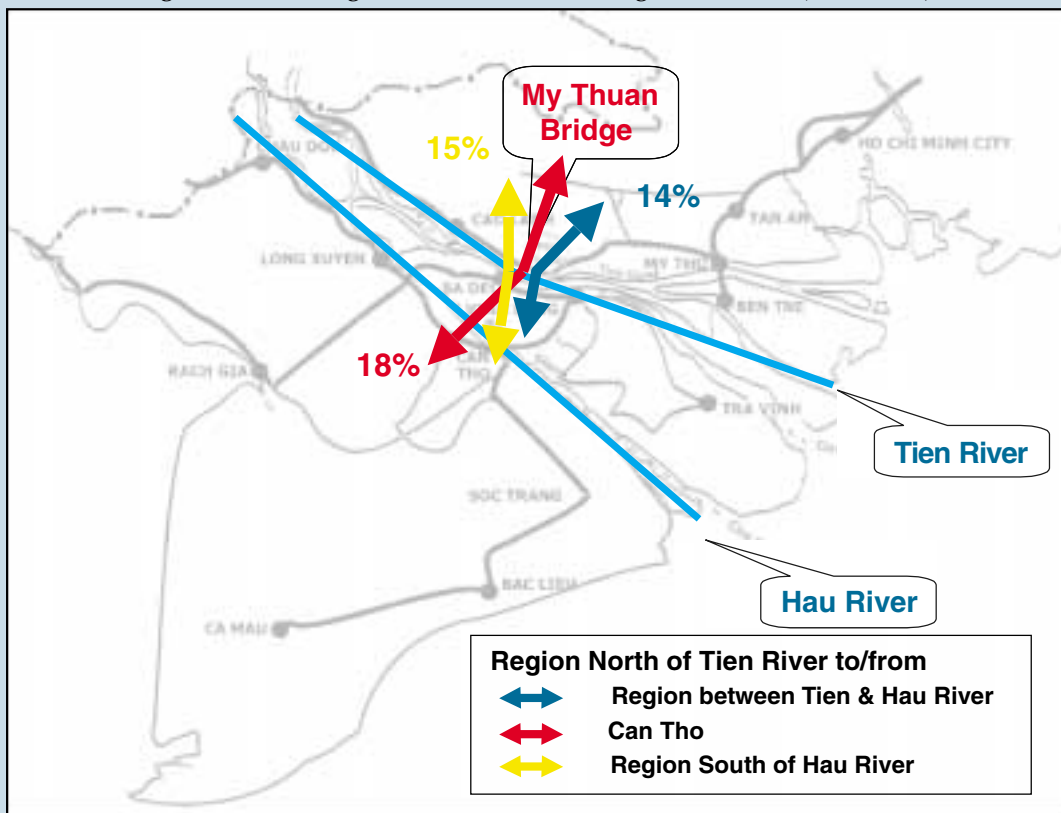
Third, the area south to Can Tho (Han River) has also benefited. The origin/destination surveys on the My Thuan Bridge at 1994 and 2002 show that freight movement between the area north of the Tien River and the area south of Hau River [see Figure 4-17, red arrow] grew faster than the other areas, such as: (i) between the area north of the Tien River and the area bounded by the Tien and Hau Rivers (blue arrow); and (ii) between the area north of the Tien River and Can Tho (yellow arrow). Although

Figure 4-16: Road Network in Mekong Delta



Source: Elaborated by the study team, based on the AusAID [2003b], p.2. Figure 1.1.

Figure 4-17: Average Annual Growth in Freight Movement (1994-2002)



Source: Elaborated by the study team based on the AusAID [2003b], pp.30-32.

**Box 4-6: Bus and Truck Operators Survey\***

Six bus companies and three truck companies which operate routes from HCMC to Vinh Long, Can Tho and An Giang were selected from the companies surveyed in the JICA-supported HOUTRNAS study, in order to obtain their perception of the impacts of the improvement of NH1 and the opening of the My Thuan Bridge. The survey was conducted in July 2003, by the HOUTRANS team.

1. Bus company survey

Among six companies, two operate the route to/from Can Tho and four operate the route to/from An Giang. (No company was found which operates the Vinh Long route as it is considered on the way to other destinations). All companies noted reduction in time and tolls, thanks to the opening of the My Thuan Bridge. Time-saving from the improvement of NH1 was not so clearly perceived due to the speed limit (regulated) and the already heavy traffic. Operating costs have been reduced by 14% on average. But, bus fares have not been decreased. Regarding bottlenecks to expansion of their operations, the interviewed companies responded: (i) waiting time for ferries (Vam Cong ferry for the An Giang route and Can Tho ferry for the Can Tho route); and (ii) increased traffic volume on NH1.

2. Truck company survey

All three companies interviewed include HCMC to Vinh Long, Can Tho and An Giang routes in their operations. All of them appreciated the time and toll reductions brought about by the opening of the My Thuan Bridge and the improvement of NH1. In addition to these direct impacts, they noted safer conditions for cargo transport and increased demand for cargo. One company explained that the freight service for the HCMC to Vinh Long route has decreased. Instead, the company started to transport freight from/to Vinh Long to Can Tho Terminal in order to use Can Tho as a hub on the west bank of the Tien River.

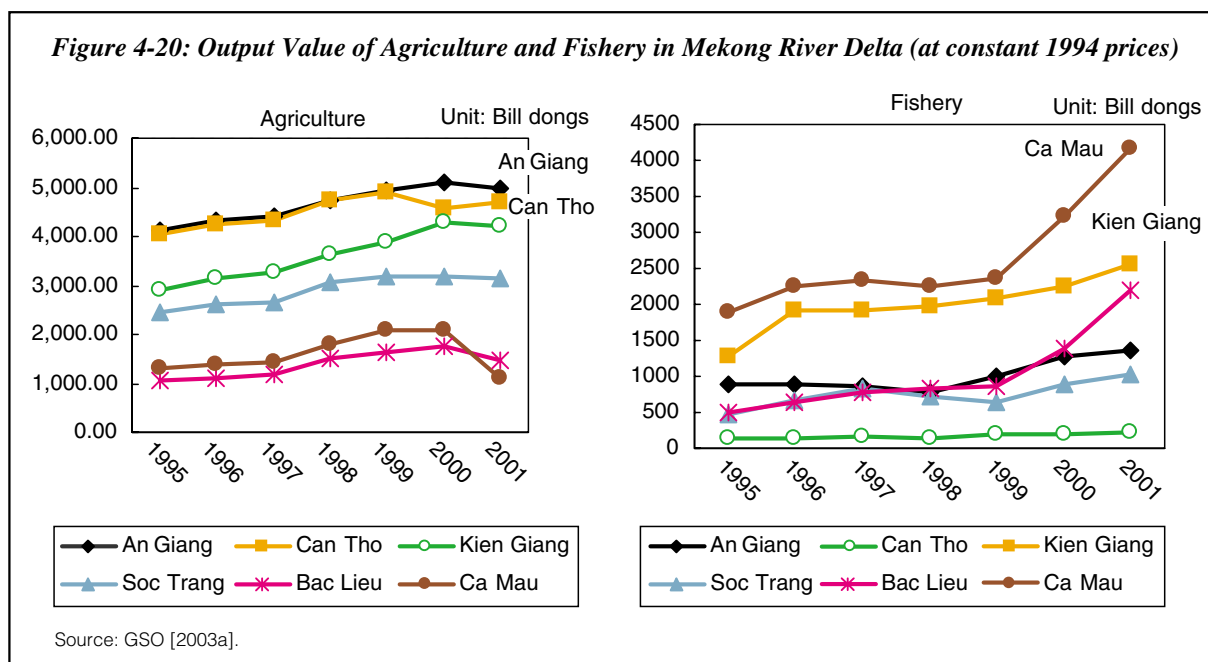
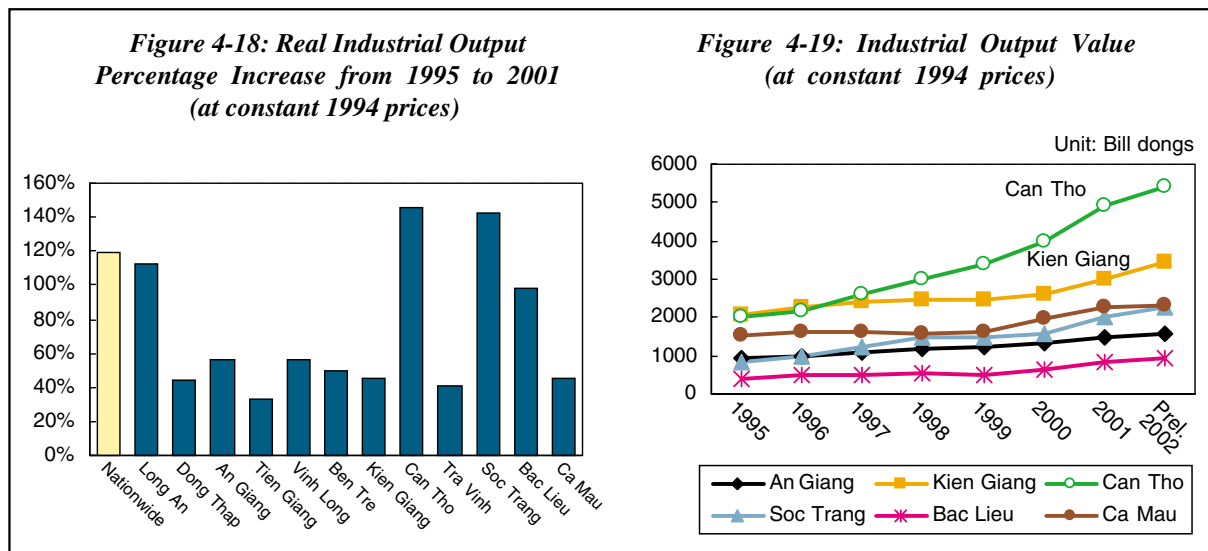
Note: \* The survey was conducted by ALMEC in consultation with GRIPS. ALMEC is a Japanese consultant company, specialized in the transport sector. The ALMEC team was responsible for the elaboration of VITRANSS [1999] and is currently engaged in the HOUTRANS study under JICA-supported technical cooperation.

the NH1 at the region south of Hau River has not been improved, this area also appears to be enjoying the benefits of improved land transport of HCMC and Can Tho.

***Natural Resources-Based Industrial Growth: Investment-inducement and Regional Economic Activation Effects***

The patterns and nature of investment attraction in Can Tho are distinct from those observed in the northern transport corridor. Here, industrialization is natural resource-based, linked with the local economy (e.g., agriculture and fishery production). It seems that in the Mekong Delta, the investment inducement effect and the regional economy activation effect are mutually reinforcing.

**Industrial output growth.** Figures 4-17 and 4-18 show the growth of industrial output by province, compared to 1995. Both in terms of output volume and growth rate, Can Tho has achieved the most rapid growth in industrial production. There has been further acceleration in growth rates from 2000. Furthermore, provinces in the Mekong Delta appear to be growing by taking advantage of their respective resource potentials. For example, in Ca Mau, Bac Lieu, and Kien Gian provinces, a rapid increase in fishery production is observed. Agriculture output continues to rise in An Giang and Kien Gian provinces [see Figure 4-20]. Although further analysis is needed, the improved land transport to HCMC and Can Tho may be one of the contributing factors to their enhanced use of resource potential.



According to CEPIZA (Can Tho Export Processing & Industrial Zones Authority), currently, Can Tho has Tra Noc I and II Industrial Zones ((I) registered in 1994), and Hung Phu Industrial Zone (currently being developed and located adjacent to the Can Tho port). Also, a plan to construct Vi Than Industrial Zone is underway. Altogether, they boast about 80 firms (with total registered capital of approximately \$230 million). Many of them are Vietnamese enterprises engaged in food processing. There are 20 FDI firms (with a total registered capital of \$100 million), eight of which were established in or after 2000 [MPI data as of March 2003].

**Jobs and income generation.** CEPIZA estimates that these firms have created about 13,000 jobs and that their procurement of agricultural and fishery products (as raw materials) have benefited about 10,000 households in Can Tho province. About 80% of the factory workers come from Can Tho province. The provincial authorities expect additional 60 investment projects by 2005, which should generate 10,000 new jobs<sup>27</sup>.

<sup>27</sup> Based on the authors' interviews with the Department of Planning and Investment in the Can Tho province and CEPIZA in June 2003.

Interviews with local businessmen and provincial authorities clearly show how the improved land transportation has facilitated their business with partners and their procurement of inputs and raw materials. Their views also highlight the importance of multimodal transport in thinking the future development of Can Tho and the Mekong Delta [see Box 4-7].

***Box 4-7: Business Prospects in the Mekong Delta—A View of Factory Owner***

Mr. Nguyen Huu Thanh has been in the food processing business for 17 years. He taught at an agricultural university in Thu Duc, worked for a food company in Vung Tau, and learned international business and the customer-satisfaction principle from foreign buyers. In 1997, he founded Viet Foods Co. Ltd, a private firm specializing in frozen shrimp, in the Can Tho IZ. His sales rose from \$5 million in 2000 to \$23 million in 2002, with \$30 million expected in 2003. He employs 1,300 workers and procures raw shrimps from coastal provinces (Soc Trang, Tra Vinh, Ben Tre, Long An) in the Mekong Delta. He proudly guides visitors through his ultra-clean factory saying, "Can you smell any odor? Can you spot any dirt? The tools and vats are disinfected every hour. If we don't do it, foreigners will not buy."

His shrimps are all exported, with 80% destined for Japan. They are either shipped from Can Tho Port in freezer containers or trucked via the National Highway No.1 to HCMC, where they are reloaded onto an ocean-going vessel. Water transportation is securer but trucking becomes necessary since the capacity of Can Tho Port is limited and there are only three small boats per week between Can Tho and HCMC.

The upgrading of NH1, including the building of My Thuan Bridge, benefited his company through improved access to foreign customers. Previously, it was much more difficult to convince potential buyers to travel all the way to Can Tho to visit his factory.

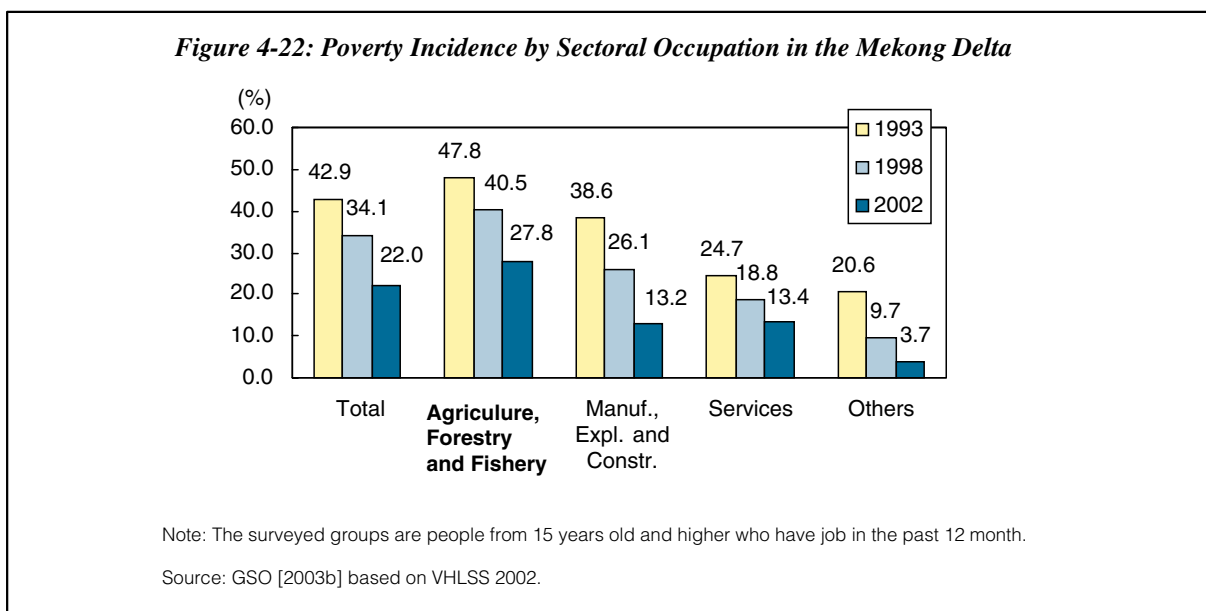
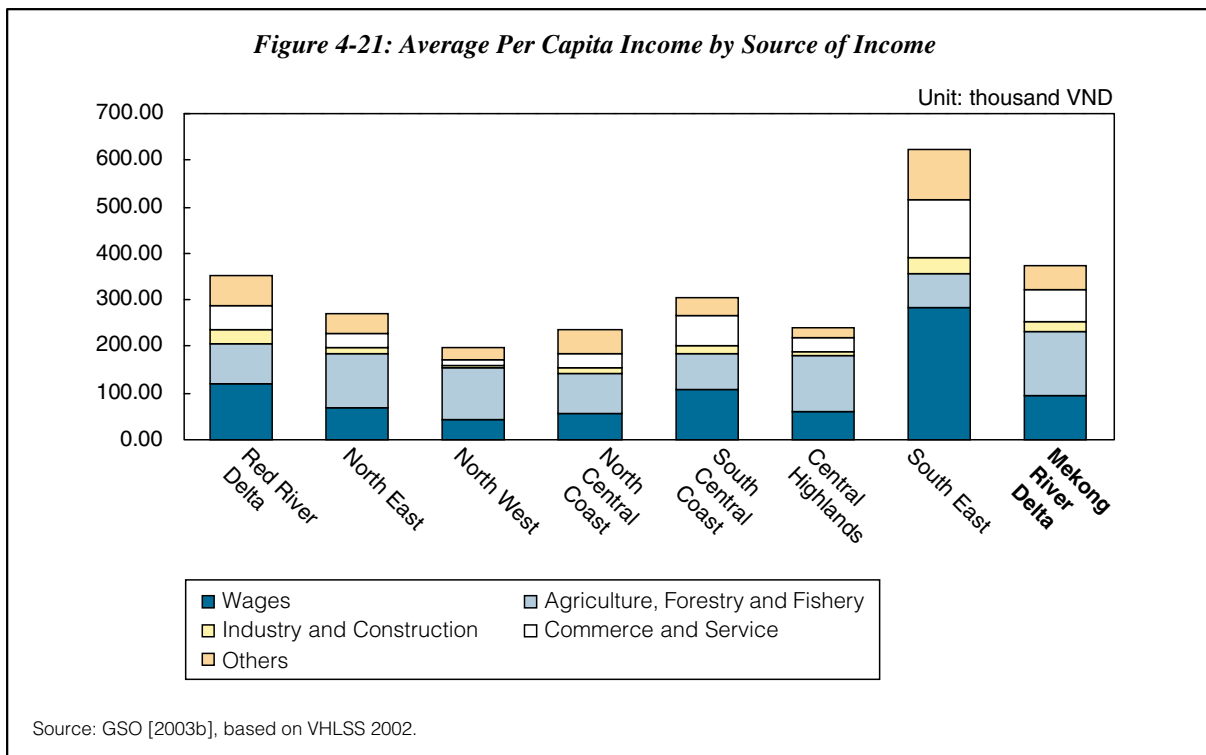
Mr. Thanh says, "All enterprises in Can Tho are looking forward to three things: (i) a new Can Tho (Hung Phu) Port; (ii) a new Can Tho Airport; and (iii) construction of Can Tho Bridge. If these dreams are realized, it will mean a booming economy for Can Tho as well as the entire Mekong Delta region."

Photo of a shrimp factory



Source: Interview and factory visit by authors, June 2003.

As explained before, during 1998-2002, poverty incidence in the Mekong Delta declined much faster than the previous period of VLSS. Per capita income grew rapidly, and in 2002, it was the second highest after Southeast (HCMC and its nearby provinces). It is also notable that fisheries and agriculture constitute important sources of income. During 1998-2002, households engaged in agriculture, forestry, and fisheries have experienced rapid poverty reduction, although the majority of the poor households continue to be found in this occupational group. Also, during the same period, poverty incidence in households engaged in manufacturing and construction dropped sharply [see Figures 4-21, 4-22, also see Box 4-8 for benefit distribution of improved land transport].



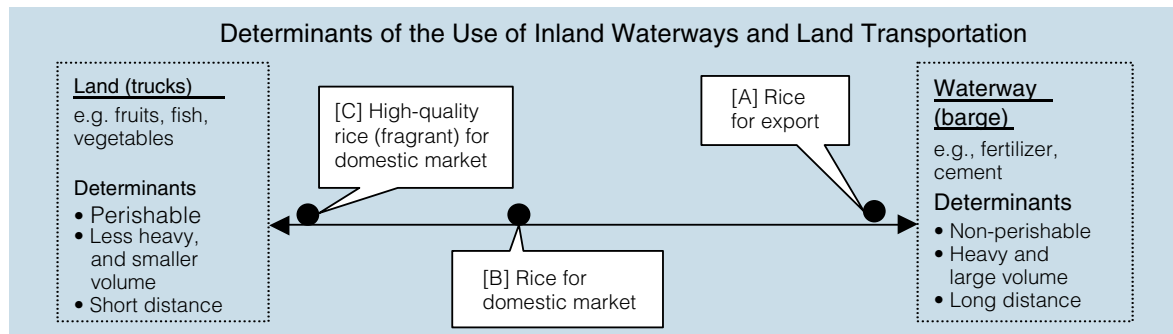
**Box 4-8: Impacts of Improved Land Transport on Rice Farmers  
A Case of An Giang Province**

An Giang province is one of the largest rice production areas in the Mekong Delta, and rice provides a livelihood to the majority of poor people. What is the nature of changes brought by improved land transport on the distribution of farm products? Have benefits from the changes been shared by small-scale rice farmers in remote An Giang province? [see Appendix for the detailed analysis].

The physical improvement of road conditions has made land transport (trucks in particular) more attractive in commodity distribution. This is shown in a sharp increase in the freight movement from HCMC and the Mekong Delta, including An Giang [see Figures 4-14, 4-17]. The impact has been further strengthened by recent deregulation of freight services and rice distribution.

Trucks have been mainly used for carrying perishable products (e.g., fruits, vegetables, fishery products) and to some extent, rice for domestic markets (e.g., fragrant rice). This is because these products require speedy handling and transaction in relatively small volume. (According to the Vietnam Southern Food Corporation, 95% of their rice for exports is transported by barge, while two-thirds of their rice for domestic markets is now transported by trucks.) On the other hand, inland waterways continue to be the dominant mode for transporting the rice for exports because they are more economical than land transport to carry bulky commodities [the data from the Saigon Port]. (Rice transportation from Can Tho to HCMC costs approximately VND35,000 ton by barge, compared to VND70,000 ton by trucks.)

In An Giang, easier land transport and the resultant efficiency gains in commodity distribution have opened



new opportunities for rice farmers, promoting: (i) production of fragrant rice even in the poorer districts (e.g., Tri Ton, Thi Bien); (ii) diversification into commercial crops (e.g., hyacinth, vegetables) and fishery products; and (iii) food processing industry using local products such as catfish, shrimp, tapioka (mainly located along the Hau River and NH91, but some in remote districts). For example, the export of frozen fishery products increased from 5,212 ton (1998) to 12,538 ton (2001) [Statistical Yearbook of An Giang 2002].

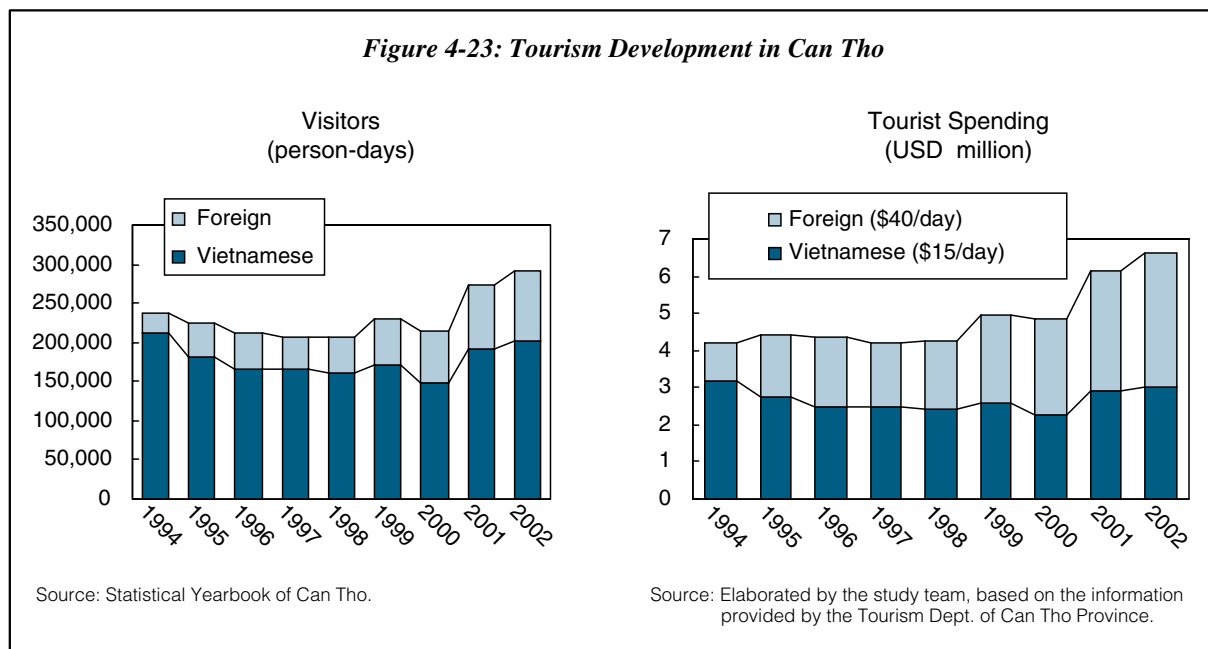
There is also a sign that producers of traditional rice varieties are (at least) not excluded from such efficiency gains, provided that their villages are linked to trunk roads via rural roads. Improved land transport has increased collectors' visits to villages and improved farmers' access to processing and paddy storage facilities. This has helped farmers to get market information and sell paddy at better prices.

Nevertheless, other factors are also important in prompting the positive changes. These include new agricultural policies for diversification, agricultural research and extension and local entrepreneurship, and deregulation of distribution and transport services (as mentioned above). Rural roads (including bridges) are also essential complement to the changes.

Source: Interview and field visit by the study team in October 2003.

**Tourism Development in Can Tho: Regional Economy Activation Effect**

The impact of the My Thuan Bridge is easier to detect in tourism [see Figure 4-23]. Tourism in Can Tho was relatively slow until 2000 but began to increase briskly in 2001. From 2000 to 2003, the number of tourists to Can Tho increased from about 189,000 to 272,000 (an annual growth rate of 17%). This trend is still continuing in 2003. While all the progress cannot be attributed to the My Thuan Bridge and the improved NH1, it appears that a critical reduction in traveling time has been achieved. With the completion of the Can Tho Bridge in the future, a further rise in Can Tho tourism is expected as the city will be within reach for day-trippers.



**Increased sales.** During 2000-2002, the number of hotels increased from 39 to 53. During this period, tourism turnover rose by 1.5 times. The results of interview survey with selected hotel managers<sup>28</sup> confirm this trend. All the hotel managers stated that more guests are coming and that their hotels have undergone expansion or upgrading. They stressed benefits from the NH1 rehabilitation and the construction of the My Thuan Bridge, stating that shorter travel time from hotels to main cities has made it easier to attract both foreign and domestic tourists to the region and to conduct daily business, including the procurement of commodities. Most hotels (except for a 4-star hotel which also uses imported commodities) procure food, cosmetics, and furniture locally, or from the southern provinces.

**Jobs and income generation.** Tables 4-8 show the results of a questionnaire survey of the staff of these hotels (totaling 23 staff). The results show a similar trend to the hotel staff survey in Quang Ninh (i.e., the Ha Long Bay area). More than half of the interviewed staff noted that their salaries have increased. The majority responded that their monthly income is important for the total income of their families.

A rough estimate (on the basis of the provincial tourism-related data and other available information) suggests that Can Tho created about 33,000 jobs during 1999-2002 in the tourism and transport sector [see Appendix for estimated job impact of bridge construction].

<sup>28</sup> Based on interviews with the managers of five hotels in Can Tho (two 2-star hotels, two 3-star hotels, and one 4-star hotel), conducted by CONCETTI in June 2003.



**Table 4-8: Employee Survey at Selected Hotels in Can Tho**

<b>Current Position</b>		Frequency		<b>Previous Job Experience</b>		Frequency	
Room-serving staff	1	4.4%	Farming	2	8.7%		
Waiter/waitress	3	13.0%	Handicraft	1	4.4%		
Chef	3	13.0%	Factory employment	4	17.4%		
Marketing staff	1	4.4%	Service	6	26.1%		
Administrative staff	5	21.7%	Government employee	5	21.7%		
Manager	2	8.7%	Others	2	8.7%		
Others	8	34.8%	No job experience	2	8.7%		
<b>Total</b>	<b>23</b>	<b>100.0%</b>	No answer	1	4.35%		
			<b>Total</b>	<b>23</b>	<b>100.0%</b>		

\*Others include receptionists, shop seller, guards and laundry staff.

<b>Academic Background</b>		Frequency		<b>How Does Income Change?</b>		Frequency	
Lower-secondary education	3	13.0%	Significantly increased	6	26.1%		
Upper-secondary education	11	47.8%	More or less increased	9	39.1%		
Vocational education	3	13.0%	Unchanged	6	26.1%		
Higher education	6	26.1%	Decreased	2	8.7%		
<b>Total</b>	<b>23</b>	<b>100.0%</b>	<b>Total</b>	<b>23</b>	<b>100.0%</b>		

Source: CONCETTI (based on interview survey conducted in June 2003).

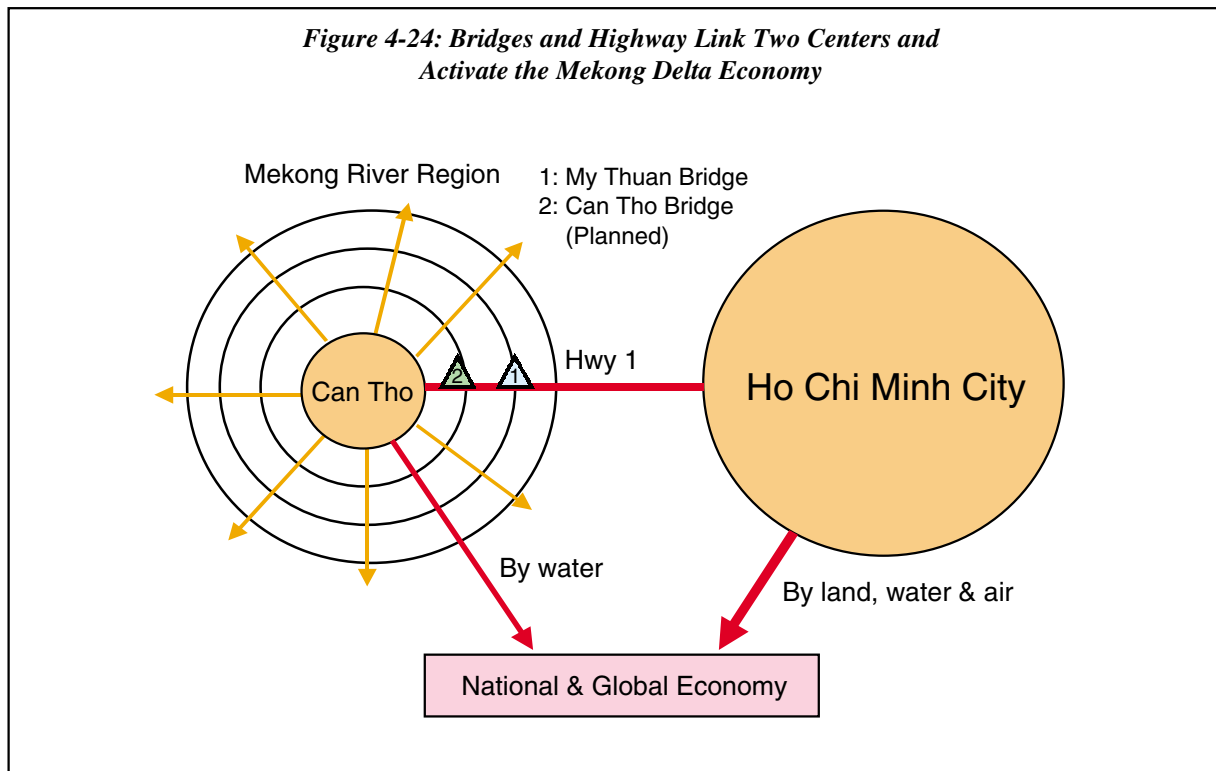
**Impact of Bridge Construction and Future Prospects**

The impact of the My Thuan Bridge should not be assessed in isolation or in the vicinity of the construction site only. As shown in the AusAID studies, the livelihoods of the neighboring communities are strongly affected by business relocation and drastic changes in traffic modes and patterns. But it is also important to consider the My Thuan Bridge more generally to be one crucial link in improving land access between HCMC and the region south of the Hau River through Can Tho as the gateway of its subregion. In this sense, the basic role of the My Thuan Bridge is the same as the proposed Can Tho Bridge. By reducing travel time from 4.5-5 hours (previously) to 3.5 hours (with one bridge) and further down to 3 hours (with two bridges), the nature and volume of the economic linkage between the two centers will undergo a fundamental change. As the Can Tho economy is activated, its effect will be felt throughout the Mekong Delta Region, including both the provinces through which NH1 passes and in those through which it does not. Figure 4-24 shows this effect schematically.

Moreover, the effect of bridge construction over the Mekong River is nonlinear and synergetic, rather than proportional. That is to say, the benefit of two bridges is not twice that of one bridge. This is because qualitative changes are brought about when a certain critical point is reached. For instance, when the maximum travel time to get to a spot is x hours for an average tourist, the reduction of travel time will have little effect if it remains over x hours. But when it is further reduced, there will be a sudden boom in tourism and associated investment and job creation. Similar discontinuities can occur in FDI attraction and marketing of agro products. In fact, there are clear signs that these activities have been stimulated since the completion of the My Thuan Bridge in May 2000. After new activities begin, the economic structure and merchandise flows are not quite the same as before, and therefore cannot be extrapolated from the past trend.

Another nonlinear factor to be reckoned with is complementarity among factors contributing to economic dynamism. The improvement of NH1 alone, including the construction of the My Thuan and (proposed) Can Tho Bridges, cannot have a full effect on the Delta economy unless other problems are simultaneously removed. These include the upgrading of other infrastructure such as connecting roads under local governments, river ports, airport, power supply, urban expansion, and industrial parks. In

addition to such physical structures, good policy frameworks are also necessary. Only when these conditions are met in proper balance can the region develop robustly without encountering new bottlenecks. Needless to say, the growth of the Mekong Delta region also depends on factors which are beyond the control of the central and local governments, such as weather and global market situations.



### 4-3. Case Study 3: North-South 500kv Transmission Line

The availability and stability of the power supply is critically important for productive activities and the economic welfare of individuals. The improvement of the power infrastructure was indispensable in sustaining Vietnam's high economic growth in the past, and will continue to be so in the future. During the latter half of the 1990s, demand for electricity grew at 10-19% per year-much faster than the annual growth rate of GDP. To sustain high economic growth at an annual average of 7.5% (as envisaged in the government's strategy documents) for the next five years, Vietnam needs to increase its electricity supply by about 9-11% annually.

Vietnam's power sector has a regional character, due to the geographic distribution of resources and the country's long, narrow shape. In the north, the system is dominated by hydropower, but there are also significant reserves of coal, the country's second most important fuel for power generation. The south

**Table 4-9: Historical Trend of Growth Rates of Real GDP and Electricity Sales**

	(%)					
Year	85-90	90-95	96	97	98	99
GDP growth	4.0	7.9	9.3	8.2	5.8	4.8
Sales electricity	9.9	12.6	19.3	14.8	15.7	10.5

Source: Elaborated by the study team, based on World Bank [1998] Annex p.8, EVN [2000] p.1.3 and GSO [2002] p.52.

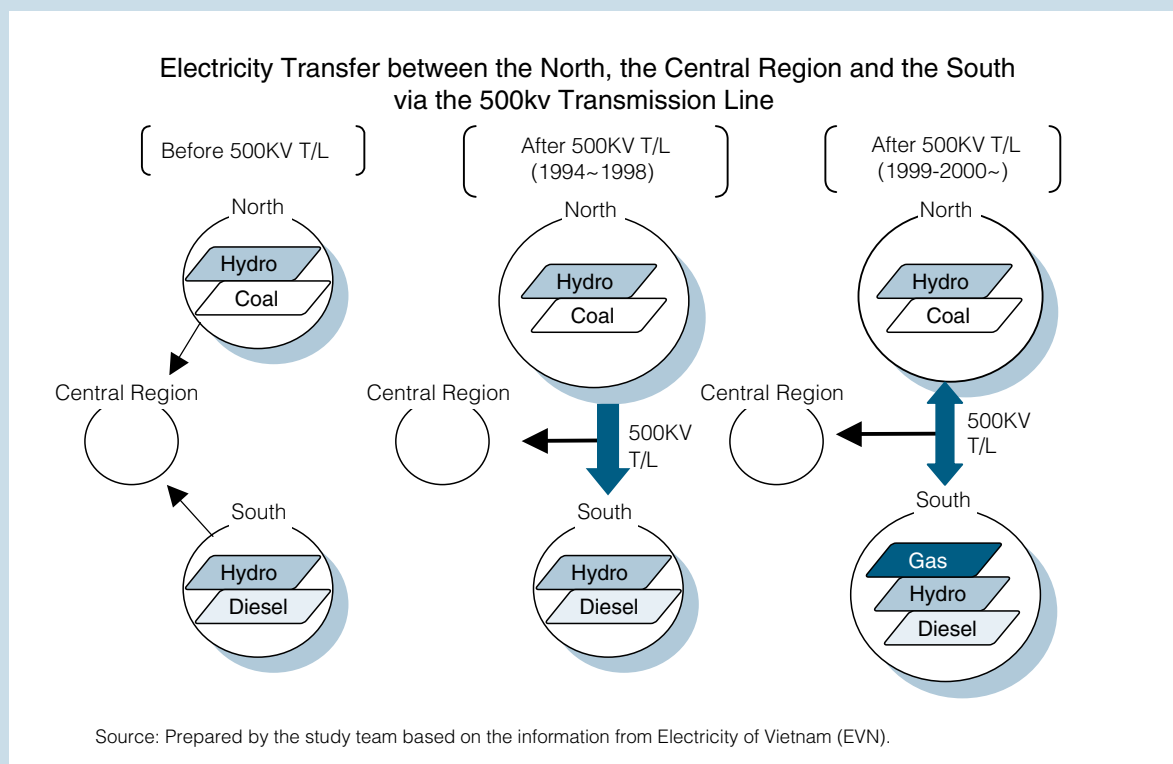
has hydro capacity as well, but has had to rely on diesel-fired generation. The offshore gas fields of Bac Ho and Nam Con Son provide the south with natural gas for power generation, but exploitation has become active only in the late 1990s. The central region has the smallest population and limited installed capacity in hydro and diesel-fired generation.

Before the construction of the 500kv Transmission Line, the north and the south had autonomous power systems, and both regions transferred a small portion of generated electricity to the central region. But these systems could not afford the rising demand for electricity, which corresponded to Vietnam's rapid economic growth starting in 1992. The development and supply of new power generation were urgently needed. This was achieved by the expansion of the Hoa Binh hydropower plant in the north, with total capacity of 1,920MW (completed in April 1994), and the construction of the North-South 500kv Transmission Line (also completed in 1994), which connects the north, central and southern regions.

**Box 4-9: North-South 500kv Transmission Line  
Changing Electricity Transfer between Regions**

The North-South 500kv Transmission Line was completed in 1994. By transferring low-cost, surplus electricity generated by the Hoa Binh hydropower plant, the 500kv line supported the nationwide utilization of the additional power capacity, particularly during 1994-98. At present, it provides system stability and shifts electricity between the north, central and southern regions at peak usage times.

Currently, Vietnam's integrated power system consists of : (i) transmission line with the length of 1,487km (bundle conductor 4x330m<sup>2</sup>); and (ii) five substations with a total capacity of 3,150 MVA (Hoa Binh substation/900 MVA, Ha Tinh substation/450 MVA, Da Nang substation/450 MVA, Pleiku substation/450 MVA, Phu Lam substation/900 MVA).The chart below shows how electricity transfer between regions changed, with the construction of the 500kv Transmission Line.



**Impact on Overall Economic Growth**

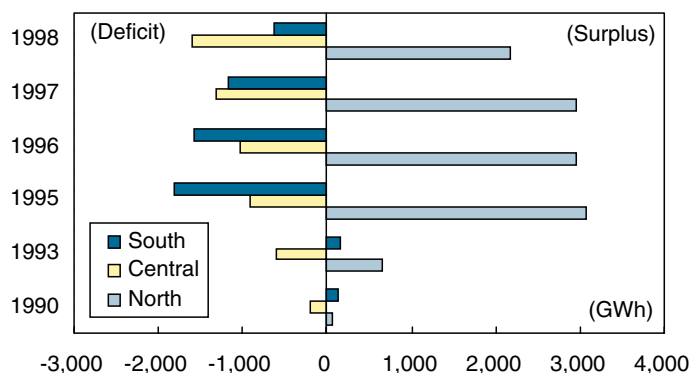
The 500kv Transmission Line has contributed to mitigating power shortages in the central region and the fast growing south (which often had to rely on costly diesel-fired generation). Upon commencement of operation in 1994, the demand for electricity in southern and central regions jumped by about 20% per year.

**Table 4-10: Annual Demand Growth of Electricity**

	(%)					
	1992	1993	1994	1995	1996	1997
North	5.4	6.8	12.1	16.0	14.0	12.8
Central	17.2	15.0	25.4	25.6	21.3	19.6
South	6.7	16.6	21.0	23.3	21.1	15.2
(GDP growth)	8.7	8.1	8.8	9.5	9.3	8.2

Source: Elaborated by the study team based on World Bank [1998], Annex 1.19-1.23.

**Figure 4-25: Demand and Supply Balance of Electricity by Region**



Source: Elaborated from JBIC [2000], p.3-2, Table3.1.2.

The transfer of electricity from the north to the south continued until 1999-2000, when large-scale exploitation of natural gas potential began in the south. As the map (p.63) shows, the capacity of thermal power plants such as Phu My and Ba Ria was actively expanded in the late 1990s through the utilization of natural gas from offshore. As a result, at present electricity is transferred from the south to the central region and the north—especially in the dry season when the load factor of hydropower plants drops.

It is fair to conclude that the 500kv Transmission Line played a vital role in sustaining Vietnam's high economic growth in the 1990s, particularly in the south, the country's largest economic center [see Box 4-10]. Even after the exploitation of new power sources in the south, it continues to be a principal supplier of electricity to the central region and contributes to system stability by adjusting electricity supply between regions in the dry season and at peak times. At the same time, considering the high costs of transferring bulk power between the north and the south via the 500kv Transmission Line, future investments should be made based on the overall plan, so that generation capacity in the north and the south could roughly balance and satisfy the projected demand in each region<sup>29</sup>.

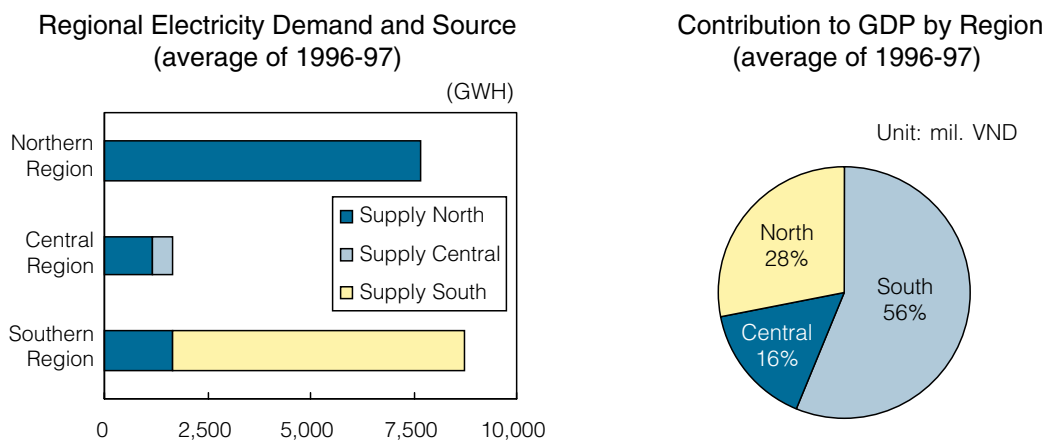
<sup>29</sup> There are three on-going projects for increasing the capacity of the 500kv T/L: (i) the Diesel 500kv Pleiku-Phu lam power station (partially financed by the World Bank); (ii) the Ha Tinh 500kv station (partially financed by SIDA); and (iii) the Diesel 500kv Phu my-Nha be-Phu lam and the Nha be 500kv station (partially financed by JBIC)[EVN (2000) p.1-15].

**Box 4-10: Sustaining High Growth and Livelihood  
The Contribution of Transferred Electricity**

During the second half of the 1990s, the electricity transferred from the north to the central and southern regions greatly contributed to sustaining high economic growth and improving the economic welfare of the population.

World Bank data indicate that during 1996-97, this transferred electricity supported about 74% of the total electricity demand in the central region (measured in terms of the total electricity required for the region to satisfy industrial, residential, and service or other sector demand) and about 19% of the total electricity demand in the south, respectively. The electricity transferred to the south satisfied more than 40% of the region's industrial demand for electricity (including loss factors), during the same period [WB 1998].

The Vietnamese economy (GDP) recorded dynamic growth in 1996-97 at 8.8%. In particular, the GDP of the south grew very rapidly at 9.2% per year (annual average of the two years). The south generates about two-thirds of national industrial GDP, and its industrial GDP grew at 14% in this period (annual average).



Notes: 1) North includes: Red River Delta, North East and North West; Central includes: North Central Coast, South Central Coast and Central Highlands; and South includes: North East South and Mekong River Delta.  
2) Demand is shown in terms of the total electricity demand required for region. Supply is shown in terms of electricity generated in (and transferred to) the region.  
3) The data include loss factors.

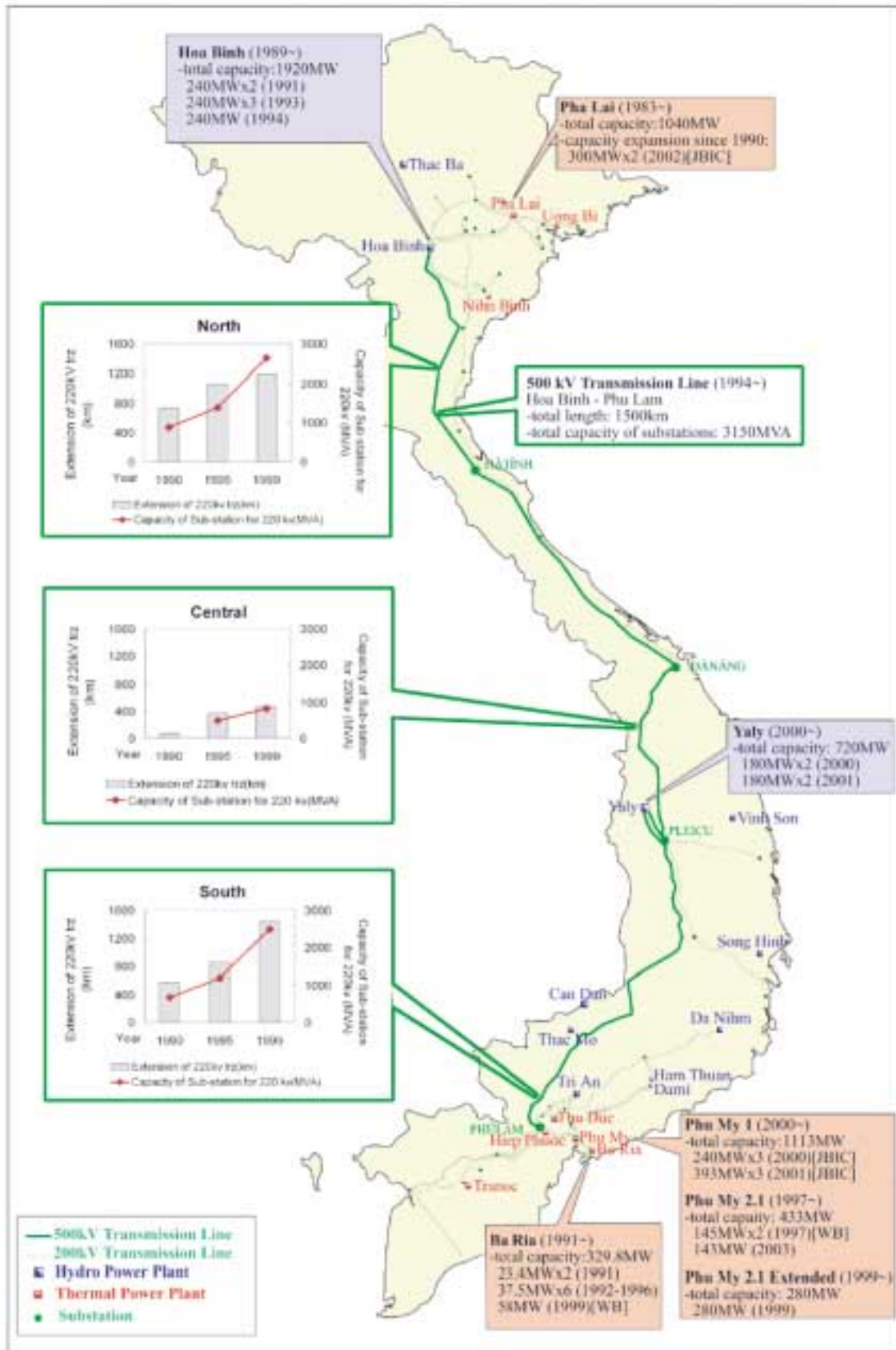
Source: Prepared by the study team based on World Bank [1998], Volume II, Annex pp.20, 23-24. GDP data are base on GSO.

**Expansion of the Electricity Network**

As the graphs in the Map (p.62) show, there has been significant expansion of the 220kv transmission lines and the capacity of substations for 220kv (MVA) since 1995. The progress was especially impressive in the south. The south had a less developed electricity network in 1990 compared to the north, but the total length of the 220kv line surpassed the north by 1999. A similar trend can be observed for the lower-capacity transmission lines and distribution lines. This indicates that electricity transfer by the 500kv Transmission Line and the subsequent increase in power generation capacity in the south allowed the rapid expansion of the electricity network.

**Impact on firm production.** As previously mentioned, no data (such as blackout rates) are available to indicate the degree of service improvements realized by the expansion of the electricity network in the south, but the following information from firms and local authorities gives a good picture of the

## Electricity Network Improvement as of June 2003



Notes: Explanation of power plant is added only for completed, large scale and currently improved power plants.

Source: Prepared by the study team based on the map and data from the Vietnam Power Development Plan 2000-2010, Prospective up to 2020, Main Body, pp.1.1-2.15. and figure 2.5 "Location Map of Existing 500-220 kv power system (Electricity of Vietnam)."

positive impacts of network expansion in the south<sup>30</sup>.

First, power supply conditions in the south have improved substantially since 2000. Until around 1996, there were scheduled blackouts (twice a week), and factories had to suspend their production lines. The representative of one (Japanese) firm stated that the costs of factory investment were calculated assuming 100% dependence on an independent power generator (according to a 1996 feasibility study). At present, blackouts rarely occur (except for periodic maintenance), and independent power generation is used as a secondary function only.

Second, industrial zones are starting to invest in their power supply systems to provide higher-voltage power to the firms inside. The following examples are representative of the benefits.

- Greater reliability of electricity supply: Vinh Loc Industrial Zone (located in HCMC) has been using the EVN network since its establishment. The industrial zone has suffered from unstable power supply for a long time because its power system was connected only to a 20MVA substation (which is commonly used by the neighboring residential area). Thanks to the extension of the 220kv transmission line to the area, the IZ authority is constructing two substations with 40MVA inside the IZ to allow for power distribution of 22kv.
- Reduced electricity tariff: Viet-Sing Industrial Zone (located in Bing Duong province) has its own power generator as a main power source. Thanks to the expansion of a 220kv transmission line to the nearby area, Viet-Sing IZ replaced its own generator with the EVN network in 2002. This has enabled the IZ authority to distribute 22kv power, at cheaper tariff rates than before [see Table 4-11].

**Table 4-11: Electricity Tariff Reduction at Viet-Sing IZ after Connecting to the EVN Network**

		Before	After
Connecting fee (US\$/kva)	High tension	19	19
	Low tension	63	63
Contracted Charge (US\$/kva)	High tension	2	1
	Low tension	2	1
Escalation tariff (US\$/kwh)	High tension	0.0862 (Peak hour)	0.08 (Peak hour)
		0.0810 (Off-peak hour)	0.075 (Off-peak hour)
	Low tension	0.115 (Peak hour)	0.11 (Peak hour)
		0.110 (Off-peak hour)	0.105 (Off-peak hour)

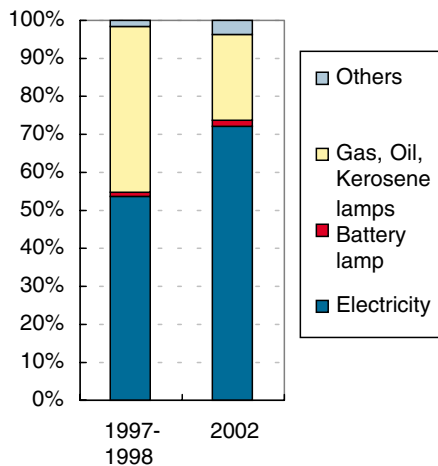
Source: Elaborated by the study team, based on the information provided by a tenant of Viet-Sing IZ.

**Impact on rural electrification.** Although no data are available on rural electrification rates before the construction of the 500kv Transmission Line, the information from a series of VLSS and VHLSS provides insight on how the network expansion has benefited all the segments of the population.

As Figure 4-27 shows, in the south the percentage of households using electricity as the main source of lighting tripled from 1993 to 1998. The poorest group also benefited from the expansion of rural electrification. The 1993 data are not available, but comparison of 1998 and 2002 data shows that among the lowest income group, the ratio of households using electricity increased from 54% to 72%. This follows the overall trend of rural electrification during the same period; specifically the percentage of households with electricity (62% in 1997 and 81% in 2002, as shown in Figure 3-4 of Chapter 3).

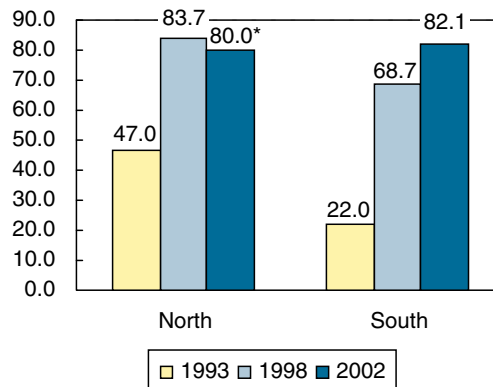
<sup>30</sup> Based on information provided by Japanese firms operating in HCMC, industrial zones in and around HCMC, and the representatives of the Can Tho power company No.2 during a field survey by the authors in June 2003.

**Figure 4-26: Source of Lighting among Lowest Income Group**



Source: Elaborated by the study team, based on GSO [2000], p.372 and GSO[2003b], p.4.

**Figure 4-27: Households Using Electricity as a Source of Lighting by Region**



Notes: \* The decline from 1998 to 2000 in the North is attributed to the change in regional classification. North Mountain Mid Land [GSO 2000] is divided into Northeast and Northwest [GSO 2003b]. The 1993 data are quoted from the World Bank [1998], p.112. The 1998 and 2002 data are calculated from GSO [2000], p.372 and GSO [2003b], p.4 respectively.

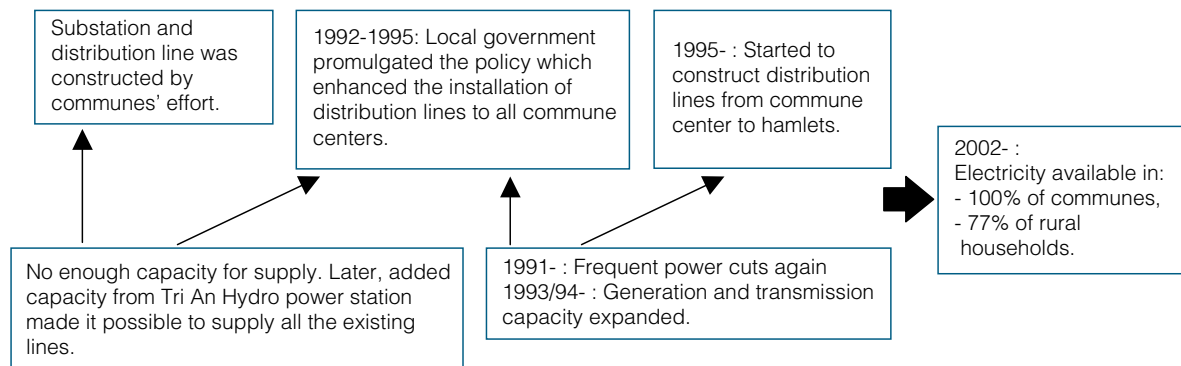
Source: Elaborated by the study team, based on the World Bank [1998], p.112, GSO[2000], p.372 and GSO[2003b], p.4.

**Box 4-11: Progress in Rural Electrification**

The Vietnamese government has strongly committed to the expansion of rural electrification. It prepared and approved (Decision No.22) the Rural Electrification Master Plan in September 1997 and February 1999. The national targets to expand electrification to 80% of the communes and 60% of the households in rural area by the end of 2000 have already been achieved. In 2002, 96.4% of the communes and 81.9% of the households in rural areas have been connected to electricity.

This achievement was made possible thanks to the overall expansion of the electricity network by the government (EVN) together with the efforts of the people and local governments. The history of Can Tho province in the Mekong Delta tells the dynamic process of rural electrification.

**Sequence of Increased Generation, Transmission Capacity and Rural Electrification in Can Tho Province**



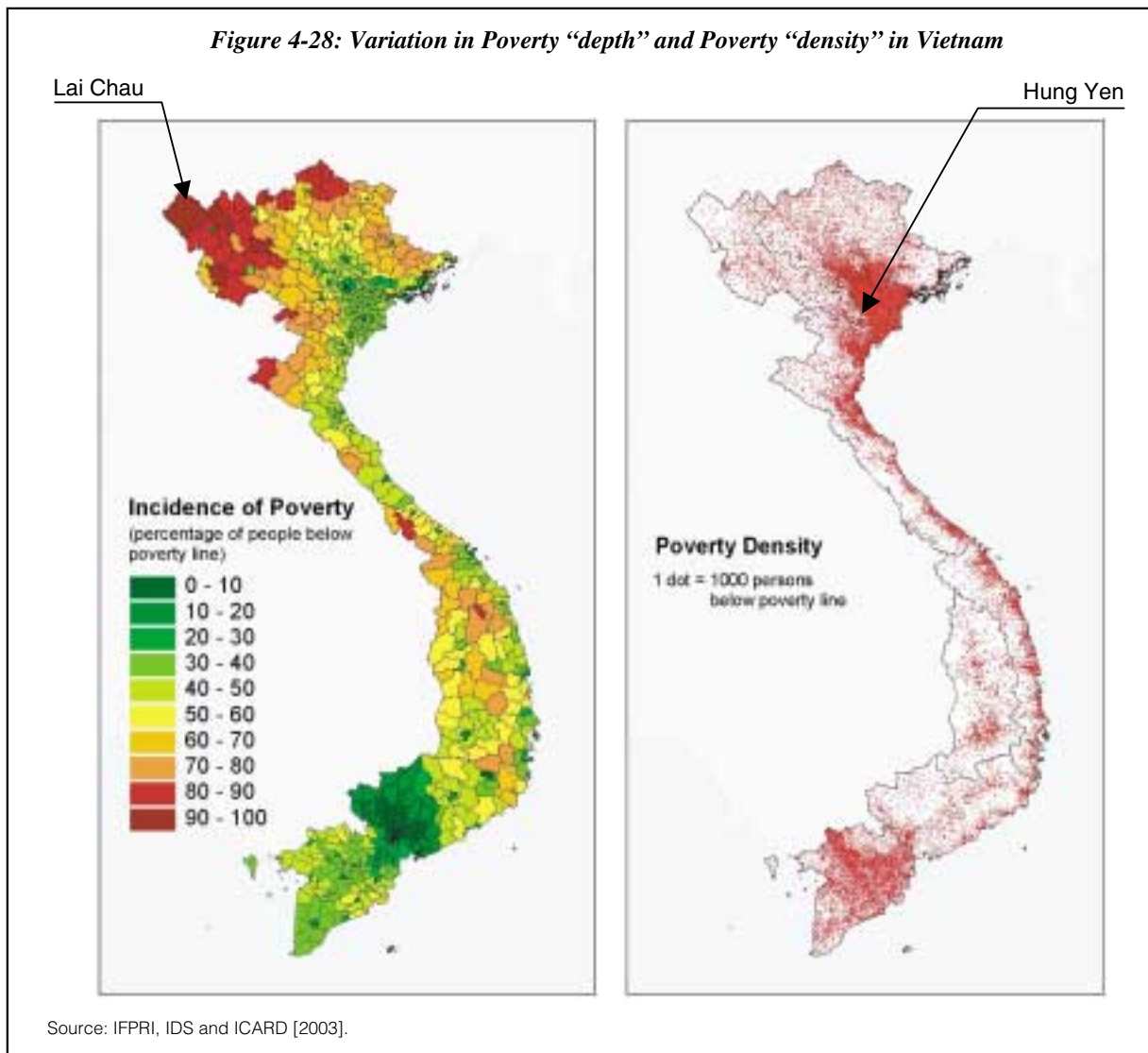
Source: Elaborated by the study team, based on the interview with PC No.2, Can Tho Office [June 2003].



#### 4-4. Case 4: Accessibility and Road Network—Comparison of Hung Yen Province and Lai Chau Province<sup>31</sup>

The two studies supported by DFID show different socio-economic impacts of the road network on rural communities in Hung Yen and Lai Chau provinces. These provinces are included in the second Rural Transport Project (hereinafter RT2), funded by the World Bank and DFID. The following are based on the findings of: (i) a perception survey of "connectivity" in nine communes (four in Hung Yen, and five in Lai Chau) [DFID 2003]; and (ii) a comparative analysis of selected socio-economic and traffic data on the two provinces [TDSI/DFID 2003] [see Appendix for the methodology of these surveys].

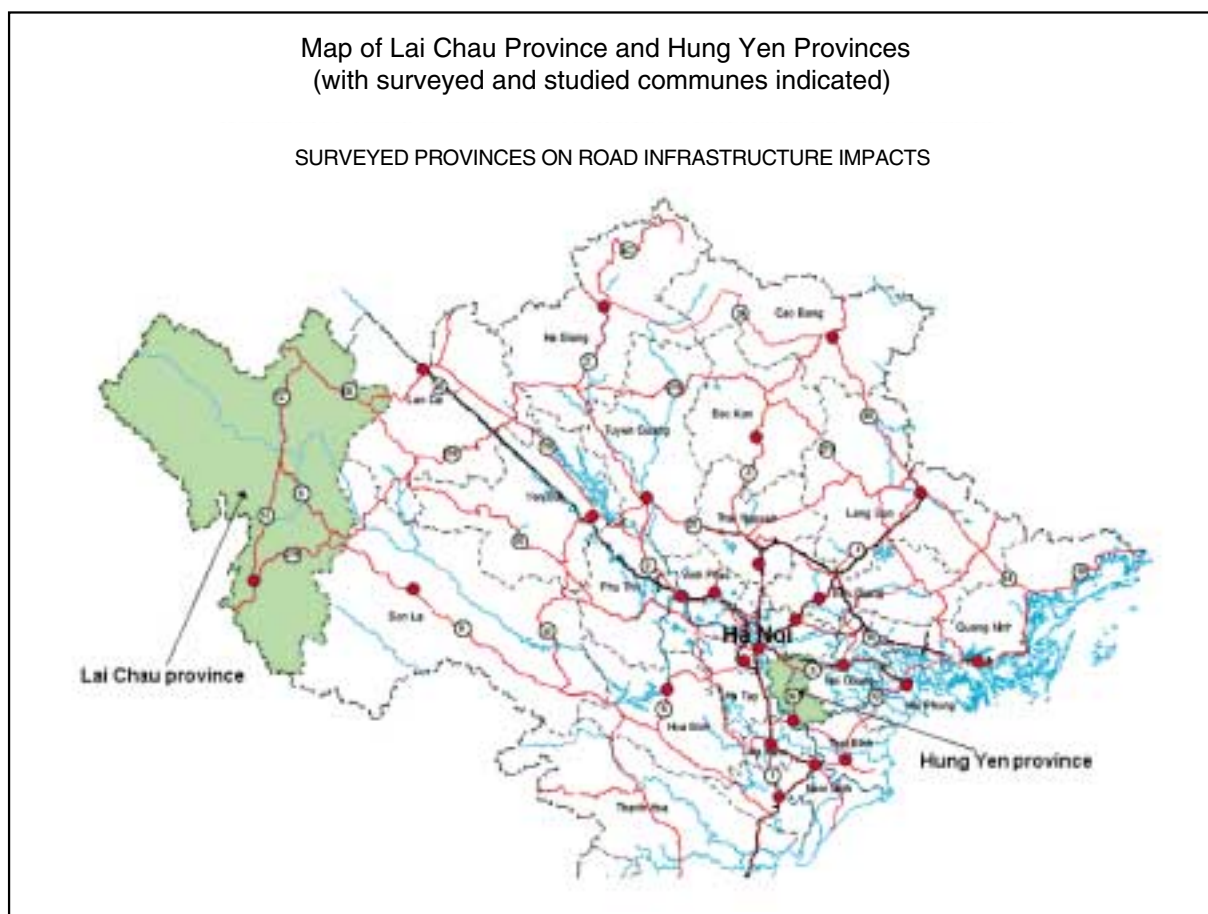
Comparison of the poverty data on Hung Yen and Lai Chau provinces reveal the "dual nature" of poverty in Vietnam. Poverty is more widespread and entrenched in mountainous, remote and isolated rural areas exemplified by Lai Chau province. The largest numbers of poor (close to the poverty line) are located in the areas of highest population density, e.g., Hung Yen province. Put another way, the most poor in terms of depth of poverty are located in distinctly different areas to the most poor in terms of numbers.



<sup>31</sup> This section largely owes to the contribution by Dr. Simon Lucas (infrastructure adviser) and Mr. Vo Thanh Son (senior program officer) of DFID/Vietnam.

**Inter-province Comparison**

Hung Yen is located in the center of the Red River Delta with very good access to Hanoi and Hai Phong Port via NH5. It takes just 45 minutes to drive from Hung Yen to Hanoi. The province has benefited greatly from recent improvements to the national and provincial road network, which has provided good access to major domestic markets. As noted before, the province has experienced substantial industrial investment in recent years from both domestic and international companies.



The situation in Lai Chau province is very different. This province is located in the northern mountains, two days drive from Hanoi. Despite some recent improvements in the road network, the remaining work to connect all communes to the provincial and district road network is a daunting task. Hung Yen is 18 times smaller, but has nearly twice the population of Lai Chau.

Table 4-12 shows the sharp contrast between the two provinces for selected socio-economic indicators. It is obvious that Hung Yen is much more prosperous than Lai Chau. This is in part determined by the "economic distance"<sup>32</sup> to markets of the two provinces, along with the availability of productive assets. These factors also affect how much each province has benefited from the recent economic growth in Vietnam. Lai Chau is not as attractive for investment as Hung Yen and is further hampered by limited options for locally-based economic growth. Figure 4-29 illustrates income, perception and bicycle ownership data for the two provinces (based on the results of the community perception survey), which reinforce this point.

<sup>32</sup> "Economic distance" refers to the costs in time, money and effort required to move goods to market. Physical distance is just one aspect determining this alongside road condition, terrain and access, cost of transport services and other social factors.

**Table 4-12: Socio-economic Comparison between Hung Yen and Lai Chau**

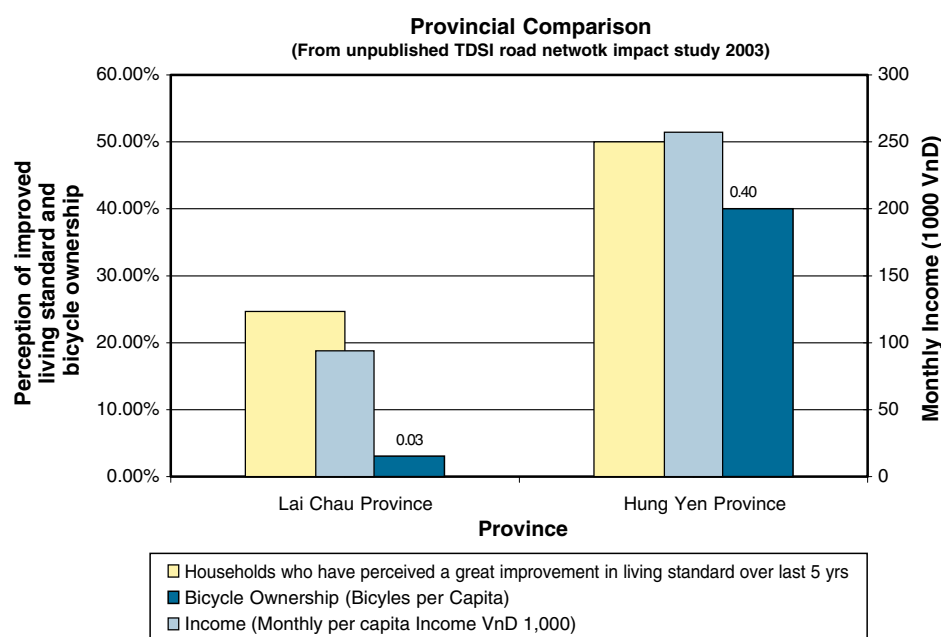
Criteria	Unit	Hung Yen	Lai Chau
Total area	km <sup>2</sup>	923	16,919
Population	people	1,105,268	641,186
GDP*	mil.VND	3,702,607	1,158,789
Poverty rate**	%	5.7	37
Road density	km/km <sup>2</sup>	4.4	0.128
Communes without road access to center	%	0	5

Notes: 1) \*Data for 2002.

2) \*\*Data for for 2000, using Vietnam National Poverty Line.

Source: TDSI/DFID [2003].

**Figure 4-29: Relative Income Levels Perceptions and Access to Basic Transport**



Source: TDSI/DFID [2003].

Both Hung Yen and Lai Chau are involved in RT2. The roads built under this project have led to improvements in physical access for certain areas of Lai Chau and to accompanying livelihood improvements. The impacts in Hung Yen have been greater, both in terms of economic improvements through increased access to transport services and social benefits, e.g., education and healthcare.

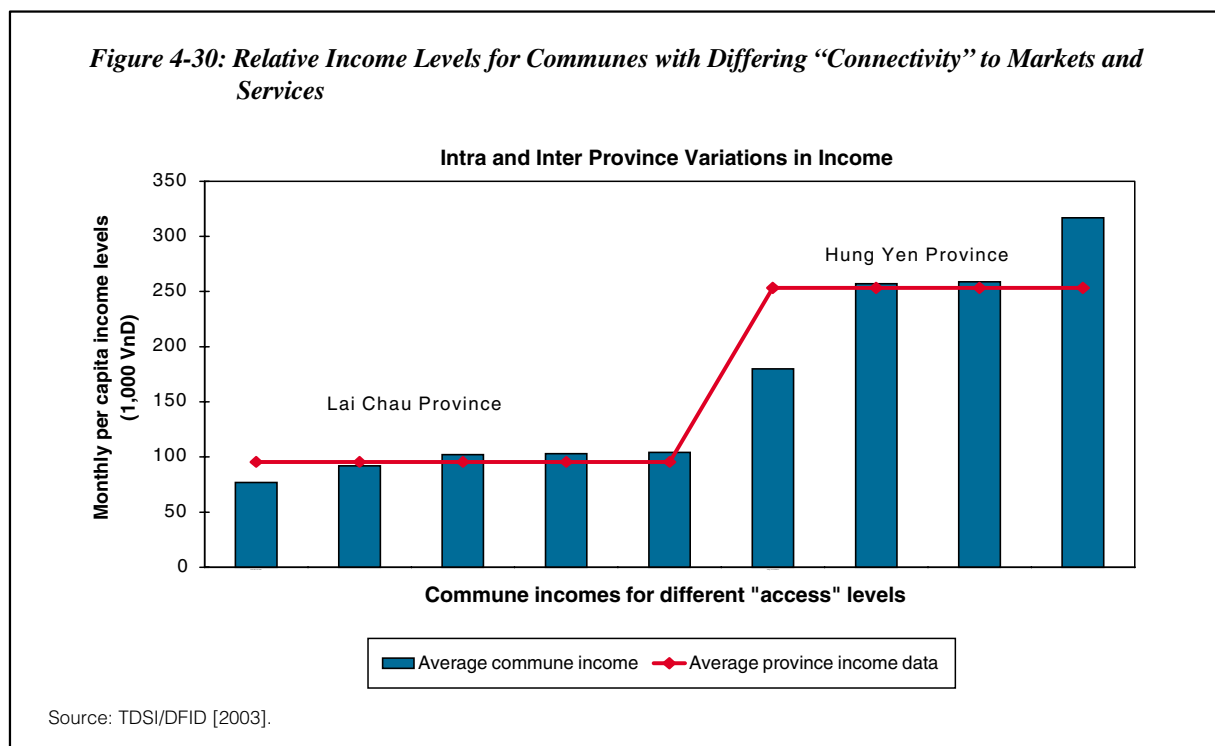
This inability to "access" the benefits of broader economic growth is a key issue for the future development of Lai Chau. "Economic distance" and "connectivity" are certainly key factors. However, other "access" issues also exist. A large proportion of its population are from ethnic minority groups who have difficulties accessing government services; the population is scattered; agricultural land is in short supply; and education levels are low. Lai Chau is consequently less able to take full advantage of the opportunities that improved road access can bring.

The implication for policymakers is that unless investment in Lai Chau for both infrastructure and other supporting interventions is increased, it will slip further behind Hung Yen, with its geographical and natural resources advantages.

***Intra-province Comparison<sup>33</sup>***

Given this contrasting picture from the inter-province comparison, it is also worthwhile to look at commune comparisons within Hung Yen and Lai Chau provinces. These illustrate that beneath the average lie diverse and complex interactions that affect accessibility and opportunities for economic growth within relatively small geographic distances.

Figure 4-30 shows the variations between communes in the same two provinces. The communes were selected on the basis of their relative "connectivity" to trunk and rural roads. In particular, Hung Yen province demonstrates high degrees of variation in commune income levels. Such variation appears to be affected by differing "connectivity levels" to markets and services. (In Lai Chau, the levels of commune income are uniformly low.)



The following analysis provides insights on how differing "connectivity" affects the socio-economic situations of each commune, even within the same province.

One better-off commune and one poorer commune have been selected from each province for comparison. The results of both quantitative and qualitative surveys are then discussed in terms of the relative "connectivity" of each commune.

<sup>33</sup> The selection of communes for intra-province comparison is intended to illustrate the role of roads in development and is not a statistically valid impact assessment. From a limited sample of nine communes, 4 have been selected to illustrate the range of impacts and perceptions of the importance of the road network on the lives of the rural population.

**Hung Yen province commune comparison**

**Table 4-13: Hung Yen Province – Hung Long Commune vs. Tong Phan Commune**

Criteria	Unit	Hung Long	Tong Phan
Total Area	ha	446	775.96
Population	people	3300	7511
No. of households	household	776	2031
Average commune income	VND 1000	5010	2950
Percentage of poor HHs	%	6.96	11.87
No. of bicycle	Item	850	4800
No. of Motorbike	Item	245	250
Relative distance to trunk	-	Close	Far
Relative road quality	-	Fair	Bad

Source: TDSI/DFID [2003] (All data are for 2002).

Hung Long commune is in My Hao district close to NH5 and has good links to both the highway and district roads [see Map]. Tong Phan, on the other hand, is in Phu Cu district, closer to the provincial town and NH39, but farther away from industrial zones. In general, road networks in both communes have improved greatly over the last few years.

In Hung Long commune, the commune road that links to NH5 and district road No.210 are most important, as they connect to industrial zones where most of the youngsters from the commune are working. In Tong Phan, the commune roads are also considered most important because they provide links to schools and markets, such as in Hung Yen and Hai Duong towns. Furthermore, commune roads are opening up many opportunities for local people to start micro-businesses. In Tong Phan commune, village roads are also considered very important, both for agricultural production and shortcuts to the commune center.

**Map of Studied Communes in Hung Yen Province**

SURVEYED DISTRICTS AND COMMUNES ON ROAD INFRASTRUCTURE IMPACTS IN HUNG YEN PROVINCE



Local people in both communes expressed satisfaction with the national and provincial roads that enable them to connect to markets, information, education, healthcare, and other services. The improvements in road links have resulted in enormous changes in cropping patterns, as well increases in the value of land. Commune roads are ranked very high in terms of usage and usefulness to local livelihoods. However, not everyone in the commune benefits from the improved access situation. In Hung Long Commune, for example, the better-off households are able to make a profit from selling more produce and/or sending their sons and daughters to work in newly established industrial zones.

***If the road No 210 improved...***

*Mr. Quynh, the chairman of Hung Long commune said that if the road No 210 improved in the near future, his commune will become an industrial commune. No youth will do on the fields...The price of land in this area will increase, and many other changes...*

*Hung Long commune, August 2003*

People in Hung Long commune are very worried about road safety. Reasons vary, but narrow roads and unclear rules are commonly mentioned. Local people in both communes are also unhappy with road maintenance. The commune roads are often rough and quickly degrade. In Tong Phan commune local people said that; "the commune is located very near national and provincial roads but it still seems to be a remote area because of a very bad commune road." However, people still rely heavily on those roads for their livelihoods. Maintaining access is a key issue if transport investments are to continue making positive impacts on local people's livelihoods.

***My problem with the road***

*Mr. Hoang Van Tien, selling ice creams on his bicycle, he has practiced his small business for 3 months. Before that, he raised livestock and cultivated rice as many people in his village. Every day, he buys 200 sticks of ice-creams from Tran Cao center and resell them within his commune, at the primary and secondary school in the commune, and nearby communes or villages. If it is a sunny day, he can sell all of them off; if it is a rainy day, he may not, so he has to travel to the Tran Cao center to deposit the ice creams to the agent for the next day. No fee is charged on this circumstance. The trip from his house to Tran Cao center is about 3-4 km. Most of buyers are passer by and pupils in the schools. Each stick of ice cream costs him 120 VND and he can resell at 200VND. So if no problem occurs, he can get 40,000 VND in turnover and therefore earns 16,000 VND incomes. However, there are about 10 sticks melted or broken due to the road condition that is very bad, so he loses 1,200 VND of capital and 800 VND of net income. So he really gets 14,000 VND of net income. He also said that he some time had problem with the road: the pokes and rim of his bicycle sometimes break. One time he and his bicycle with ice cream on the rack fell onto a river off the road. He lost all ice creams*

*Tong Phan, August 2003*

**Lai Chau province commune comparison**

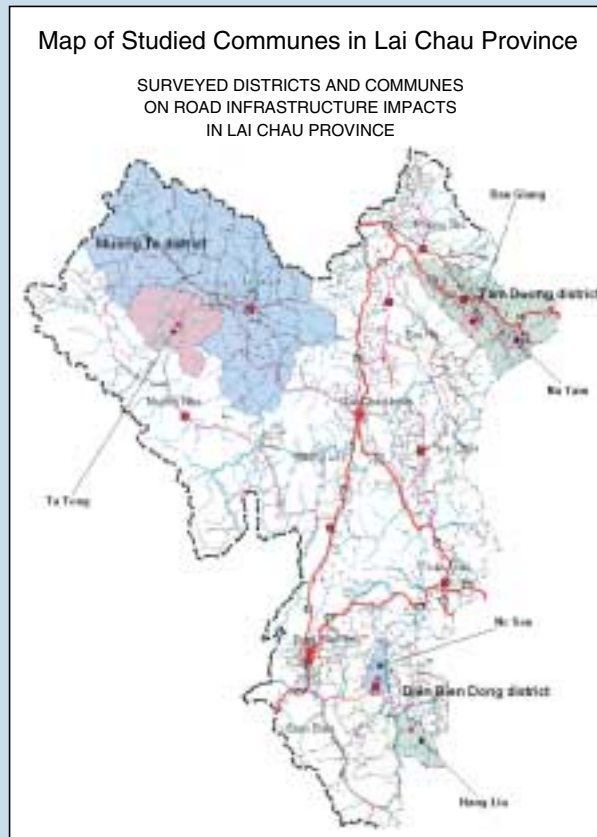
**Table 4-14 : Lai Chau Province — Na Son Commune vs. Ban Giang Commune**

Criteria	Unit	Ban Giang	Na Son
Total Area	ha	3,598	9392
Population	people	2790	3646
No. of households	household	522	591
Average commune income	VND 1000	2281	762
Percentage of poor HHs	%	34.09	42.3
Relative distance to trunk	-	Close	Far
Relative road quality	-	Fair	Poor

Source: TDSI/DFID [2003] (All data are for 2002).

Both Ban Giang and Na Son communes have experienced improvements in the commune roads that link them to provincial and district roads. Being connected to the wider road network has enabled local people to diversify their crops and cropping structure, to sell and buy things more easily, to better access schools, healthcare and water, and make social trips. In other words local people have experienced improvements in their physical capital through road construction, which have led to improvements in human, social, and financial capital. They value the commune roads most because they provide the key link to essential services.

In Na Son commune, the improved roads have had direct impacts on school attendance. Interestingly, Ban Giang commune is farther away from the province center, but has benefited a lot from improved road links to the district and provincial roads. Better trade links have also appeared. In contrast, Na Son commune is very near Dien Bien town, the provincial center, but suffers from a poor commune road link. This has limited the opportunities for local people to connect to markets and social services.



***Ms Nguyen Thi Ly and her husband Mr. Nguyen Huu Hieu:***

*Both of them have been teaching in the commune's primary school since 1997. Before the roads were improved, she had to go to pupils' houses and invite them to the school. Now children voluntarily go to the school. Quality of education is better now, number of pupils is increasing.*

*Na Son commune, August 2003*

Benefits within communes are not equitably distributed. In both communes, the better-off households are more likely to capture the opportunities to increase their income. They have better means of transport and can apply improved techniques to new crops. This implies a need for more coordination in efforts to improve roads and agricultural service delivery so that the benefits can reach the poorest.

The poor and women, in Ban Giang commune, particularly value the commune roads on which they rely for their daily life. The perceptions of those who travel by foot are that there are no direct impacts on their lives from road improvements.

Again, local people are not happy with the way roads are currently maintained. Overall maintenance is badly done and commune roads are often covered with mud and are rough, preventing access.

***Mr. Nguyen Thi Tam, an agent buying rice and maize:***

*She comes from the district center and hires a house and uses it as a shop cum a house. Each year, she can buy up to 50 tones of maize, 10-20 tones of rice, and some tones of soya beans. She and her 3 children use their bicycles, going to the villages, via dirt roads, buying every kg of rice and maize. She has to pay cash on carry because each family just sells a very little grain. When her family has gathered enough grain, she communicates with the purchasing agent in the district. The agent uses a big truck to carry grain from several commune agents like her. There is one more agent like her in the Ban Giang commune.*

*Ban Giang commune, August 2003*

#### 4-5. Case Study 5: Reproductive Health Project, as National and/or Regional Programs Based on Community Participation

Trunk roads (or large-scale infrastructure) constitute an indispensable part of the road network, together with rural roads (or small-scale infrastructure) in improving user access to social services. The importance of rural roads has been frequently analyzed, mainly as to how they facilitate physical access to service points. However, physical access is only one of the determinants of user access to social services. Service quality, education (changing people's awareness of service needs) and costs are also critically important<sup>34</sup>. Therefore, the role of the road network should be analyzed more comprehensively, covering such aspects as: (i) ensuring physical access; (ii) improving the quality of social service delivery; and (iii) providing education for users. The latter two especially require the effective implementation of national and/or regional programs based on community participation. Thus, special attention should be given to how the road network can contribute to establishing such programs.

##### *Improving Social Service Delivery through Increased Mobility and Proximity*

The JICA-supported Reproductive Health (RH) Project in Nghe An province is a good example to understand the role of various levels of roads in facilitating access to two types of services: (i) basic health care, and (ii) IEC (information, education and communication) or dissemination activities aimed at raising the awareness of community people [see Box 4-11 for the Project]. The findings from interviews with the project team and the local authorities suggest that both trunk (national and inter-district) and rural (inter-commune and inter-hamlet) roads respectively serve essential functions for three of the four determinants mentioned above<sup>35</sup>. (Although the project itself is designed to focus on reproductive health, the views expressed by the project team and the local authorities seem to be relevant to the delivery of primary health services in general.)

- Trunk roads (national roads, including inter-provincial and inter-district roads): Well-serving trunk roads are indispensable, particularly for service providers (and the project staff) to engage in a regional (or even national) health care program. Bad road conditions limit the mobility of health staff (at the Maternal Child Health and Family Planning (MCH/FP) center at provincial capital, district health centers (DHCs) and commune health centers (CHCs)) and thus make it difficult to establish and sustain the quality of services as well as educational activities for users. This, in turn, could affect the willingness of potential user access to services. Under the JICA-supported RH project, trunk roads (i.e., NH 1, 7, 15, 48)—by connecting provincial capital (Vinh city) and district capitals (where DHCs are located)—play a crucial role in transferring new skills and information to the lowest referral point of the system (through such activities as training and seminars), and in establishing a permanent quality control system (e.g., check up system of activities, or monitoring system).
- Inter-commune roads: By connecting commune and district centers, this type of road serves important functions for both service providers and users. First, easier travel between the district capital and CHC facilitates: (i) the transfer of new skills and information to CHC, and (ii) the establishment of a permanent quality control system. Second, for users, good access to DHC is vital for the treatment of emergency cases. For example, pregnant women in emergency obstetric cases must be immediately transported to DHC (or to higher-level hospitals when affordable). The

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<sup>34</sup> The World Bank [2001] points out five determinants (i.e., the quality of service, geographical access, education, income, and service price) and stresses the importance of the latter two for hospital-based and private health service. Although the analysis here does not include these two (because of its primary focus on the road network and public health care system), they are important in the analysis of the effectiveness of overall health service, including access to private hospital and health care service, particularly by lower-income groups.

<sup>35</sup> Based on the findings of a field visit by the study team to the Nghe An Province in June 2003.



establishment of a system for such emergency treatment is essential to reducing maternal mortality rates<sup>36</sup>. (In this regard, not only good transportation, but a comprehensive ambulance system is needed.)

- Inter-hamlet roads: By connecting users and CHCs, this type of road serves core functions; namely, (i) the provision of basic health care, such as contraceptive methods, pre-natal check-ups, delivery attendance at CHCs; and (ii) access to information, for example, participation in IEC seminars and consultation with health workers.

***Box 4-12: The Vietnam Reproductive Health Project in Nghe An Province***

The JICA-supported Reproductive Health (RH) Project started in June 1997 under collaboration with Japanese NGO, JOICFP. The project aims to improve the RH services in Nghe An province—which is one of the poorest provinces and lacks well-trained midwives at the commune level. In Phase I, the project covered 244 communes (8 districts) and provided assistance to all 244 CHCs based on an integral approach; i.e., retraining the staff members responsible for pregnancy care and delivery, providing basic medical equipment and medical supply, and renovating CHC facilities, such as delivery rooms, toilets and shower rooms\*.

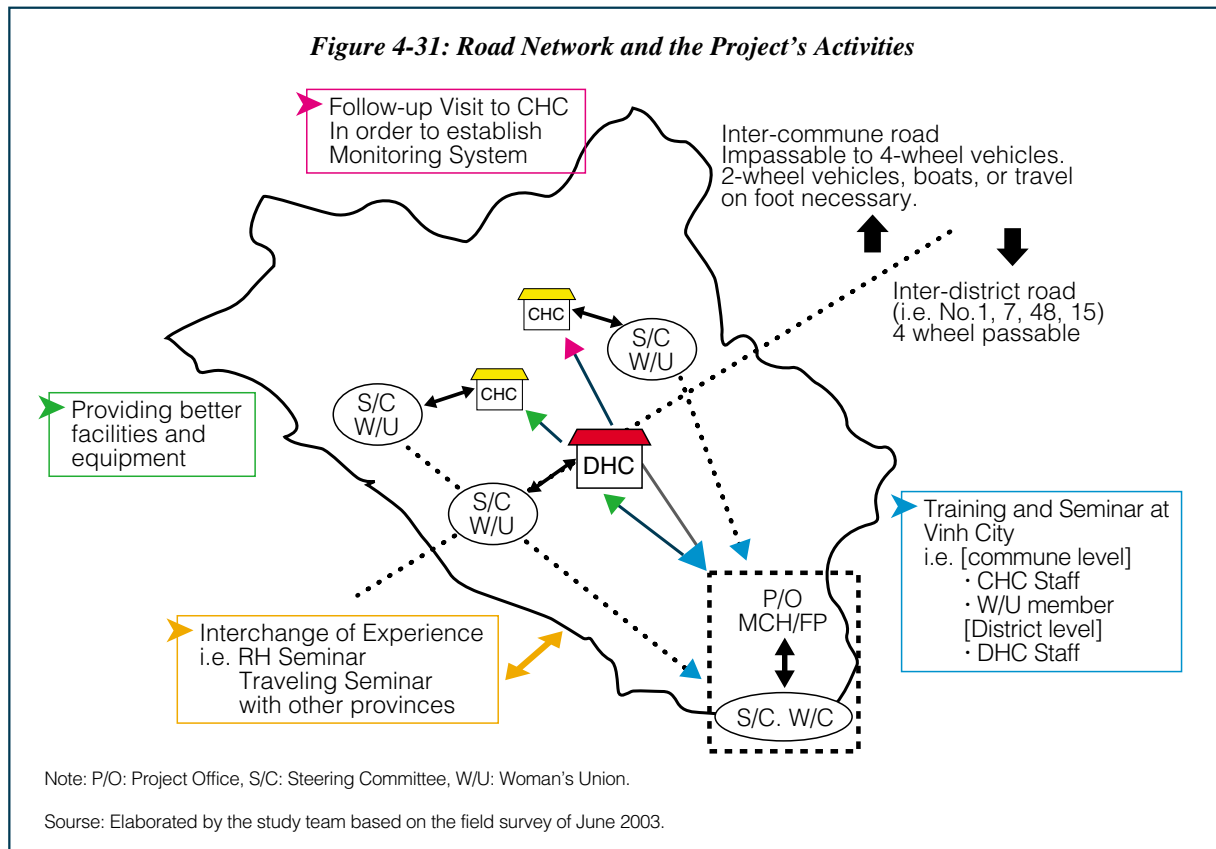
Currently, the project is in Phase II (from September 2000 to August 2005). In Phase II, the project has extended coverage to all 469 communes (in 19 districts) and pays greater attention to the quality of RH services and client-friendly services. Building on the experiences accumulated in Phase I, the project incorporates new elements including: (i) capacity building of community-based voluntary organizations and DHCs; (ii) strengthening of links with family planning-related activities such as training of health workers in post-abortion counseling skills; after abortion and (iii) establishment of the Health Management Information System.

Note: \* Information on the Project is based on the JOICFP website  
[[http://joicfp.or.jp/eng/where\\_j\\_operates/vietnam.html](http://joicfp.or.jp/eng/where_j_operates/vietnam.html)].

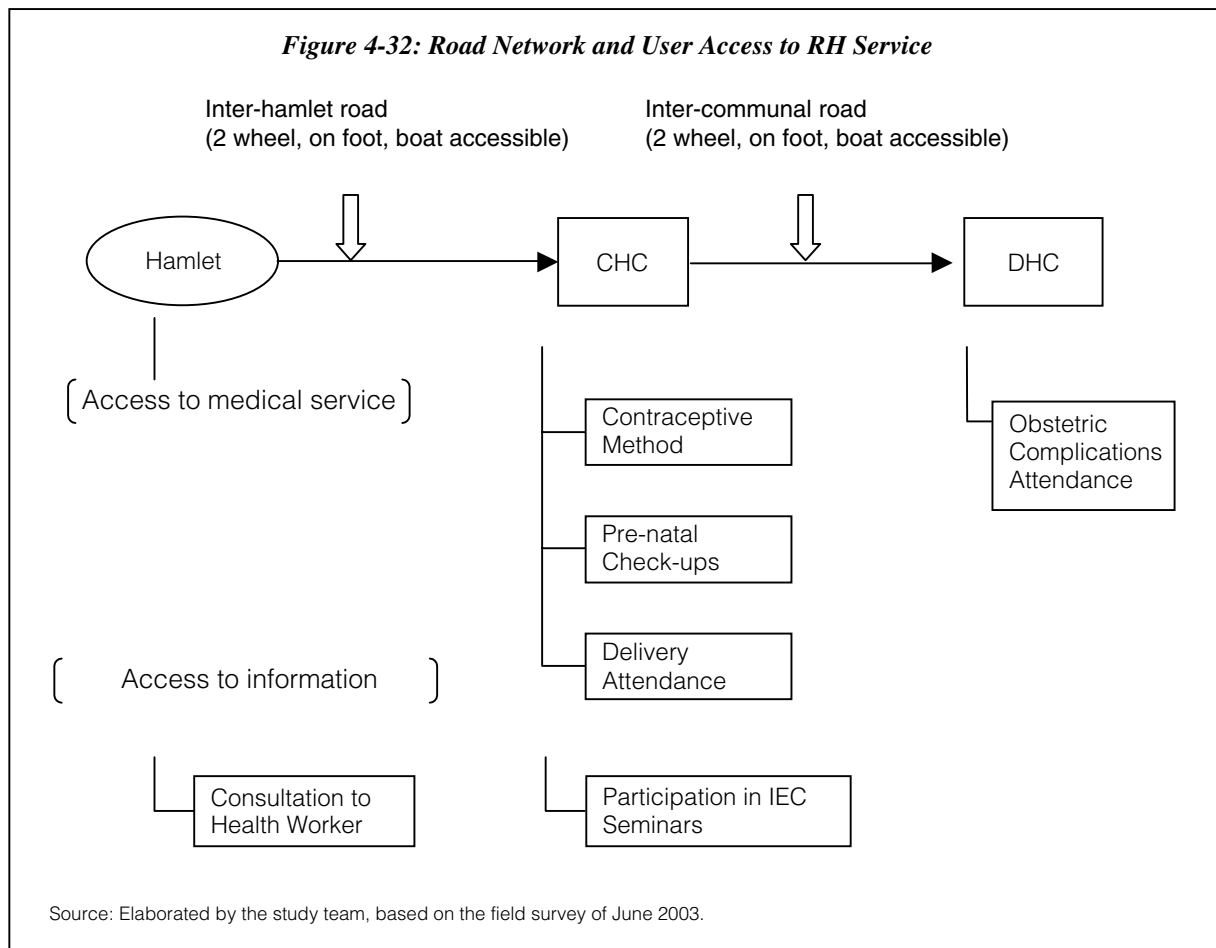
Figures 4-31, 4-32 and Boxes 4-13, 4-14 illustrate how different levels of roads can complement each other in improving the provision of (or access to) information and services—from the viewpoint of both service providers and users.

<sup>36</sup> Maine [1997] points out the following three major causes for delay which contribute to the high likelihood of maternal deaths: (i) delay in deciding to seek care; (ii) delays in reaching a treatment facility; and (iii) delay in receiving adequate treatment at the facility. Inter-commune roads are vitally important to avoid the delay related to (ii).

**Figure 4-31: Road Network and the Project's Activities**



**Figure 4-32: Road Network and User Access to RH Service**



### **Box 4-13: Views of Service Providers**

#### **Establishing a region-wide, community-based program for RH service delivery**

*“Leaving at 6:00 a.m. and being back to Vinh City at 18:00 to 19:00 pm, we continue to run 50-200 km per day. From my experience with this project, I can affirm that the qualification of staff working for the primary health care project with region-wide operation is “physical toughness.” Today, we, myself and Japanese expert Ms. Watanabe continue to visit rural areas expecting that this tough work would serve us as a diet” (Sekai to Jinko, 1998-5 p.43).*

The Japanese expert mentioned here is a midwife. She visits different CHCs twice a week to meet with the midwives of CHCs who have participated in training offered by the project. The project aims to establish a monitoring system for CHC midwives, who are trained by the staff of MCH/FP centers. While visiting CHCs, the expert assists the midwives in solving difficulties in their practice of the skills acquired at training. In doing so, she also provides on-the-job training, monitoring skills of local staff members at MCH/FP centers and DHCs who will be in charge of monitoring work later. The monitoring team uses car(s) of the MCH/FP center from Vinh City to accessible points, and then has to use motor bikes, horses, small boats, or even walk in order to reach many CHCs. The number of communes the expert visited reached 137 in Phase I and 70 in Phase II (as of June 2003). The expert stressed the importance of road improvement in facilitating her mobility, as follows:

*“I visit communes in order to motivate the people. There have been major improvements in the road network at all levels, especially inter-district roads. At the beginning of the project, we had to leave Vinh City at 5:00 and returned at 20:00-21:00, but now we can leave 6:00 and be back by around 17:00-18:00. This makes us feel easier to visit communes. I think roads are vital for the development of a region-wide, community-based service delivery program. Especially trunk (note: inter-district), if trunk roads are good, further access is possible somehow. However, we should not forget the lower-level of roads (note: inter-commune, inter-hamlet roads). There are still a lots of communes, where the access is really difficult, especially in the Mountainous Area\*.”*

Note: \*10 out of 19 provinces are categorized as “Mountainous Areas,” of which 6 districts are designated as areas for the government’s poverty-targeted program No. 135.

### **Box 4-14: Views of Users**

#### **Physical access to Reproductive Health Services**

Will the improved quality of services (by the project) result in more frequent use of RH services at CHCs, such as delivery attendance or pre-natal check-ups? The project expects that by the time of its completion, the frequency of pre-natal check-ups in the plane district (note: the area where the physical access to CHCs is relatively easier than in the mountainous area) would increase by more than three times on average\*.

In June 2003, the author conducted a field visit to two communes in the Anh Son District (around 75km to the west from Vinh City). The two communes are included in the project under Phase II. In one commune, the attendance at CHC has increased, but in the other, no change has taken place. In the first commune, inter-hamlet roads were upgraded recently—from earthen to concrete paved, and two wheeled vehicle-passable. In contrast, in the second commune, inter-hamlet roads remain earthen. The president of the People’s Committee of the first commune stressed that thanks to the improvement of road conditions and service quality, people’s access had been enhanced. His statement confirms the importance of rural roads for users from two aspects: (i) improved physical access by better road conditions, and (ii) enhanced service quality of the project. The Japanese expert also said that: *“if road improvement to CHCs had been included as a component, the impact of the project would have been even greater, by bringing (i) easier access; (ii) better service quality; and (iii) information, all together.”*

Note: \*JICA Project Document.

#### 4-6. Case Study 6: Effective Demand for Road Construction—An Example of National Highway No.18

The ongoing project of National Highway No.18 (NH18) improvement is a good example of the effective demand effect of infrastructure construction, especially direct job and income generation for seasonal workers. The JBIC-financed sections cover approximately 129km between the Noi Bai International Airport (in Soc Son district, Hanoi city) and Cua Ong town (Quang Ninh province), including the construction of the Pha Lai Bridge<sup>37</sup>. The construction work started in October 1999 and is to be completed by the end of 2003. As noted before, together with NH1 and NH5, the improvement of NH18 has helped to promote the dynamic development of these areas and northern Vietnam.

##### *Creating Off-Farm Jobs and Income*

In the construction of highways, a number of works can be carried out economically by locally-recruited manual labor. These are simple works, such as route clearance, earth digging and piling, manual transporting of materials, making road tallies, planting and maintaining grass. The employment of local farmers for such unskilled works contributes to job and income generation in the surrounding rural areas, particularly during off-farm seasons.

The construction works of NH 18 are divided into five bidding packages. Up to this point (as of September 2003), the works have been largely completed, with the exception of the Noi Bai-Bac Ninh section, where the construction started in January 2001 and is about 85% complete. According to estimates of the Project Management Unit (PMU No.18)<sup>38</sup>, 6,584 workers have been hired since their commencement—including 2,934 skilled workers (normally, fixed-term assignment for the average work period of 664 days) and 3,650 unskilled workers (temporary assignment for the average period of 31 days). Most of the unskilled workers are engaged in the NH18 construction works for 24 months or longer, implying that many work repeatedly.

An interview survey with 26 seasonal workers (17 unskilled and 9 skilled) at the construction site of the Noi Bai-Bac Ninh section confirms the importance of seasonal construction works for rural households<sup>39</sup>. As regular jobs, about half of the interviewed workers are engaged in farming and animal husbandry (12 workers, or 46%), followed by factory employment. The majority of their families gain income from farming and animal husbandry (24 families, multiple answers). Most of the workers (17) live in nearby provinces where NH18 passes (Bac Ninh, Hanoi), with the rest coming from various provinces in the north (e.g., Hung Yen, Hai Duong, Hai Phong, Ha Thay, Thai Binh, Thanh Hoa, Cao Bang and Phu Tho).

As figures 4-32~37 illustrate, further analysis of the 17 unskilled workers shows that: (i) off-farm activities provide an important source of their family incomes (on average, accounting for 68% of annual cash income of their households); (ii) income from the NH18 works occupies a significant share of their family incomes; and (iii) thanks to the onset of NH18 construction, opportunities for off-farm job and income have greatly increased. Two years ago, 11 of the 17 interviewed unskilled workers spent only 1-3 months for off-farm jobs; now, all the unskilled workers (except 1 no answer) have been

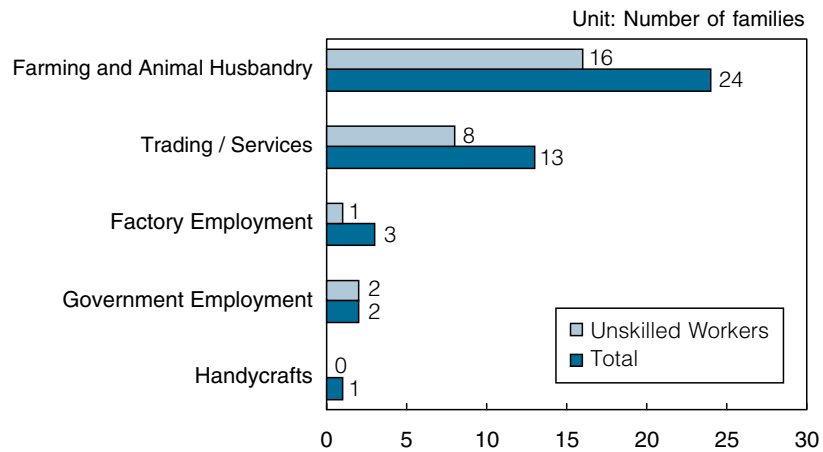
<sup>37</sup> The entire route of NH18 extends approximately 300km, of which 59km (Chi Linh-Bieu Nghi section) was improved during 1998-99 financed by Korea and 100km (Cua Ong-Mong Cai section) is yet to be improved.

<sup>38</sup> Based on the interview with the PMU No.18 staff by the study team in September 2003 and additional information provided through CONCETTI.

<sup>39</sup> The interview survey was conducted by CONCETTI in September 2003. All the 26 interviewed workers are engaged in unskilled jobs. But, it turned out that 17 people are recruited as unskilled workers and that the remaining 9 people are skilled workers who have been temporarily assigned to unskilled jobs during the standstill periods at the construction sites. The works of the Noi Bai-Bac Ninh section have so far involved 1,200 unskilled workers (30 days per assignment) in addition to 662 skilled workers.

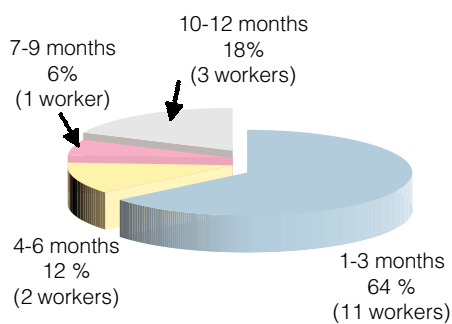
involved in the construction works of NH18 for 4 months or longer (with 8 working for more than 12 months). These rural households use the resulting additional income for routine expenses, education, family savings, etc.

**Figure 4-33: Main Sources of Monthly Income of Workers' Families (multiple answers)**



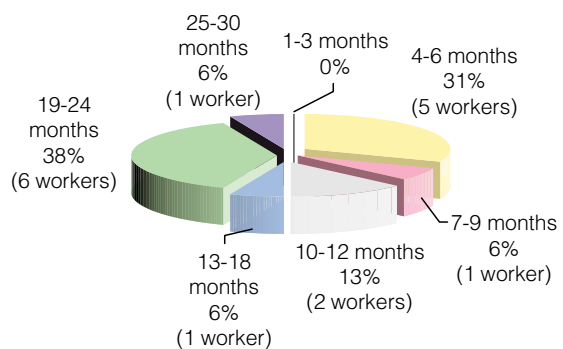
Source: CONCETTI [2003b], based on interviews with 9 skilled and 17 unskilled workers (totaling 26 workers) at the Noi Bai-Bac Ninh section of NH 18 construction site.

**Figure 4-34: Number of Months Working Off-Farm (2 years ago) – Unskilled Workers**



Source: CONCETTI [2003b], response was obtained from 17 unskilled workers.

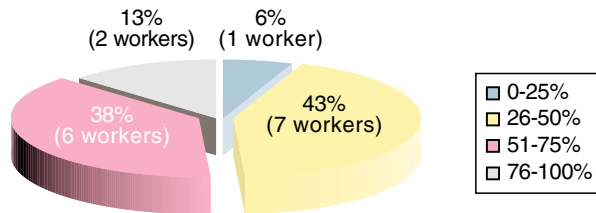
**Figure 4-35: Number of Months Working on NH18 Construction – Unskilled Workers**



Note: The construction of the Noi Bai-Bac Ninh section started in January 2001.

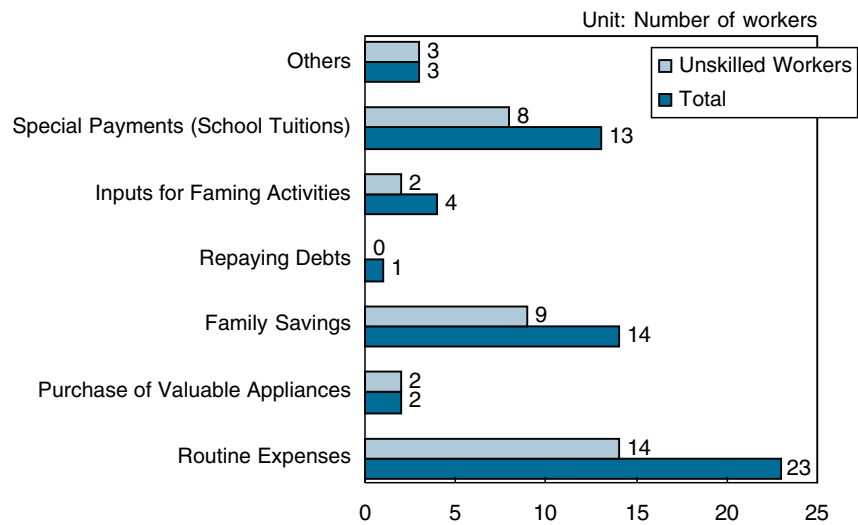
Source: CONCETTI [2003b], response was obtained from 16 unskilled workers.

**Figure 4-36: Contribution of NH18 Seasonal Income to Family Monthly Income – Unskilled Workers**



Source: CONCETTI [2003b], response was obtained from 16 unskilled workers.

**Figure 4-37: Use of NH18 Seasonal Income (multiple answers)**



Source: CONCETTI [2003b]. The total data are based on interviews with 24 families. The data on unskilled workers are based on 14 families among the total 24 interviewed families.

## Chapter 5. Vietnam's Development Challenges and the Role of Infrastructure

As Vietnam continues to make progress in improving the living standards, it must fine-tune its development strategy to respond to new challenges. Industrial development needs to be further promoted, with special consideration to Vietnam's accelerating global integration. As poverty incidence declines, further reductions in poverty will increasingly depend on distributional issues. There is a need to cope with urban-rural disparity through rural development and also ensure that the poorest and disadvantaged groups are not isolated in benefiting from the growth process. The future role of large-scale infrastructure must be considered from these perspectives.

Three issues are particularly critical: (i) enhancing competitiveness in the globalized economy; (ii) promoting rural development, particularly by creating off-farm employment; and (iii) strengthening the effectiveness of poverty-targeted measures. Infrastructure can play an important role in addressing these challenges. The analysis in the previous chapters suggests the effectiveness of linking different levels of infrastructure ("network") and the usefulness of complementary policies and measures to maximize the impacts of infrastructure development.

### 5-1. Enhancing Competitiveness in the Globalized Economy

Vietnam is located at the heart of dynamic East Asia. The country also has diligent and less expensive labor force. To sustain rapid growth and strengthen industrial competitiveness, Vietnam's future development strategy must be geared to maximize these advantages. Furthermore, Vietnam's intermediate position—between China and ASEAN—presents a unique development potential from a regional perspective.

There are four major changes that are currently and will significantly affect the Vietnamese economy in the near future<sup>40</sup>.

- Vietnam's pledge to join the ASEAN Free Trade Area (AFTA) and its commitment on tariff reductions
- The Vietnam-US bilateral trade agreement (USBTA)
- Vietnam's accelerating WTO accession
- China joining the WTO

In this way, Vietnam faces fierce competition in the global market through the accelerating trade and investment liberalization. As traditional barriers to market access decline, trade facilitation measures have become more critical. In particular, the importance of multimodal transport has increased in terms of: (i) matching inland with maritime infrastructure, (ii) simplifying trade documentation; (iii) developing an efficient freight forwarding industry; and (iv) developing an effective communications system [Carruthers and Bajpai 2002]. Efficient infrastructure is a key element of trade logistics and facilitation, and large-scale infrastructure can serve to strengthen the function of urban centers as gateways for international trade.

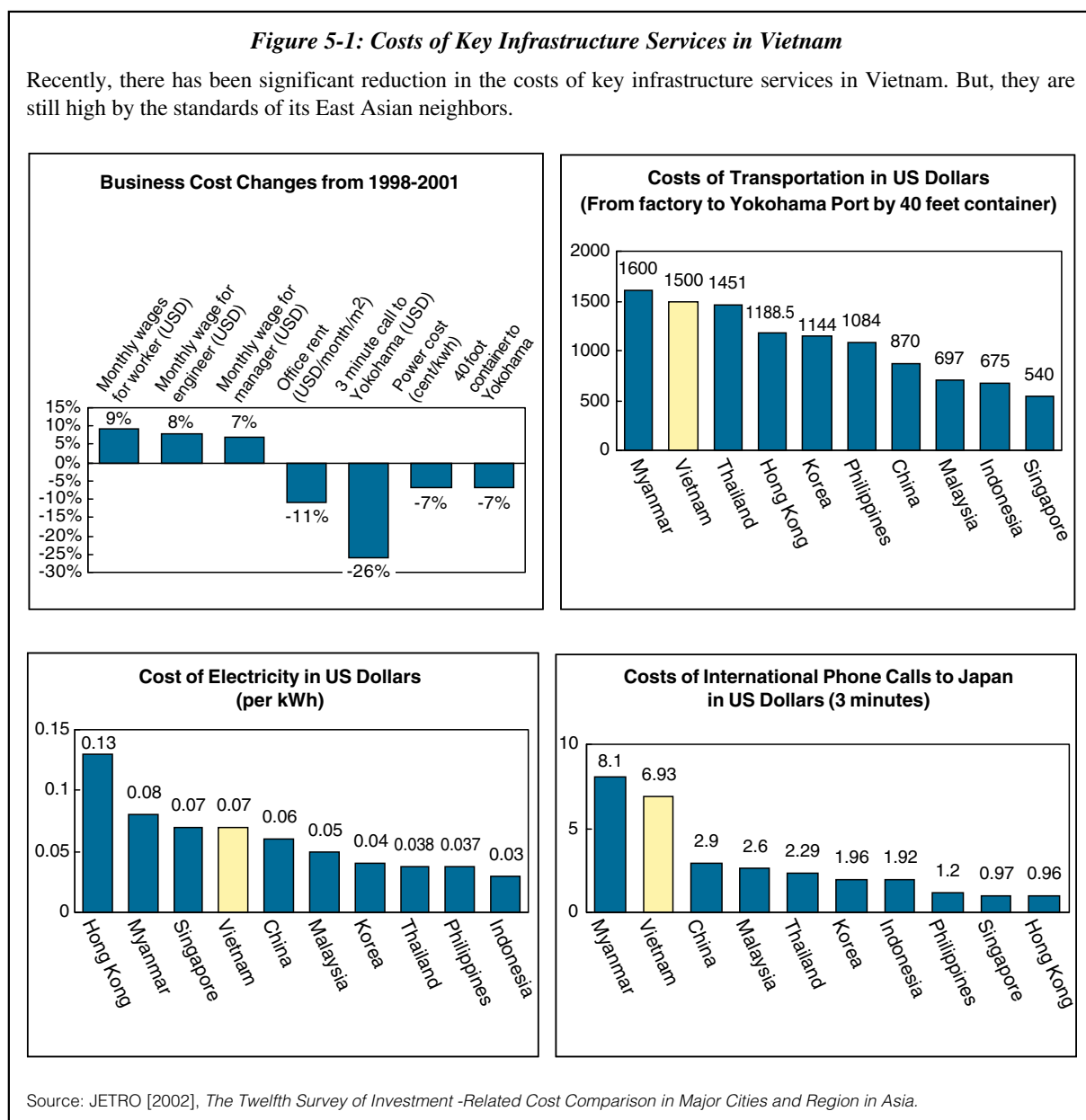
Although Vietnam's infrastructure has greatly improved from the past, it still lags behind the standards of neighboring East Asian countries—in terms of availability, cost, and quality. Thus, continued progress in this area is indispensable [see Figure 5-1 for the costs of key infrastructure services in Vietnam]. For example, a recent World Bank report notes that Vietnam's ports are among the highest cost ports in the East Asian region. Although overall port, cargo handling trucking, and rail tariffs may

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<sup>40</sup> Quoted from MPI/JICA [2003].

not be excessive, relative inefficiencies impose high costs in terms of inventory and unproductive time of vessels and road vehicles [Krumm and Kharas 2003]. A recent survey on the investment climate also confirms that investors perceive Vietnam's underdeveloped infrastructure as one of the major bottlenecks.

At the same time, there are other investment bottlenecks, such as difficulty in procuring local parts, problems with business practices and inconsistent FDI policies [see Table 5-1]. The benefits of economic infrastructure cannot be fully achieved unless favorable policy and institutional environment is put in place for trade and investment promotion<sup>41</sup>. It is thus necessary to take an integral approach to improve the investment climate and treat infrastructure as part of a national strategy to strengthen industrial competitiveness.



<sup>41</sup> The urgency to improve the policy environment for industrial promotion is stressed in the NEU-JICA Joint Research Project (*Vietnam's Industrialization Strategy in the Age of Globalization*) <http://www.neujica.org.vn/> or <http://www.grips.ac.jp/module/vietnam/>.



**Table 5-1: Assessment of Competitiveness in terms of Specific Factors Impacting FDI**

Specific characteristics	Vietnam	China	Thailand	Malaysia	Philippines
FDI Confidence index	2	4	3	3	2
Potential economic growth	3	4	2	2	
Quality of infrastructure	1	2	4	4	2
Legal system (development, transparency, instability)	2	2	4	4	3
Tax system (development, transparency, instability)	2	2	3	3	2
Political & Social stability	4	3	3	3	2
Foreign exchange rate control and stability	2	3	2	2	2
Procurement of parts	1	3	3	3	2
Potential market access	2	3	3	3	2
Ease of doing business	1	2	3	3	2
Corruption perception	1	1	2	2	2

Note: Rankings are based on Price Water House Cooper's calculations (Rank: 4 = most competitive, 1 = least competitive). The calculation is made on the review of existing studies.

Source: MPI/JICA [2003].

The importance of infrastructure investment in enhancing the business climate has also been emphasized in the Vietnam Business Forum<sup>42</sup>. The Infrastructure Paper prepared by the Infrastructure Sub-Group (November 2002) pointed out that there is a substantial gap between what the government needs to raise in money for infrastructure over the next few years and what it is able to raise from budget and ODA sources. According to the paper, approximately 12% of GDP is required of which 3% can be raised by the government and 2% from ODA sources, leaving a gap of 7% of GDP which equates to US\$2.1 billion per year. The magnitude of overall investment and funding requirements points the need for prioritization and optimal use of diverse resources for infrastructure projects.

## 5-2. Promoting Rural Development

Poverty remains a largely rural phenomenon. There exists a large gap in living standards between all rural areas and the urban and peri-urban areas, and urban-rural inequality is expanding. About 80% of the poor in Vietnam are farmers, the majority of whom have benefited from agricultural reforms over the past 15-20 years. As noted in Chapter 3, the majority of gains in the agricultural sector have been exhausted. The levels of income in rural areas are now constrained to levels very close to the poverty line by land availability and production capacity. Consolidating and providing the impetus for the next stage of income growth for the majority of the population will largely depend on the generation of off-farm employment. Empirical evidence suggests that there is quantifiable increase in incomes for rural households by diversifying their income base and stresses the important role of infrastructure in rural poverty reduction [see Box 5-1, Van de Walle et al. 2003].

The case analyses of regional economy activation in Hung Yen and Hai Duong provinces and the Mekong Delta region demonstrate a vital role of trunk infrastructure in promoting income diversification and off-farm employment. Infrastructure network (both large and small, trunk and rural) is a key determinant for "economic distance" and "connectivity" to markets and services and serves as a pre-condition for realizing poverty-reducing growth in rural areas. This is so particularly in the context

<sup>42</sup> The Vietnam Business Forum was created in 1997 (initially as the Private Sector Forum), aimed at providing a policy dialogue among the government, donors, and the private sector. Since 1998, it has been officially linked to the Consultative Group Process. The meeting is chaired by the Minister of Planning and Investment, and Country Director of the World Bank, and co-chaired by IFC. See <http://www.vietnambusinessforum.org/>.

***Box 5-1: Impact of Infrastructure on Rural Poverty Reduction***

The Deolalikar [2001] study shows how infrastructure helps in the reduction of rural poverty from various aspects:

- Roads have very strong effects on income and living standards of households and their effects are most pronounced in the poorest provinces;
- The presence of a road in the community is a significant factor for a household to break out of poverty;
- There is a strong association between the availability of roads and secondary school enrolments. The strength of the association is strongest in provinces with low-living standards;
- There is a strong positive effect between the presence of a road in a village and the utilization of government hospitals and inter-communal polyclinics;
- Both irrigation and road infrastructure have significant effects on the agricultural yield growth; and
- There is a significant impact of roads on industrial output growth both in rich and poor areas (an output elasticity of 0.15).

Source: Deolalikar [2001], "The Spatial Distribution of Public Spending on Roads in Vietnam and Its Implications," September 27, 2001 (draft).

of Vietnam, where the majority of the population belongs to the "transient" poor and the creation of income "opportunities" through "trickle down" effects appears to be effective.

***Inter- and Intra- Provincial Variations in Poverty***

At the same time, it is necessary to recognize great variations in the poverty situations within rural areas. As noted before, the poor and the rich are not static groups in Vietnam. Nevertheless, this should not mask the fact that there exist certain groups (or the "chronic" poor) which are severely constrained from participating in new economic opportunities. There may be a potential disconnection between growth and poverty reduction, particularly for the poorest and most disadvantaged groups (and areas). To ensure wider benefits and broad-based growth, it is important for the government and other agencies to design effective poverty-targeting programs by using the resources generated by growth, including revenue and redistribution policies.

Situated close to Hanoi and NH5 to Hai Phong Port, the rural population of Hung Yen has benefited substantially from the growth of the region. In contrast, Lai Chau is in the remote Northwest of Vietnam and lacks basic infrastructure services and access to markets. The experience of RT2 shows the greater impacts of rural road development in Hung Yen, both in terms of social and economic benefits. Lai Chau is less able to take full advantage of the opportunities that improved road access can bring.

Moreover, the comparative analysis of Hung Yen and Lai Chau provinces shows varying abilities among local government bodies in mobilizing resources for rural infrastructure [TDSI/DFID 2003]. In Hung Yen, investment funds for capital construction have increased in the recent two years. In particular, there has been a drastic increase in the funds from non-state sectors (exceeding 80% of the total investment funds in 2002). While transportation and communications account for small share of the total investment funds (at only 5% in 2002), the province has mobilized various investment resources to develop its rural transport network. On average, it has improved 360.8km every year (equivalent to VND42.5 billion, or nearly US\$2.7 million), in which combined investments from central government, the province, and the RT2 project contribute to about 35%. The remaining 65% comes from the contributions from commune budgets and the general public.

Lai Chau province has also experienced rapid increase in investment funds for capital construction in recent years. But, state-investment accounts for 76% of the total investment funds. Investment for transportation and communication is low and mainly comes from the central government budget. In this province, 120 of the 141 poor communes receive support from the Program 135. (The poverty rate of

these communes is 46.5% compared to 17.2% of the national average.) There remain 20 communes without access roads to their centers.

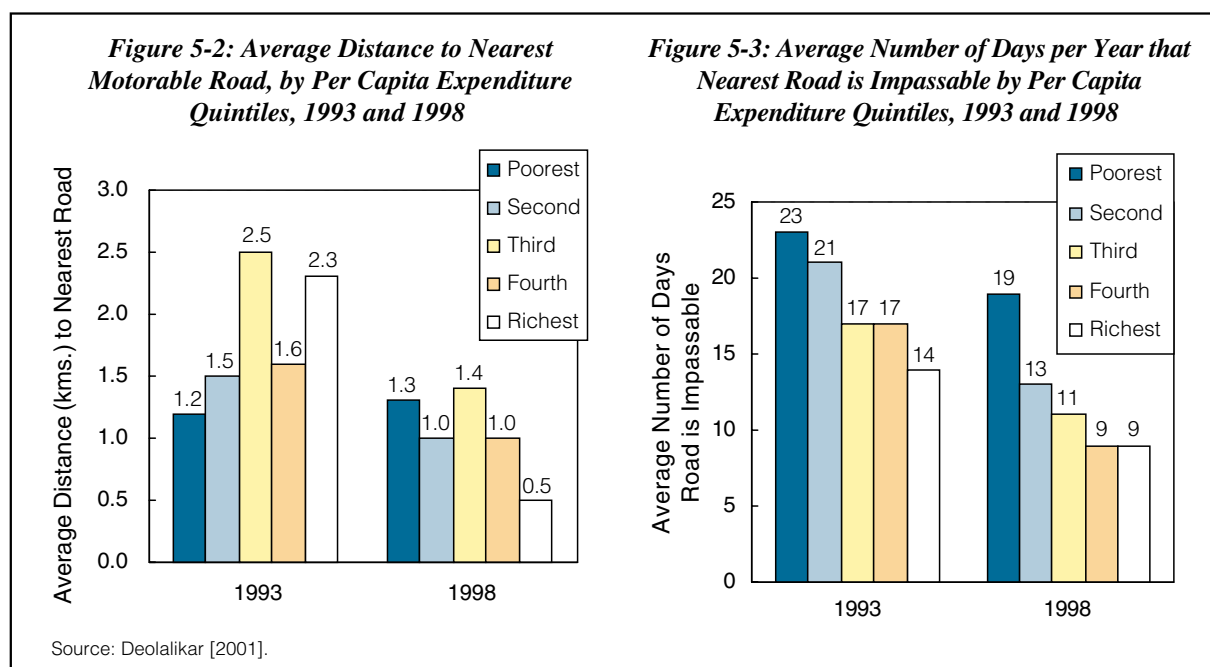
Such inter- and intra-provincial variations in income and the resultant resource mobilization capacity suggest a need for taking different approaches to rural road development-between the areas where the "transient" poor live and where the "chronic" poor are concentrated.

### 5-3. Strengthening the Effectiveness of Poverty-Targeting Measures

Public spending on roads, although still tilted in favor of better-off provinces, became more equal during the second half of the 1990s. For example, the growth in real public spending on roads has been more diffused. Between 1995 and 1999, the 15 provinces that accounted for 75% of the national GDP increase accounted for only 31% of the national increase in public road spending [Deolalikar 2001].

Nevertheless, the study also finds that the poorest groups (and areas) continue to be disadvantaged by the access to and the quality of road infrastructure, when looked from the perspective of the commune or village levels. Evidence from the analysis of longitudinal VLSS data shows that during the period 1993-98: (i) while the access to motorable roads for the richest population quintile increased substantially, such access for the poorest quintile shrank considerably; (ii) the poorest quintile are substantially disadvantaged relative to the richer (the second poorest and the above) in terms of impassability of the nearest road; and (iii) the richer quintiles have substantially higher access to quality roads (asphalt or tar) than the poorest quintile. Also, a major difference exists between the poorest and the second poorest quintiles regarding the speed of improvement of road infrastructure.

Therefore, there is still a need to design infrastructure projects and programs that target the "chronic poor," mainly in remote areas, in order to avoid risks of reinforcing the poverty gaps evident from the most recent data. But, targeting infrastructure development in poor areas will not automatically benefit the poor. Careful design is essential in order to ensure that the interventions benefit the poor in an inclusive manner. In many cases this will require complementary interventions to ensure that the poor can access the services provided by infrastructure. For example, if the poor cannot afford connection fees or electrical equipment they will not benefit from grid extension, similarly if the poor have no



means of transport [see Figure 4-29, bicycle ownership figures in Lai Chau province] and there are no public transport services, then the benefits of roads to the poorest will not be maximized.

#### **5-4. The Role of Infrastructure in Poverty Reduction**

The three channels for pro-poor growth will be of differing importance to the "chronic" poor in the remote areas and the "transient" poor in the better-off areas. The "chronic" poor are unlikely to benefit from economic growth directly. Consequently direct interventions aimed at improving local economic opportunities (transfer of agricultural technology, rural roads, etc.) are the most appropriate to help achieve equitable growth. In addition, social safety net or "policy" channel interventions should also be adopted (e.g., subsidies, fiscal transfer, etc.) to redistribute the gains from growth in the wider economy to poorer areas so that basic services are securely provided.

In the better-off areas (where there are large numbers of the "transient" poor), interventions that enable poor households to improve their economic linkages with domestic and external markets and support for non-farm diversification are most relevant. Put another way, to enable a "trickle down" to take effect, the formal economy needs to be made accessible to the poor. This is the most likely route for bringing the most benefit to the large segment of the population who have already benefited from Vietnam's growth but now need to be assisted to make the next step from farm to non-farm, and informal to formal employment.

Large-scale infrastructure (trunk roads and major power production) provides the foundations on which economic growth for the formal, non-farm economy is built. And this paper has clearly demonstrated its validity in the context of Vietnam. However, too much focus on large-scale investments, without consideration to their links to the other areas, is likely to make growth inequitable as the richer sections of society may capture the benefits (because they have access to the services that such infrastructure provides).

Small-scale infrastructure (rural roads, irrigation, rural electrification infrastructure etc.) is also a proven, necessary but not sufficient, supporting measure for both "chronic" and "transient" poverty reduction. It provides the basic access to services and economic opportunities that the poor require to improve their livelihoods. Nevertheless, too much focus on small-scale infrastructure will only generate local improvements and limit economic growth, as the poor will not be connected to growing domestic and foreign markets.

Past experiences suggest dilemma of how to select small-scale, rural infrastructure projects, balancing economic and social/poverty concerns [see Box 5-2]. This implies there is a scope for further improvement in selection criteria, particularly for small-scale, rural infrastructure, taking account of inter-and intra-provincial variations in the poverty situation in Vietnam.

To maximize the gains of each level of infrastructure requires a planned approach that adequately invests in both areas and ensures "connectivity." One way of seeking balanced investment decisions (between growth and poverty reduction) might be to incorporate a "network" perspective into investment planning and prioritization. The case studies presented earlier in this paper demonstrate the importance of connecting remote areas with power grids, and trunk roads with feeder roads to achieve poverty-reducing growth. Thus, greater attention should be paid to the synergy of networking between large and small, trunk and rural infrastructure.

**Box 5-2: Balancing Economic and Social/Poverty Concerns**

Despite major progress in infrastructure development in Vietnam, the poorest quintile continues to be disadvantaged by access to infrastructure service. There may be several reasons for such an outcome.

- *Lack of systematic consideration in infrastructure placement:* Infrastructure locations, to a large extent, are demand driven. For example, national electricity distribution grids are extended to areas where the demand for electricity is high and the benefits exceed the financial cost. Under such a criterion the poor areas where the demand for electricity is low have been left out.
- *Selection of infrastructure based on economic efficiency:* Selection criteria for rural infrastructure can be different from that of trunk infrastructure (which is mostly based on economic efficiency). For example, consider the appraisal of two rural roads—one passing through a high-income area and another through a low-income area—under budget restrictions. The road that passes through that area will have a higher economic rate of return as the people in the high-income area will be willing to pay more for the benefits they receive. Therefore, the road in the high-income area will attract the investment. The World Bank-supported Rural Energy Project\* seeks to expand electricity in 671 communes in 32 provinces through grid extension. However, it will only extend in communes where at least 60% of the households confirm their willingness to get connected and pay the connection charges. This may exclude the poorest communities.
- *Economies of scale in infrastructure provision:* Due to the low indivisibility of infrastructure, it requires economies of scale to justify establishment. This means that the areas with high population density are more likely to get preference over low-density areas. In Vietnam, the proportion of poor people is higher in sparsely populated areas. Results of an analysis that involves 61 provinces show that there exists significant negative correlation between the rural population density and the proportion of poor households (correlation co-efficient of -0.40 with significance of 0.001). Therefore, the poor are further disadvantaged given the failure to meet the necessary requirements of economies of scale.
- *Non-inclusion of the whole range of benefits:* Non-inclusion of all types of benefits (e.g., economic, social and environmental) in infrastructure appraisal process may disadvantage poorer communities. For example, if a rural road connects to an isolated area that was without a reliable road connection, the social benefits (e.g., access to health, educational institutions, etc.) would be a significant portion of the overall benefits unlike an area with good road connection. These benefits are not included in the conventional appraisal process, as it is difficult to quantify and value them, or predict post-improvement benefit levels.
- *Higher spending capacity of well-off local governments:* The better-off local government bodies (provincial, districts and communes) tend to invest more on transport infrastructure than their poorer counterparts and demand lower community contributions.

Note: \*The components of the World Bank-supported Rural Energy Project (US\$150million) include: (i) electrification of 671 communes located in 32 provinces through grid extension; (ii) defining and establishing institutional mechanisms and strategy for rural electrification; and (iii) promoting the application of renewable energy sources in areas inaccessible to the national grids, and supplementing grid power supply.

Source: DFID/Vietnam infrastructure team [2003].

## Chapter 6. Issues for Future Strategic Planning of Infrastructure Development and Aid Partnership

The final chapter highlights selected strategic issues which are important for the development of large-scale infrastructure. It also suggests required measures to maximize development impacts of large-scale infrastructure and how government-donor partnership can be further enhanced in this regard. As this paper shows, the links and channels through which large-scale infrastructure promotes economic growth and poverty reduction have been clearly established. The perceived dichotomy between growth and poverty should be avoided because infrastructure provides a platform for both. The government needs to articulate a shared vision for the role of infrastructure, under an overall development strategy.

On the basis of Vietnam's past experiences with infrastructure development, main issues can be broadly classified as follows: (i) complementarities between infrastructure, social investments and institutions; (ii) spatial dimension of infrastructure development; and (iii) policy and measures to maximize the effectiveness of infrastructure investments (including fiscal and financial aspects, sectors policies, project management etc.). These issues are important to ensure appropriate resource allocation and mobilization, make inputs into large-scale infrastructure effective, and mitigate its possible negative impacts.

### 6-1. Complementarities among Infrastructure, Social Investment and Institutions

There exist close complementarities among infrastructure, social investment and institutions, although they are financially substitutable. First, human capital is essential to ensure the development effectiveness of infrastructure investment. Health and educational achievements greatly affect the productivity of labor. These are important for agricultural productivity, influencing the effectiveness of agricultural extension and technology transfer. Also, business productivity critically depends on the quality of factory workers and the managerial and technical capacity of skilled workers. Further integration into the world economy will increasingly necessitate a skilled labor force. Although literacy rate in Vietnam is high compared to other countries, the trained workforce is relatively small. Shortages of qualified workers, technicians and managers are already apparent in dynamic economic centers<sup>43</sup>.

Several provinces have already initiated efforts to address this problem. The northern four provinces (along NH5) have very active vocational training programs. For example, Hai Duong province has 23 vocational schools, supplying over 6,000 students per year. Nine of them were established during the last two years. Notably, these new schools are run by private-local government's partnership. Hung Yen province has 13 vocational schools, supplying 5,000 graduates per year. The recent expansion of training programs in the two provinces is very impressive, and the newly invested foreign and domestic enterprises benefit from the programs<sup>44</sup>. In the south, Binh Duong province has a technical training center within the Viet-Sing IZ, with financial support from the private sector and the central government.

Second, there is a need to address the potentially negative environmental and social aspects of infrastructure projects. These include environmental impacts, resettlement, road safety issues, etc.

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<sup>43</sup> The local authorities of Can Tho province also state that the shortage of skilled, technical workers makes it difficult to fully satisfy the demand from FDI firms. (Based on interview with the Department of Planning and Investment in Can Tho province in June 2003.)

<sup>44</sup> It is worth noting the generally high educational achievements of the population of the two provinces. Hai Duong and Hung Yen are among the first eight provinces of the country, which achieved universal secondary education in 2001. During the war with the US, a number of higher educational institutions, including vocational schools, were evacuated from Hanoi to the two provinces. Thus, there are enough secondary school graduates to be trained at vocational schools [JBIC/IDCJ 2003].

Proper safeguard measures must be taken throughout planning, construction, and operation of projects.

The Vietnamese government is mindful of these issues. For example, in the case of donor-supported trunk road projects, the Ministry of Transport (i.e., Project Management Units and Regional Road Management Units) has been making serious efforts. The past experience suggests that requirements under environmental assessment and resettlement action plans have been generally complied, consistent with relevant laws and guidelines of the government and respective donors. The experience also shows that if properly handled, the affected families (e.g., by relocation) could sufficiently enjoy benefits of the development of large-scale infrastructure [see Box 6-1]. However, the implementation of resettlement and land acquisition has turned out to be very time-consuming, affecting the progress of construction work.

The World Bank-supported post-evaluation study of the National Highway No.1 project points out the further need to strengthen the capacity of the ministry and responsible units in: (i) carrying out EIA studies and monitor the implementation of mitigation measures during construction; (ii) identifying 'bottlenecks' earlier, in the implementation of resettlement procedures and compensation payments, to avoid unnecessary delays; and (iii) improving the reporting of traffic accidents at both central and local levels<sup>45</sup>. This point is important because the poor are more likely to be vulnerable to potentially adverse consequences

***Box 6-1: Social Impacts of National Highway No.1***

As part of post-evaluation study of the World Bank-funded National Highway No.1 project, the environmental and social component of the project was assessed, by using key informant interviews (38 respondents) and household survey (1,129 respondents—Hanoi-Vinh (164), HCMC-Can Tho (132), Hanoi South Development Corridor (101), Vinh-Dong Ha (634), and Dong Ha- Quang Ngai (98)). The surveys were conducted between January-May 2003.

The major findings of the surveys are as follows:

- Most of the respondents claimed that their families have been compensated satisfactorily.
- Most of the respondents who were relocated in resettlement sites declared that their present areas are better than their original locations.
- There has been a shift in income sources after six years, with a reduction in those engaged in farming and business. There was a marked increase in the number of respondents now engaged in other sources of livelihood.
- Income levels have generally increased over the past six years. Most of the respondents has rated their present level of income as "better than before" 1996.
- Most of the respondents rated the overall impacts of the project as positive. Among the positive impacts cited were reduction in travel time, improved access to facilities and services, and better opportunities for work and other livelihood/business aspects.
- About 39% of the total respondents mentioned two negative impacts of the road rehabilitation. These were increased noise from traffic and increased incidence of accidents.
- Of the total respondents who availed of training programs under NH1, only a small percentage (16%) have found suitable jobs after the training. The majority has found it difficult to find appropriate jobs.

Source: World Bank [2003a].

<sup>45</sup> Based on the World Bank-supported post-evaluation study of NH 1, *Project Monitoring and Evaluation Study: National Highway No.1 Rehabilitation Projects (HRP1-HRP2)*, prepared for the World Bank, July 2003.

Road safety is another example of emerging social problems, associated with infrastructure. Vietnam's road safety situation has been deteriorating. The official estimates show fatality rate of over 14/10,000 vehicles, and road fatalities have been increasing at a rate of over 30% per year during the last several years<sup>46</sup>. Recently improved infrastructure, rapid motorization, speed acceleration, and increasing traffic densities (largely motorcycle users) are all contributing to a high level of road-related fatalities. The growing social and economic costs of road accidents have made transport safety, especially road safety, a high priority for the Vietnamese government.

Third, there exist institutional complementarities. There is a need to pay attention to not only physical aspects, but also service and management aspects (such as pricing, competition, and accessibility by the poor) of infrastructure development. The latter greatly affects the efficiency of infrastructure services, which are vital for industrial competitiveness. For example, efficient customs administration is indispensable to the functioning of port infrastructure. Traffic regulation and a proper system for operations and maintenance are crucial for road infrastructure. Moreover, the quality of infrastructure service and management determines how the benefits of improved infrastructure are distributed to society as a whole (including the poor). To maximize the impacts of large-scale infrastructure, institutional reforms must be implemented in parallel.

## 6-2. Spatial Dimension of Infrastructure Development

Vietnam's development vision incorporates spatial dimension in a pro-active manner<sup>47</sup>. The underlying assumption is to start from the highest potential region (s) in terms of human resources, location, externalities, etc. and gradually move to the second highest potential region (s). It is expected that growth in the first region would provide financial resources for the next. Growth diffusion in the northern provinces along transport corridors and the southeast provinces surrounding HCMC, as well as dynamic prospects for Can Tho and the Mekong Delta region confirm that such approach based on spatial dimension has been working in Vietnam so far.

To ensure rapid but equitable economic growth, it is necessary to continue efforts in developing and deepening linkages between growth centers and adjoining rural areas—so that benefits of growth are more widely spread. This implies infrastructure investments at the national, sub-national, and regional levels, namely:

- National transport (or inter-provincial) corridors themselves to link growth centers;
- Sub-national and rural road network (provincial, district, and feeder roads) to connect growth center (s) and selected rural areas, so that transport corridors can reach out into remote areas; and
- Regional road network to extend the above linkages even further to the neighboring countries in the Greater Mekong Subregion (GMS)<sup>48</sup>.

The timing and sequencing of investments could greatly affect industrial location, the promotion and diffusion of growth centers, and the effectiveness of national and/or regional programs of social service delivery. As a result, these may determine the patterns of growth and poverty reduction and balanced

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<sup>46</sup> Because of underreporting, unofficial estimates of fatalities are significantly higher. The information of this section is based on the findings of the World Bank mission on road safety, which visited Vietnam in June 2003.

<sup>47</sup> Prakash [2003] notes the important implication of spatial dimension of infrastructure, because these investments are often embedded in a fixed location.

<sup>48</sup> The ADB has been actively supporting regional cooperation within the Greater Mekong Subregion (GMS), covering Vietnam, Thailand, Cambodia, and Lao PDR. Priority or potential infrastructure projects (aimed at serving subregional linkages) have already been identified, and some of them are under construction. These include: (i) the road from Hanoi to Lang Son on the border with the People's Republic of China; (ii) the HCMC-Phnom Penh-Bangkok highway; (iii) East-West transport corridor through Lao PDR connecting northeast Thailand and central Vietnam; and (iv) the road and rail route from Hanoi to La Cai.



regional development. Such investments should be designed not only to maximize growth potential, but also to link rural households and enterprises with new market and job opportunities arising from the growth.

As stated before, a notable feature of the poverty in Vietnam is that a large proportion of the population is clustered around the poverty line. This places the country in a unique situation whereby adoption of appropriate infrastructure strategies can substantially reduce poverty by connecting the poor to the growth of the economy. The case of Hung Yen illustrates this positive effect. The well "connected" parts of the province have benefited far more from general economic growth than the less well connected. Consequently, it is essential to ensure that the areas in which there is a concentration of poor people located near the "growth hubs" are well connected to these markets and non-farm opportunities, if the "economic growth and trickle down" channel is to be effective for the "transient" poor.

At the same time, in view of prevailing inter-and intra-provincial variations in the poverty situation, there is a need to: (i) address the poorer provinces funding shortfalls; and (ii) carefully design projects and programs so that the interventions can benefit the "chronic" poor living in the poorest, remote areas, in an inclusive manner.

To this end, there is a need for strategic planning and better coordination of infrastructure investments at the national, sub-national, and regional levels, under the broadly shared development vision. Investment decisions need to be based on transparent allocation criteria linked to an overall strategy which maximizes the synergies of networking between different levels of infrastructure.

### **6-3. Policy and Measures to Maximize the Effectiveness of Infrastructure Investments**

Provided that the above issues are fully taken into consideration, there is still a need to pay attention to the issues specific to infrastructure investments and sector policies. Investments in large-scale infrastructure have significant fiscal implications. Moreover, the quality of management and the levels of productivity attained within the infrastructure sectors greatly affect the overall growth of economy [Willoughby 2003]. Thus, due consideration should be given to the issues of selection criteria, financing, maintenance, and regulatory framework for infrastructure investments and operations, and so on.

To maximize the development impacts of infrastructure investments, continued capacity building efforts are necessary in various areas-covering fiscal and financial aspects, sector policies, and project management.

First, regarding budget formulation and fiscal management, the following measures are particularly important to ensure appropriate resource allocation and overall revenue generation.

- Improving a mechanism for prioritizing public investment projects and developing the Public Investment Program (PIP), based on proper appraisal of economic and social benefits.
- Strengthening the link between budget management and investment planning, so that sufficient recurrent expenditure (for operations and maintenance) can be secured for the ongoing or newly planned infrastructure investments.
- Improving tax policy and the efficiency of tax administration so that fiscal sustainability can be ensured in the longer-term and that fiscal revenues generated by growth can be appropriately collected and spent for the objectives of equitable growth.

It is vitally important to establish proper project selection criteria, so that infrastructure investment can be prioritized and planned, consistent with an overall development vision. This point is crucial because future decisions on infrastructure investment will become more difficult, as the marginal

returns to investment tend to diminish with the progress in trunk infrastructure development. The formulation of a Master Plan is useful in order to examine alternatives in the short, medium and long-term under budget constraints, and to ensure the consistency of investment at both the regional and sectoral levels.

The above selection criteria should take account of two aspects<sup>49</sup>: (i) the infrastructure "network," i.e., how to maximize synergy effects of different levels of infrastructure; and (ii) a proper balance of economic vs. social and poverty concerns. Although further analysis is necessary, economic criteria could include: rate of returns to investment, costs for operations and maintenance, cost reduction potential, etc. Social and poverty criteria could include: direct impact on poverty reduction, likely distributional impact, impact on improving infrastructure network beyond the project area, social and environmental impacts, etc. The specific weight of a given criteria could differ by project type, size, location, etc. Ideally, it is suggested that a system be developed, where the proposed projects would be ranked based on the most relevant criteria and priority be given to the best-ranked investments under the budget constraints. This is far from easy task. Concerted efforts are needed to identify such criteria and establish a practical mechanism for incorporating them in the PIP process.

Second, efforts should be made to gradually diversify the sources of infrastructure financing. As a typical developing country, Vietnam faces enormous demand for infrastructure investment [see Chapter 5]. Since public finance alone cannot satisfy all the resource requirements, efforts are needed to mobilize both public and private sector financing. At the same time, the lessons from the Asian financial crises suggest that sole reliance on private sector financing would not be realistic either<sup>50</sup>. Thus, it is important to explore optimal use of diverse resources, identifying appropriate financing sources for different types of infrastructure. Private finance should be fully utilized in investment where the private sector can be attracted (e.g., in the form of BOT). On the other hand, in the areas where the private sector is unlikely to participate but which have significant implications for social and economic development, public finance and ODA may be utilized<sup>51</sup>.

Vietnam's experiences suggest that particularly for a low-income country, public (and ODA) support at the initial phases of large-scale infrastructure development is necessary, in order to accumulate the know-how of infrastructure planning and operations and build confidence of potential investors. This should help prepare for the subsequent phases of private sector participation in infrastructure. In this sense, the experience with the Phu My Thermal Power Plants offers a good example of "step-by step" approach to the private sector participation in infrastructure [see Box 6-2]. It is also important to establish a sound regulatory framework because this is a prerequisite for promoting privately-financed infrastructure<sup>52</sup>.

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<sup>49</sup> These are based on suggestions by Dr. Simon Ellis (transport sector coordinator, World Bank) and Dr. Alessandro Pio (principal programs officer/economist/ADB) at the September 2003 workshop on large-scale infrastructure.

<sup>50</sup> Despite a major emphasis placed on the private sector to handle infrastructure investment, private financing for infrastructure plummeted to \$58 billion in 2002 from \$128 billion in 1997 (global figures).

<sup>51</sup> Dr. Alessandro Pio (ADB) also suggested at the above workshop that: (i) government budget (e.g., fiscal revenues, bonds) would be expected to address to some extent all types of infrastructure, but (ii) the focus of private sources would be more on infrastructure that generates economic growth (and hence financial returns which will make private financing viable), (iii) while ODA may be directed to projects which combine growth and poverty objectives.

<sup>52</sup> For example, the feasibility study of the My Thuan Bridge (1996) concluded a BOT option premature because of lack of the regulatory framework in Vietnam (based on the statement of a participant at the September 2003 workshop on large-scale infrastructure (in Hanoi)).

**Box 6-2: Combining ODA and Private Financing: Phu My Thermal Power Plant Complex**

To meet a sharp increase in power demand in Southern Vietnam, a series of plans to construct power plants and power stations in the Phu My area (about 75km from HCMC, located in the Ba Ria-Vung Tau province) are underway. In 1994 JBIC provided the first ODA loan for the construction of the Phu My 1 Power Plant, financing common facilities for water treatment and fire prevention. This project, in turn, has paved way for subsequent financing from private sector. Now, the Phu My 2 Power Plant (the first private infrastructure project in Vietnam) and further projects are being financed with private sector participation, including:

- Phu My 2 Power Plant (phase II): Based on a 20-year build-operate-transfer (BOT), with the funding of ADB and JBIC loans, and a private sector consortium under a World Bank-supported Partial Risk Guarantee.
- Phu My 3 Power Plant: Based on a 23-year BOT contract, with the funding of ADB and JBIC loans, international commercial loans, and MIGA guarantee (for political risks).

Source: Japan News [2003], p.7, and World Bank/Vietnam website.

Third, regarding sector policies and infrastructure management, the following aspects are especially useful to make inputs into large-scale infrastructure effective (the list is not exhaustive).

In transport, further efforts are required to:

- Establish economically efficient and fiscally effective funding systems for road maintenance;
- Design and implement a cost-effective urban transport strategy (which links specific urban transport needs with the cities' role as engines of growth and gateways for international trade, and also takes account of connectivity among urban, inter-urban, and rural transport network etc.);
- Strengthen the management of resettlement issues; and
- Establish an institutional mechanism for addressing road safety issues.

In power, there is a need to:

- Improve the overall system efficiency, especially in view of the sector's large investment requirements;
- Enhance rural access to electricity, including the promotion of renewable energy;
- Strengthen the managerial and administrative capacity of the sector institutions;
- Strengthen the financial sustainability of the power sector; and
- Minimize pollution and environmental degradation.

In addition, the overall policy and institutional environment is essential to realize the benefits of infrastructure investments.

As stated in the above (6-1), in light of potentially great impacts of large-scale infrastructure projects on local residents, there is a need to take measures to mitigate their possible negative impacts. Moreover, it is important for the government (and responsible agencies) to promote local participation and raise their awareness of the projects during the planning and implementation stages. Such measures should help them well prepared for new opportunities and changes that the projects should bring.

In this connection, the AusAID-funded My Thuan Bridge Monitoring Program is an important effort aimed at capacity building for "ex-post" monitoring of the traffic, economic, social, and environmental effects of a large-scale infrastructure project [see Box 6-3].

**Box 6-3: My Thuan Bridge Monitoring Program**

1. *Why "(ex-post) Monitoring Program"? And what is the purpose of this program?*

"(Ex-post) evaluation" is one of the stages of the project cycle, which is conducted after the project "completion" (typically, in the case of infrastructure projects) in order to measure the achievements and outcomes of the project. This stage sometimes faces the difficulty in how to feedback the lessons learned. The AusAID-funded, "My Thuan Bridge Monitoring Program" attempts to overcome such difficulty by making the ex-post "monitoring" part of the responsibility of the project implementation. By doing so, the monitoring program aims to ensure the sustainability of the bridge and the realization of its expected benefits.

2. *How the program conducted?*

This is a three-year program. Between January 2001 and January 2003, five bi-annual monitoring reports were prepared. In order to build the capacity of local researchers for conducting this kind of survey, the University of Economics in Ho Chi Minh City was engaged by AusAID to implement the monitoring program, with continuous assistance from an international consulting firm.

3. *What has been measured?*

The table below indicates the objectives, concrete indicators and sources of the baseline data used in the program.

Table: My Thuan Bridge Monitoring Program

Objectives	Indicators	Source of baseline
(1) Comparing the situations before and after the Bridge construction.	<ul style="list-style-type: none"> <li>Traffic movement (including the volume of traffic using the bridge, comparison of actual and forecast traffic, and the origins and destinations of traffic using the Bridge).</li> </ul>	<ul style="list-style-type: none"> <li>Feasibility study, including the final report and unpublished technical working papers prepared during the feasibility study.</li> <li>Other historical data collected during the monitoring program.</li> </ul>
(2) Identifying the progress in economic and social development of the population concerned.	<ul style="list-style-type: none"> <li>Basic socio-economic data (population, provincial GDP growth, etc.).</li> <li>Industrial zones in its immediate sphere of influence.</li> </ul>	
(3) Establishing the success of mitigation actions taken to ameliorate potential negative impacts of the bridge.	<ul style="list-style-type: none"> <li>People who were previously dependent on the My Thuan ferry.</li> <li>Development along access roads to the My Thuan Bridge (including sexual transmission disease).</li> <li>Changes in access to social services.</li> <li>Environmental impacts (changes in water and air quality, etc.).</li> </ul>	
(4) Establishing the potential for sustainability of the Bridge and its beneficial impacts.	<ul style="list-style-type: none"> <li>Engineering maintenance.</li> <li>Safety of people and property.</li> <li>Financial sustainability.</li> </ul>	
(5) Providing information that can be used for future transport planning (e.g., baseline for the Can Tho Bridge).		

Source: Elaborated by the study team, based on AusAID [2003a] (interim report) and AusAID [2003b] (draft final report).

**6-4. Government-Donor Partnership**

Vietnam is a country where government-donor partnership (including NGOs) is active. As reviewed in this paper, there are many areas where such partnership can be fruitful to achieve the effective and sustainable investments in large-scale infrastructure.

The primary objectives of investments in large-scale infrastructure are to help the creation and the diffusion of growth. It creates economic and social opportunities through various linkages, directly and

indirectly. At the same time, complementary measures are necessary to further enhance the impacts of large-scale infrastructure—for example, by developing rural roads, investing in human capitals, enhancing the investment climate, and building capacity for project planning and selection, maintenance and operations, institutional and sector policies. Furthermore, for those groups who are severely constrained from participating in new opportunities created through growth, targeted interventions are necessary. It is important to support such poverty-targeted programs and enhance their effectiveness, as well.

Thus, infrastructure investments should be treated as integral part of the broader strategies for promoting growth and poverty reduction. Aid partnership will be useful in supporting the government's efforts in realizing all elements of the strategies, with each partner playing a complementary role based on its strength(s) [see Box 6-4].

**Box 6-4: Shared Development Vision toward Equitable Growth**

**Strategies and Policies for Promoting Growth and Poverty Reduction**

Measures Objectives	Role of large-scale infrastructure	Complementary Measures			
		Rural roads	Human capital	Targeted interventions	Policy and institutions
Growth creation	X		X		X
Growth diffusion	X	X	X		X
Direct poverty reduction		X	X	X	X

Lastly, in implementing the above measures, it is essential that the diversity of aid modalities be recognized, according to the nature and the size of specific activities. For example, in the case of investments in large-scale infrastructure, project-based management appears to be generally appropriate. This is because these projects involve huge financial resources and require careful monitoring from engineering, social, and environmental aspects, and so on. The processes of procurement (often, international competitive bidding) and financial management provide opportunities for the government (i.e., executing agencies) and donors to share and confirm these aspects<sup>53</sup>. The situations can be different for targeted interventions, which are relatively small in size and can be more effectively managed on the basis of programs.

Therefore, the "best mix" of aid modalities should be sought—consistent with the nature and the size of interventions—under a shared development vision and strategies for promoting growth and poverty reduction.

<sup>53</sup> In this regard, the ongoing effort on aid harmonization among 5 Banks merits important attention. This effort was initially started among 3 Banks (the World Bank, ADB, and JBIC) actively involved in financing major infrastructure projects.

# Appendices

- **Integrating Poverty Impact Assessment in the Economic Analysis of Projects**
- **A Framework for Assessing the Links between Rural Poverty and Infrastructure**
- **Industrial Parks in Hanoi and its vicinity, and HCMC and its vicinity**
- **Location of FDI and Domestic Enterprises**
- **Linking Trunk and Feeder Roads — Public Transport System in Hung Yen**
- **Rural Household Survey and Local Agricultural Market Survey**
- **Direct Impacts of the Improvement of National Highway No.1 and the Construction of the My Thuan Bridge**
- **Impacts of Improved Land Transport on Rice Farmers — A Case of An Giang Province**
- **Impact Evaluation of Bridge Construction**
- **DFID Study of Road Network Impacts on the Poor**

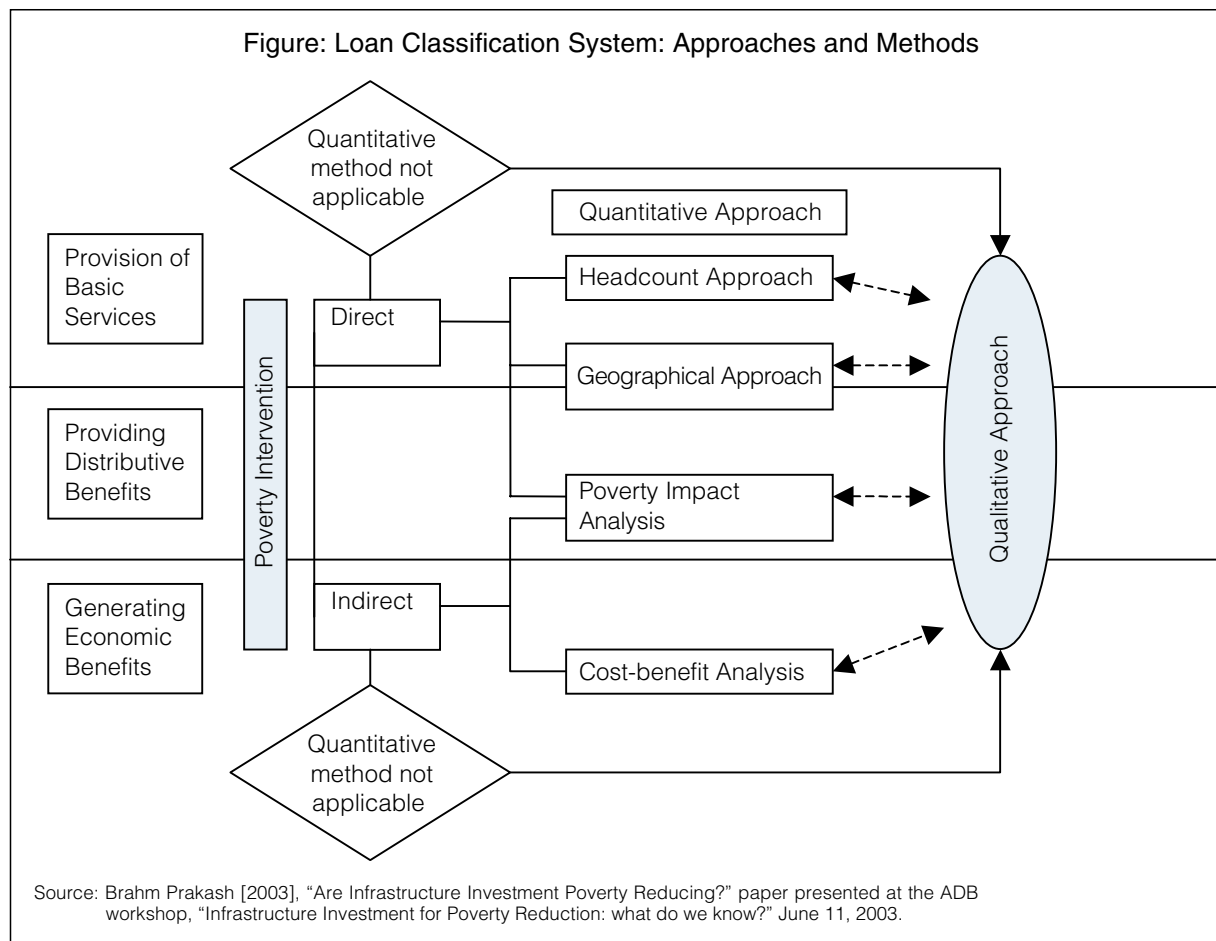
## Integrating Poverty Impact Assessment in the Economic Analysis of Projects

It is important to make proper matching between types of intervention and methodologies for assessing their poverty reduction impacts. A framework being practiced in the ADB is a useful point of reference, because it recommends separate approaches to "core poverty" interventions and the other (non-targeted, "growth-oriented") interventions.

These approaches make up three tiers of interventions, as shown in the figure below [Prakash 2003].

- \* Direct approach: using the headcount and geographical quantitative methods.
- \* Distributional approach: emphasizing distributive benefits and using the poverty impact ratio as a tool of measurement.
- \* Indirect approach: focusing on economic benefits and using the cost-benefit analysis.

In the case of infrastructure, the direct approach is relevant to the provision of basic services and small-scale (or rural) infrastructure, because beneficiaries should be specific and easily identifiable. On the other hand, the indirect approach is more relevant for the provision of large-scale infrastructure, because its poverty reduction impact is generally realized by economic growth. In recent years, there have been attempts to incorporate the distributional approach into the indirect approach (as an extension of the standard cost-benefit analysis), by breaking down the benefits likely to accrue to the poor. [See also *Handbook for Integrating Poverty Impact Assessment in the Economic Analysis of Projects*, ADB 2001b.]

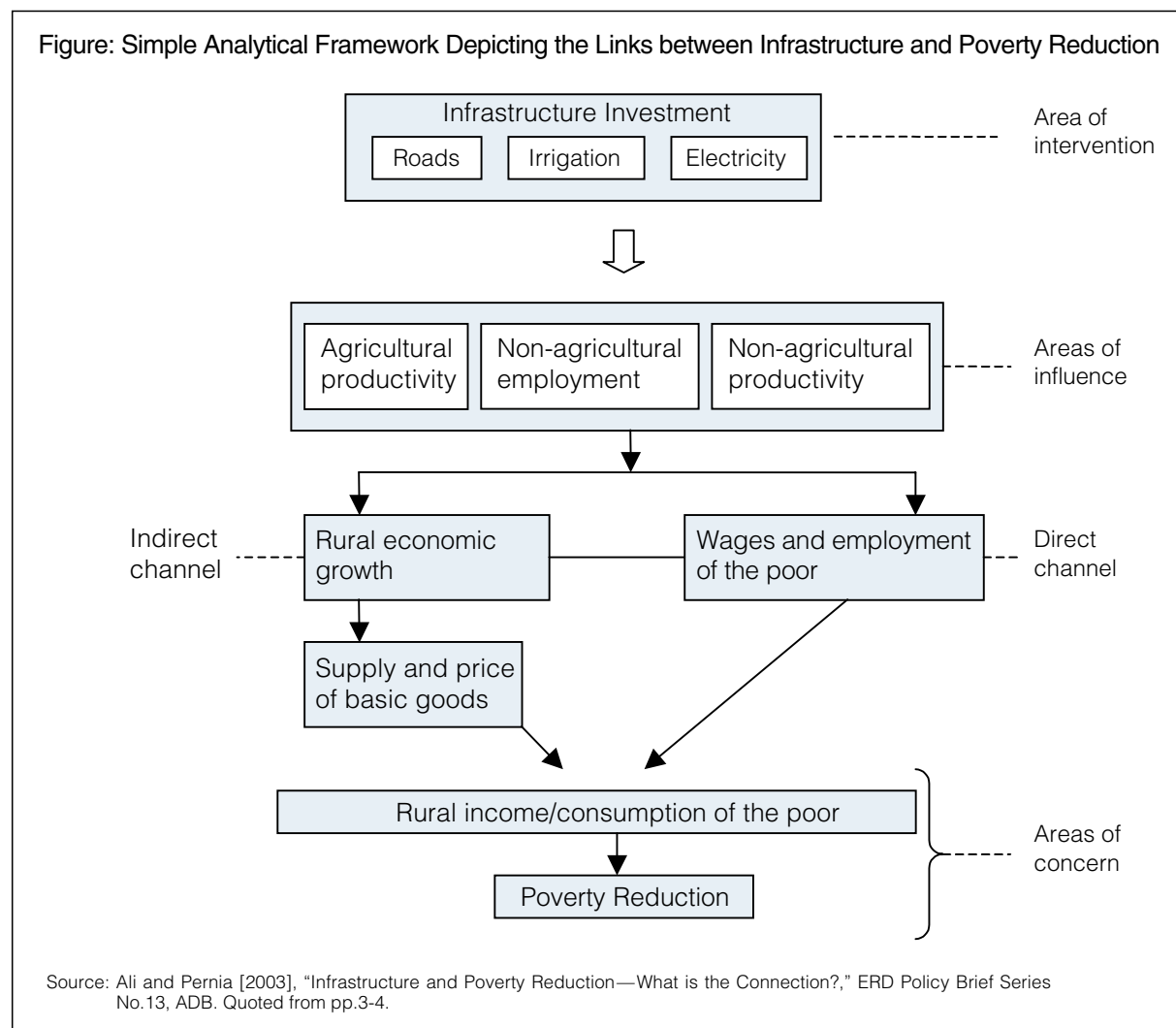


### A Framework for Assessing the Links between Rural Poverty and Infrastructure

Ali and Pernia [2003], focusing on rural poverty, propose a simple analytical framework for the links between infrastructure and poverty reduction.

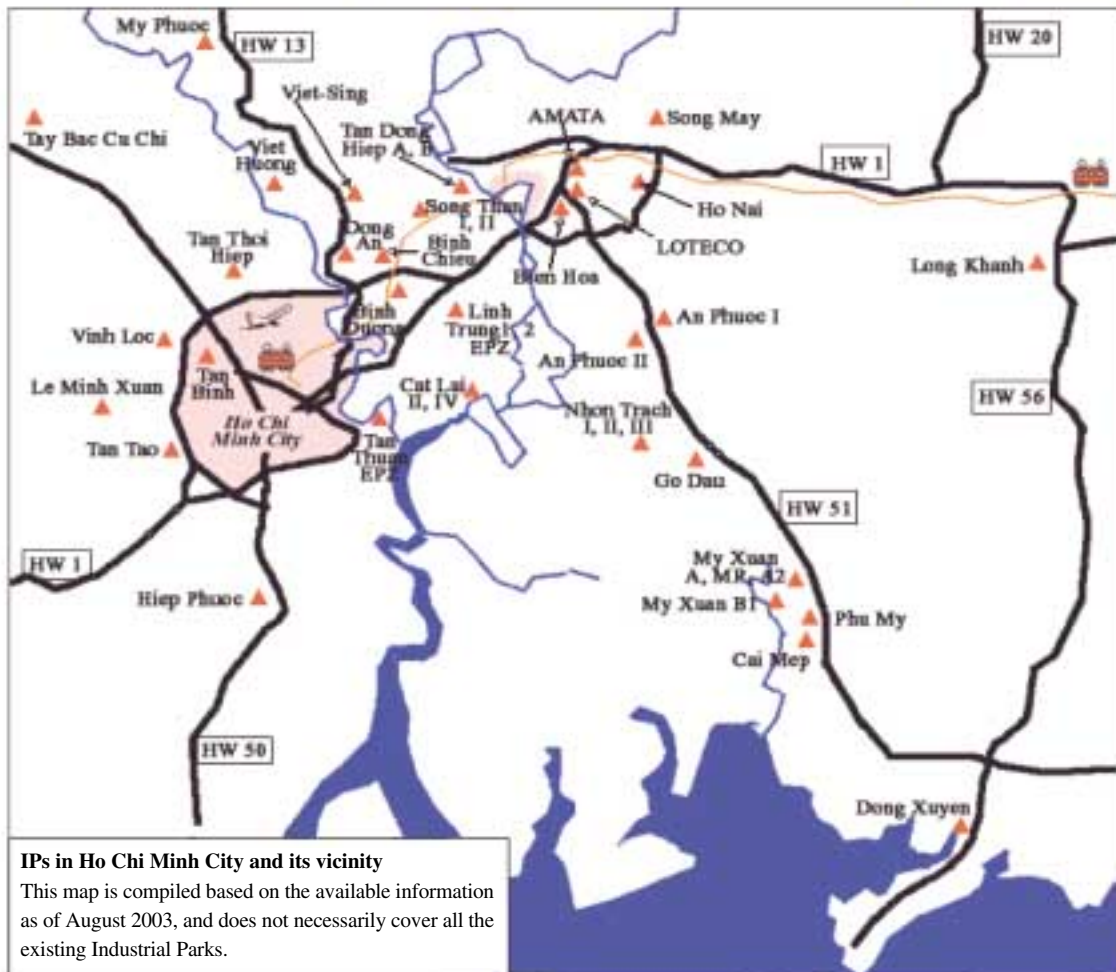
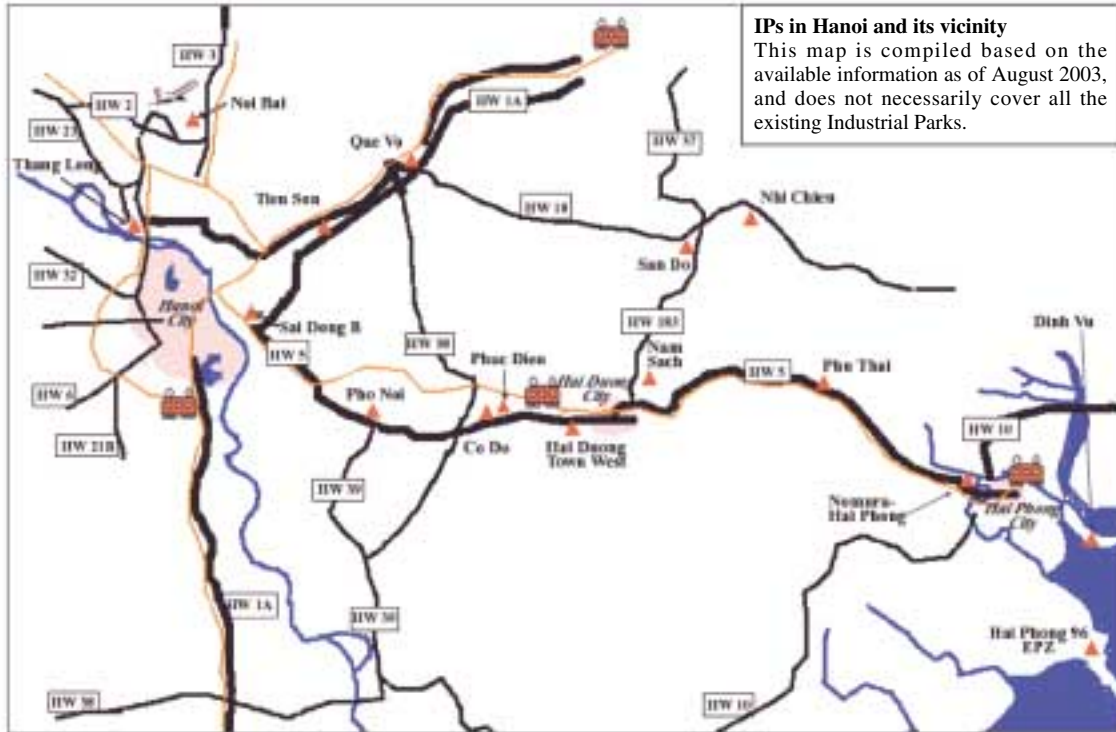
The figure below summarizes the links from infrastructure investments (areas of intervention) through three determinants (areas of influence) to the poor's wages and employment (direct channel), on the one hand, and rural economic growth (indirect channel) that influences the supply and prices of basic goods, on the other. The final links are to real income/consumption of the poor and, consequently, poverty reduction (area of concern).

For example, a road investment could result in an increase in agricultural productivity, nonfarm employment and productivity, directly raising the wages and employment of the poor and, hence, their economic welfare. This is the (direct) income distribution effect. In addition, higher productivity and expanded employment lead to higher economic growth, affecting the supply and prices of goods and, thus, the poor's well-being. This is the (indirect) growth effect. Similar links can arise from irrigation and electricity investments.

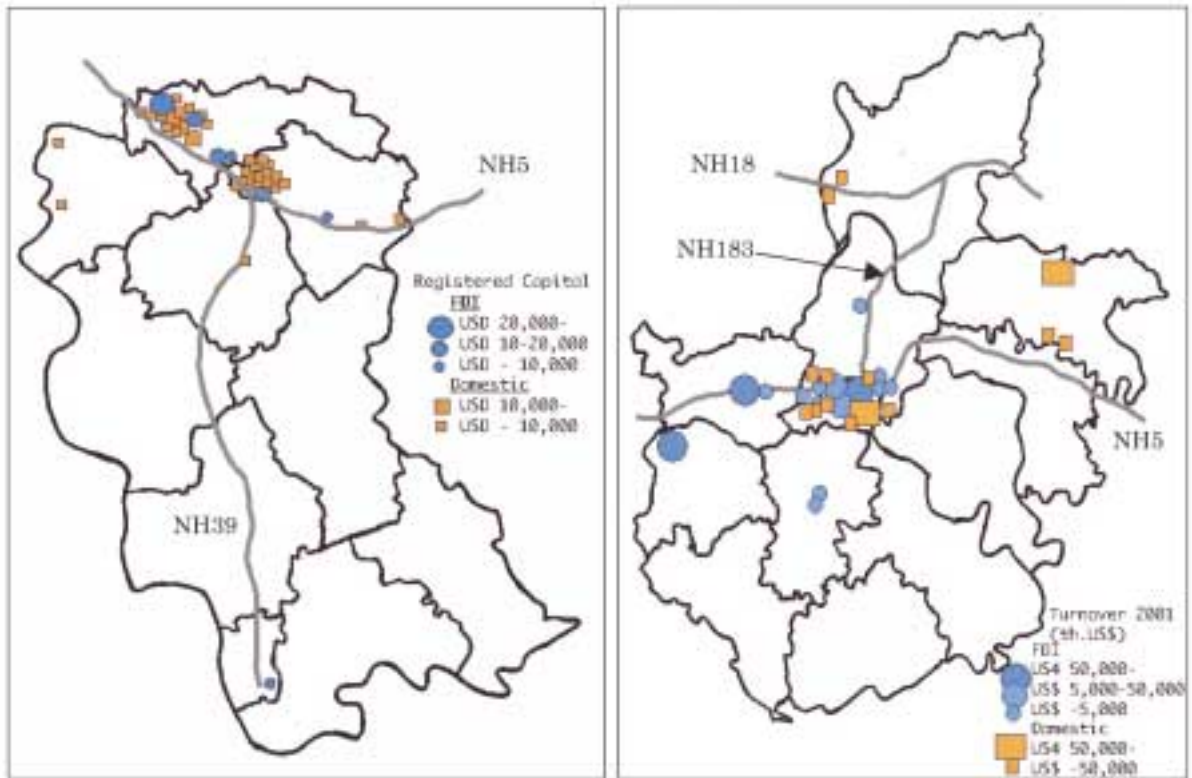




### Industrial Parks in Hanoi and its vicinity, and HCMC and its vicinity



### Location of FDI and Domestic Enterprises

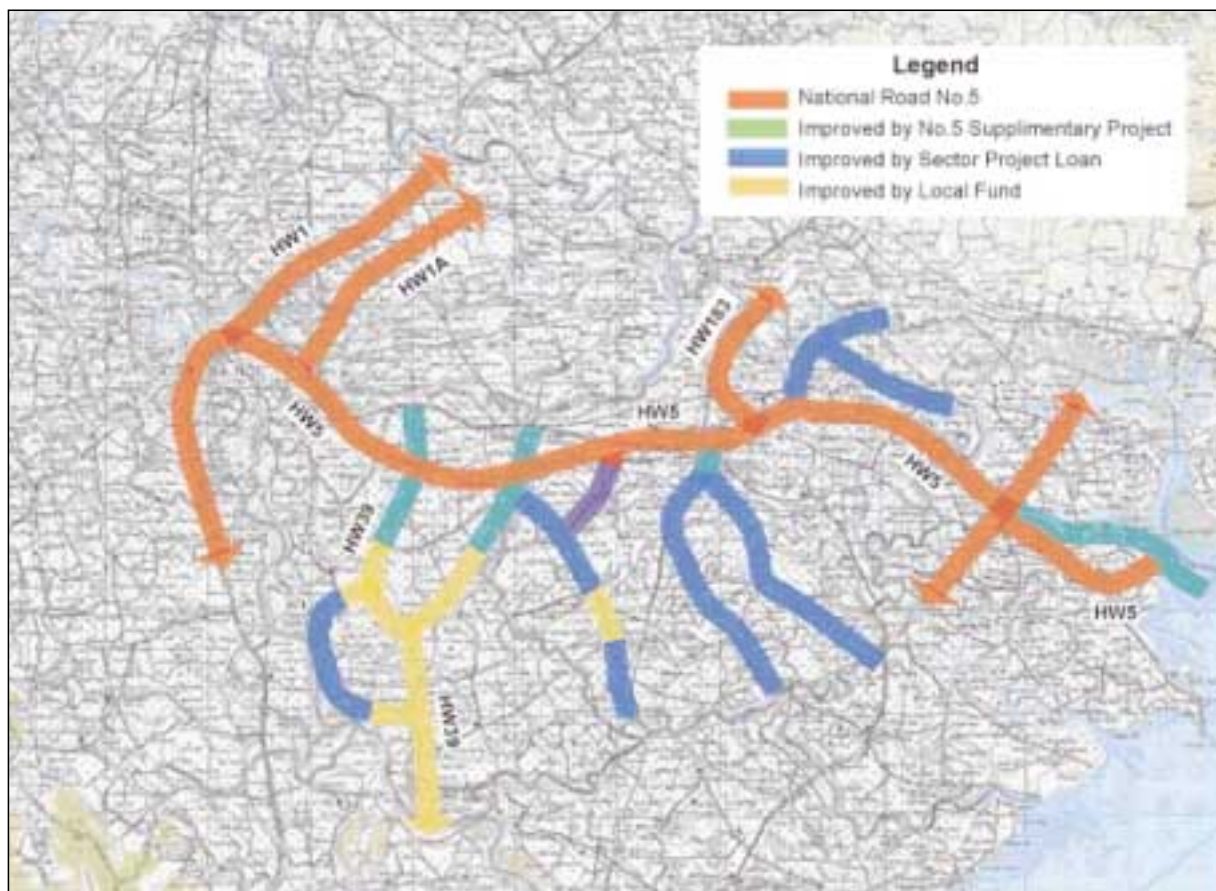


### Linking Trunk and Feeder Roads — Public Transport System in Hung Yen

In Hung Yen province, the development of trunk infrastructure—combined with feeder roads—has contributed to the expansion of public transport system. Public transport system in the Hung Yen province is mainly served by bus. The inter-provincial bus operates to/from bus terminal located in the province center. In 2002, the number of passengers and passengers-km reached 1,790 thousand and 12,000 thousand, respectively (at annual increase rates of 7%, 9% respectively). In addition, unauthorized feeder buses (using minibus with 12-15 passenger capacity) operate in the province primarily along feeder roads. These feeder buses are very popular among the people living along the bus routes such as farmers because of cheaper fare and flexible boarding/alighting at any points along the bus routes.

The improved feeder bus system is greatly attributed to feeder roads development, which sometimes (even) preceded trunk roads improvement including NH5. The development of feeder roads has been financed by various sources, including local budget, villagers' contributions, donor funds.

Map: National Highway No.5 and Connected Feeder Roads The Development of Road Network



Source: JBIC/IDCJ [2003].

## Rural Household Survey and Local Agricultural Market Survey

Under the JBIC-financed post-evaluation study (JBIC/IDCJ study) on the impact assessment of northern transport infrastructure projects (the upgrading of National Highway No.5 and the expansion of the Hai Phong Port), two types of rural surveys were carried out during February-March 2003. The below summarize the methodology and main findings of these surveys.

### 1. Rural Household Survey

A rural household survey was conducted in rural households in Hung Yen and Hai Duong provinces. These two provinces are located intermediary of NH5 and have been greatly affected by the upgrading of NH5. The majority of the population (85-90%) lives in the rural area. The number of surveyed households is 206, located in six communes. Five communes are alongside, and one commune is away from NH5. Within communes, sample households were selected from both poor and non-poor income groups.

In each commune, 32-36 households were interviewed on the following topics.

- Profile of respondent and family
- Change of land use
- Change of income and major sources
- Respondent's perception of the impact of NH5
- Change of agricultural activities
- Transport and access
- Problems

Basic indicators of the surveyed communes and respondents are as follows:

Province/ District (HD: Hai Duong) (HY: Hung Yen)	Commune (X: commune away from NH5)		General Indicators					Respondents		
			Pop.	HH	Av. Family	No. of HH	% of HH	HH	No. of HH	Av. Family
HD	Kim Thanh	Lai Vu	4,825	1,292	3.73	150	11.6%	34	0	3.85
	Cam Giang	Cam Doai	3,628	859	4.22	78	9.1%	35	2	4.40
	Ninh Giang	An Duc	X	4,972	1,283	3.88	166	12.9%	36	4
HY	Van Lam	Dinh Du	7,123	1,843	3.86	30	1.7%	34	0	4.09
	Yen My	Giai Pham	5,519	1,452	3.80	61	4.2%	32	1	3.84
	My Hao	Ban Yen Nhan	8,752	2,208	3.96	10	0.5%	35	2	4.11
Total/Average			34,819	8,937	3.90	496	5.5%	206	9	4.17

Note: The JBIC/IDCJ team took account of the provincial authority's advice in selecting five communes (from largely affected area) and one commune (from relatively unaffected area). After the initial interview survey in February 2003, the questionnaire was finalized.

### 2. Local Agricultural Market Survey

The local agricultural market survey (or local traders survey) was conducted to identify changes or any impacts on marketing pattern. Four markets were selected from local wholesale market (i.e., Duong Cai, Yen My, and Bac markets in Hung Yen and Man Sach market in Hai Duong). 54 traders were randomly selected for interviews.

The traders were interviewed individually on the following topics.

- Profile of respondent
- Change of products traded and their origins.
- Change of marketing channels
- Change of people involved in trading
- Impacts of NH5 upgrading on their business.

Market	District	Province	Respondents	Coming from other provinces	
				Respondents	Name of province
Duong Cai	Van Lam	HY	24	2	Vin Phuc, Bac Ninh
Yen My	Yen My	HY	12		
Bac	My Hao	HY	7		
Nam Sac	Nam Sac	HD	11	1	Hung Yen
Total			54	3	

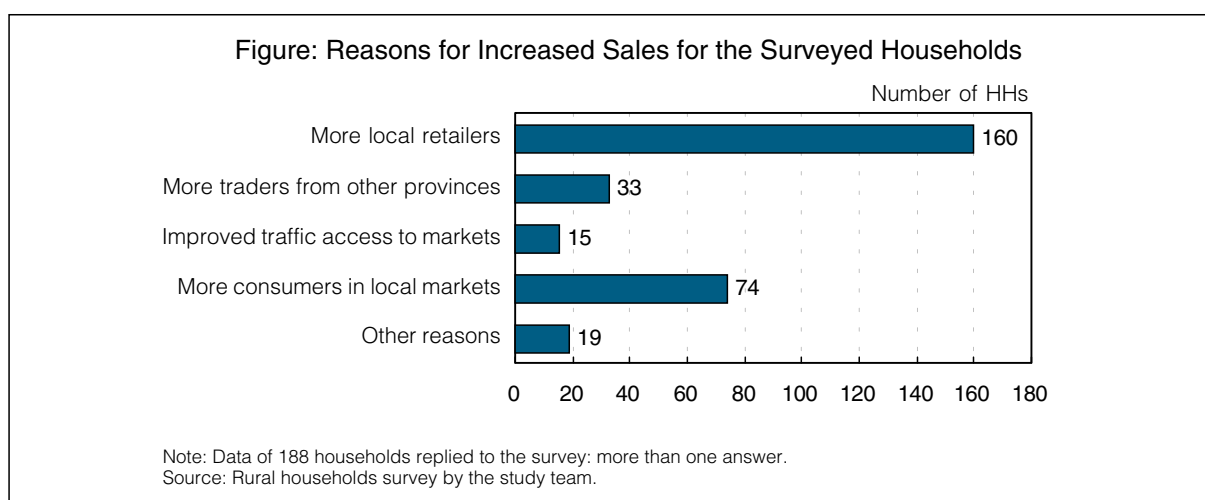
### 3. Main Findings from the Two Surveys

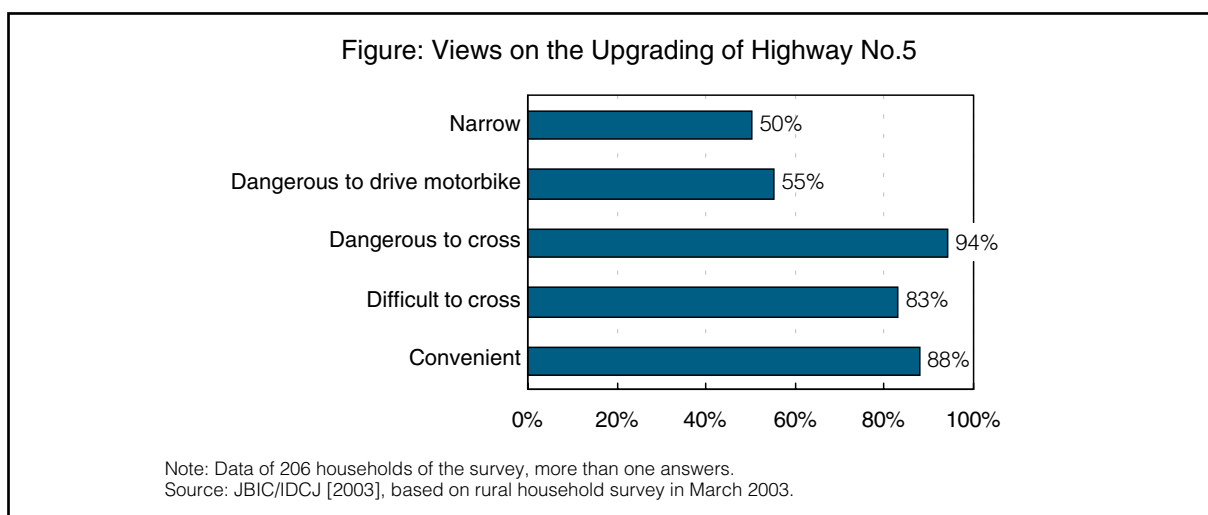
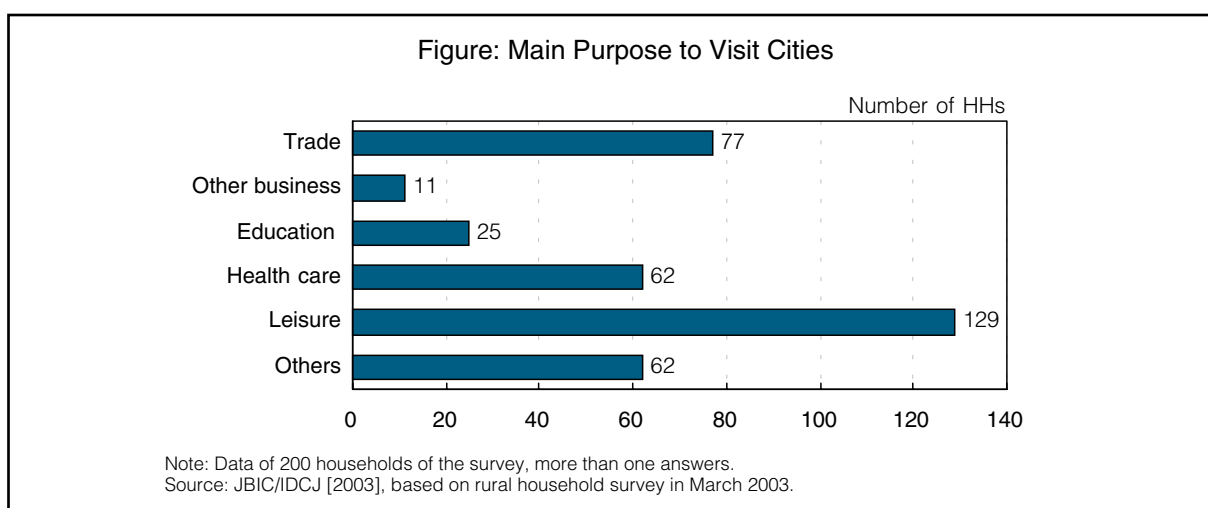
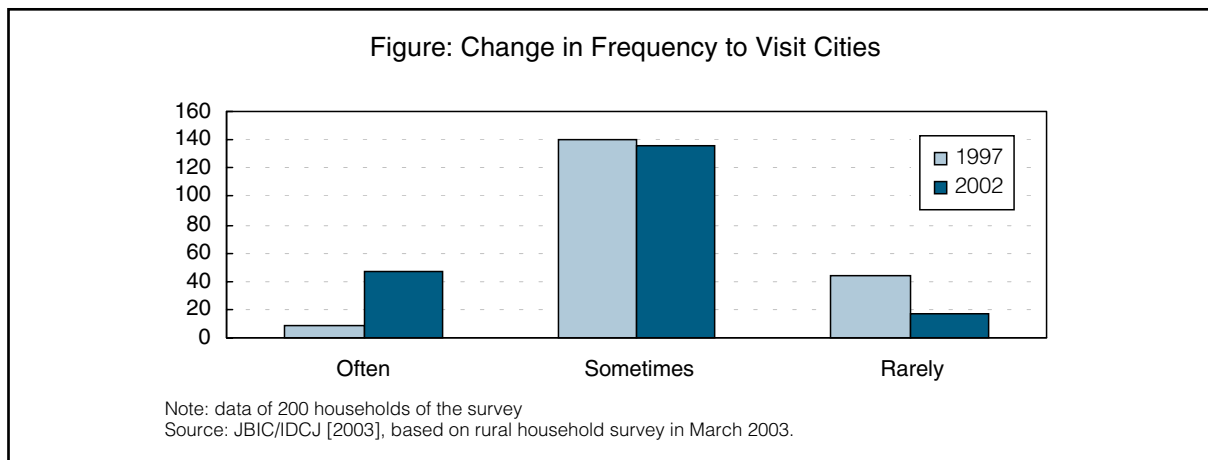
#### 3-1. Rural Household Survey

Table: Number of Surveyed Households that Started New Economic Activities

	Fishery	Growing vegetables, flowers	High-quality paddy	Commerce	Working in other regions	Other activities	Total
An Duc	6	3	0	2	3	4	18
Lai Vu	3	0	0	1		5	9
Dinh Du	4	0	0	15	2	3	24
Giai Pham	2	3	0	5	2		12
Ban Yen Nhan	5	5	0	9	2		21
Cam Doai	7	0	0	4	2		13
Total	27	11	0	36	11	12	97
Share in HH that started new activity	28%	11%	0%	37%	11%	12%	100%
Share in total surveyed HH	13%	5%	0%	17%	5%	6%	47%

Note: Data of 206 households of the survey.  
Source: JBIC/IDCJ [July 2003].





### 3-2. Local Agricultural Market Survey

Tables: Change in Variety, Origin and Volume of Products for Local Traders

(1) Varieties of agri-products in the last 5 years

	No. traders	
Much more variety of products	12	24%
More variety of products	16	32%
No change	19	38%
No answer	3	6%
Total	50	100%

(2) Products origin in the last 5 years

	No. traders	
Significantly diversified	14	28%
More or less diversified	21	42%
No change	11	22%
No answer	4	8%
Total	50	100%

(3) Volume of products sold in the last 5 years

	No. traders	
Increased	14	26%
No increased	40	74%
Total	54	100%

Tables: Types of Products Increased for Local Traders

(1) Increased products in the last 5 years

	No. traders	
Vegetable	22	56%
Meat	9	23%
Fish	2	5%
Others	6	15%
Total	39	100%

(2) Procurement of products

	No. traders	
Directly from farmers	16	56%
Self-producing	10	23%
Buy at local markets	7	5%
From traders	3	15%
Farmers come to sell	2	5%
Other traders come to sell	2	5%
Total	40	100%

Source: JBIC/IDCJ, *Impact Assessment of Transport Infrastructure Projects in Northern Vietnam —Final Report—* [July2003].

## Direct Impacts of the Improvement of National Highway No.1 and the Construction of the My Thuan Bridge

### 1. Travel Time

The improvement of NH1 and construction of the My Thuan Bridge reduced travel time between Mekong Delta and HCMC by almost one-third. After the opening of the My Thuan bridge, time for crossing Tien River was shortened from 31.6 minutes to 5.5 minutes. Since 31.6 minutes is the time required at normal traffic, time saving could be even larger at both off-peak (waiting for a fuller boat) and heavy traffic time [AusAID 2003]. The tables below show the reduction of travel time from 1998 to 2003 (for both buses and trucks).

Table: Change in Bus Travel Time and Speed

	1998			2003		% increase in speed
	km	hours	kph	hours	kph	
HCMC to:						
My Tho	72	2.2	33.2	1.5	47.8	44
Vinh Long	136	3.5	38.5	2.7	51.2	33
Can Tho	169	4.5	37.7	3.2	52.3	39

Table : Change in Truck Travel Time and Speed

	1998			2003		% increase in speed
	km	Hours	kph	hours	kph	
HCMC to:						
My Tho	72	2.3	31.2	1.6	46.3	48
Vinh Long	136	4.1	33.4	2.8	48.2	44
Can Tho	169	4.9	34.5	3.4	49.6	44

Source: Elaborated by the study team, based on World Bank [2003], p-3-10 Table 3.9 and Table 3.10.

### 2. Transport Fare

Two data on ferry tolls are available: one for September 1994, and the other for April 2000. (The latter is significantly lower than the first.) The comparison between former ferry tolls (the 1994 data) and current My Thuan Bridge tolls shows that current tolls are much lower than the former one in real terms\*. While comparison between former ferry tolls and current bridge tolls is not straightforward because of changes in the categorization of vehicles, the same trend can be confirmed in a recent interview survey on bus and truck companies, conducted by GRIPS-ALMEC in July 2003.

From 1998 to 2003, bus fares and freight rates between HCMC, Vinh Long and Can Tho have been reduced only slightly. Such little change on prices seems to be related to the introduction of the higher-quality buses during the same period, which brought the higher service quality for passengers, together with the improved road conditions [World Bank 2003a].

Moreover, according to the GRIPS-ALMEC survey, thanks to reduced time and tolls, bus companies have saved operation costs (by 14%, the average of six companies). However, such saving does not seem to be reflected in the bus fares. Thus, further analysis on pricing mechanism in transport services would be needed.

\* AusAID [2003b (p.20)]. The same report emphasizes the need to set fares to balance two objectives-ensuring optimal use of the facility and generating sufficient revenue to meet long term needs [AusAID 2003b (p.62)].



Table: Bus Fares From Mien Tay Terminal HCMC (VND)

HCMC to:	km	1995-98	1999-2003	Class	% Increase	%Real Change*	
My Thuan	126	14,500	17,000	Class III S	17	-1	
			20,000	Class III C			
			23,000	Class II			
			23,500	SL			
			27,000	Class I			
Vinh Long	136	16,500	19,000	Class III S	15	-2	
			21,000	Class III C			
			25,000	Class II			
			26,000	SL			
			28,000	Class I			
Can Tho	169	21,000	>25 seats	24,000	Class III S	14	-3
		33,000	12-25 seats	27,000	Class III C		
		38,000	4-9 seats	32,000	Class II		
				33,000	SL		
				36,000	Class I		

*Class III S*      *State Large Bus Non AC*  
*Class III C*      *Cooperative Light Bus Non AC*  
*Class II*          *Cooperative Light Bus AC*  
*SL*                *State Light Bus Non AC*  
*Class I*          *Cooperative Light Bus AC <5 years old*

\*December 1996 to December 2002

Table: Market Freight Rates for Class 3\* Goods

	km	1998	2003	% Increase	%Real Change*
HCMC to:					
Tan An	47	80,000	90,000	13	8
My Tho	72	90,000	100,000	11	7
Vinh Long	136	136,000	140,000	3	-1
Can Tho	169	160,000	160,000	0	-4

Source: Elaborated by the study team, based on World Bank [2003], p. 3-9, Table 3.8 (for the upper table) and p. 3-7, Table 3.6 (for the lower table).

### 3. Traffic Volume

During the latter half of 1990s, the growth rate of the Mekong Delta economy (GDP) was slower than that used to forecast traffic demand for NH1 and the My Thuan Bridge at the time of project appraisal. One of the reasons for the slower growth rate is lower population growth (0.7% average per year during 1993-2000, which was a third of the original projection) due to in-migration to HCMC.

Table: GDP in Mekong Delta, Forecast and Actual

Province	Growth in GDP (% pa)				
	Forecast*		Actual		
	1994-2000	2000-2015	1995-1999	1999-2000	2000-2001
Vinh Long	9	9.5	6.6	6.5	6.3
Can Tho	6	7.5	8.3	6.2	14.6
Mekong Delta Average	8	9	7.8	-	8.1

Note: \*Forecast to occur in the absence of the My Thuan Bridge.

Source: Elaborated by the study team, based on AusAID [2003a], p.7, Table 2.3.

Therefore, the growth of aggregate demand for travel in Mekong Delta was somewhat lower than the original forecast.

Table: Road Transport Task in the Mekong Delta: Average Annual Growth Rate (percent), Forecast and Actual

	Freight			Passengers		
	1991-2000	1995-2000	2000-2015	1991-2000	1995-2000	2000-2015
	Forecast	Actual	Forecast	Forecast	Actual	Forecast
Growth in transport task*	13.5	9.9	4.1	14.3	6.5	4.4

Note: \*The transport task is defined as tonne-kilometers for freight movement and passenger-kilometers for passenger movement.

Source: Elaborated by the study team, based on the AusAID [2003b], p.19, Table 3.1.

On the other hand, the actual traffic of the My Thuan Bridge (across the Tien River) and Can Tho ferry (across the Hau River) did not follow this tendency. My Thuan bridge was opened to traffic in May 2000. The traffic volume after opening of the My Thuan Bridge greatly exceeded the original forecast (based on the traffic survey in 1994).

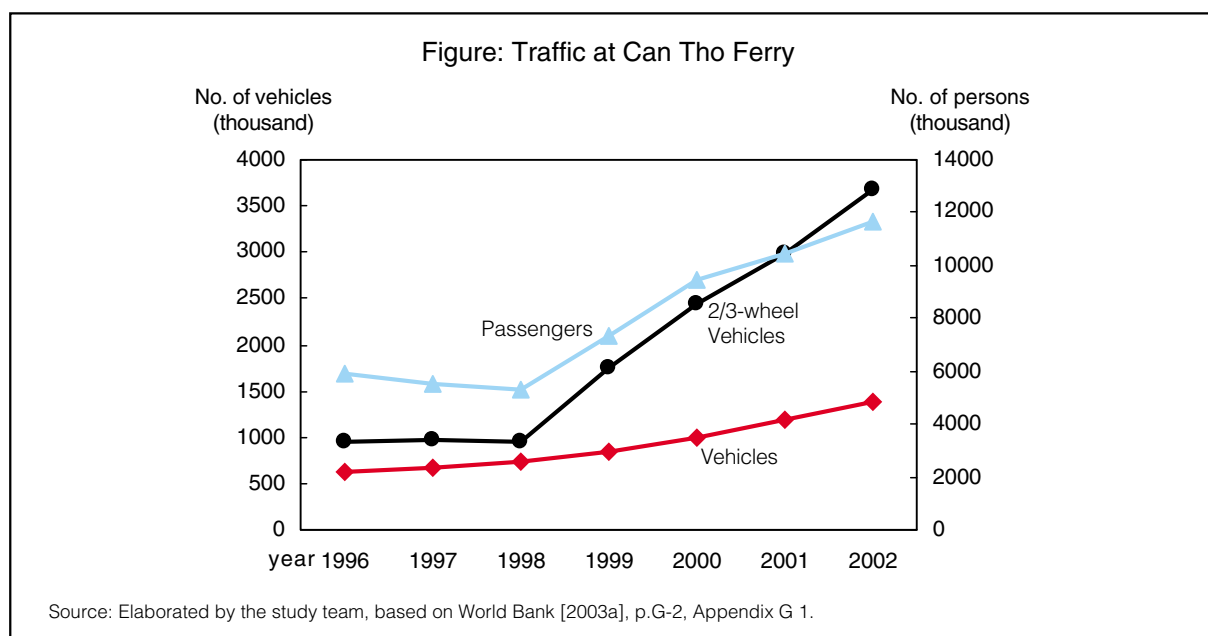
Table: Traffic at My Thuan Bridge, Forecast and Actual

(average daily)

	1999		2002	
	Forecast	Actual (ferry)	Forecast	Actual (bridge)
Motorcycles	3,600	3,120 (-13%)	4,580	10,610 (+132%)
Other vehicles	5,370	3,410 (-36%)	6,770	9,480 (+40%)
Vehicle Occupants	46,360	35,290	64,730	86,770 (+34%)

Source: Elaborated by the study team, based on the AusAID [2003a], p.22, Table 3.4 and AusAID [2003b], p.35, Table 3.13.

The number of Can Tho ferry users also increased rapidly. The average annual growth rates of 2-3 wheels vehicle, vehicle and passengers between 1996 and 2002 were 28%, 14%, and 13% respectively. The rehabilitated section of HCMC to Can Tho was opened to traffic in September 1999. The traffic on Can Tho ferry sharply increased from 1999.



#### 4. Analysis on Induced and/or Diverted Traffic

*"The benefits of reduced travel time and improved travel conditions compared with the congestion, uncertainty, risks and capacity constraint associated with the former ferry service have been so substantial that they have enabled a considerable amount of additional economic and social activity, and attendant transport movement, to occur" [AusAID 2003a, (p.23)].*

What are the reasons for the greater traffic movement on the My Thuan Bridge and Can Tho ferry? Where does this induced traffic come from? The table shows passenger and freight movement captured at the exit of HCMC on the NH1, based on the OD (origin/destination) surveys. The number of passengers between HCMC and An Giang, and the freight movement between HCMC and Vinh Long, Can Tho and An Giang dramatically increased.

Table: Passenger and Freight Movement to/from HCMC 1999 and 2002

Mode	Vinh Long		Can Tho		An Giang	
	1999	2002	1999	2002	1999	2002
Passengers /day	1,973	2,617 (+33%)	4,390	5,661 (+29%)	896	3,292 (+267%)
Freight (tons/day)	582	2,215 (+281%)	1,244	4,130 (+232%)	140	1,649 (+1,078%)

Source: VITRANSS [1999] and HOUTRANS[2002], established under JICA-supported *Study on the National Transport Development Strategy in the Socialist Republic of Vietnam* and *Study on the Urban Transport Master Plan and Feasibility Study in HCM Metropolitan Area*.

The data indicate that the improvement of NH1, together with opening of the My Thuan Bridge, facilitated and stimulated the movement of passengers and freight between HCMC and Mekong Delta. Therefore, it is fair to say that the two large-scale infrastructure projects created great opportunities for the growth in Mekong Delta, by linking the region with the most dynamic economic center of the country, i.e., Ho Chi Minh City.

Moreover, the data suggest that An Giang is not isolated from economic links with HCMC—even though the area is not located along NH1. An Giang is connected from NH1 by three routes (see map): (i) NH1-Cao Lanh ferry-Vam Cong ferry; (ii) NH1-My Thuan Bridge-Vam Cong ferry; and (iii) NH1-My Thuan Bridge-Can Tho ferry. According to the GRIPS-ALMEC survey, all of the four bus companies operating the HCMC-An Giang route use the route (ii) and noted great benefits from the improved NH1 and the construction of the My Thuan Bridge (especially the latter, thanks to the reduced time and tolls).

Further analysis is needed to understand why traffic volume between HCMC to An Giang increased drastically. But, at least, the data tell that the benefits of the two large-scale infrastructure projects have been spread to include the An Giang area.

## **Impacts of Improved Land Transport on Rice Farmers —A Case of An Giang Province—**

### **1. Issues**

The Mekong Delta accounts for about 50% of national rice production and about 90% of the total rice exports. An Giang province is one of the largest rice production areas in the Mekong Delta, and rice provides a livelihood to the majority of poor people.

What is the nature of changes brought by improved land transport (particularly by the construction of the My Thuan Bridge and the upgrading of NH1) on the distribution of farm products? Have benefits from the changes been shared by small-scale rice farmers in remote An Giang province? This note attempts to address these questions, based on the findings of a field visit by the GRIPS study team in October 2003, which conducted a series of interviews with the government, local authorities, food companies, and researchers in Hanoi, Ho Chi Minh City, and An Giang province. Special attention is paid to small-scale rice farmers in An Giang province, the Mekong Delta.

### **2. How Land Transport Improvement has Contributed to the More Efficient Distribution of Farm Products?**

The physical improvement of road conditions, by shortening transportation time, has made land transport (such as trucks) more attractive in commodity distribution. As shown in Chapter 4, the freight movement between HCMC and An Giang province increased sharply after the improvement of NH1 and the opening of the My Thuan Bridge [see Figures 4-14 and 4-17].

The attractiveness of land transport has been further strengthened by the following three factors:

- Government decision to deregulate freight services, which has prompted entry of new truck operators into freight service market, thus lowering transportation costs
- Diversification of distribution channel (For example, in case of rice for domestic market, traders have started to own truck(s) and supply many kinds of rice directly to wholesalers in HCMC.)
- Increased processing capacity within the region, promoting shift of the shipping place(s) of final products from HCMC to the Mekong Delta (Taking an example of rice, paddy is processed and sometimes packaged for retail.)

These changes have generally impacted distribution channels of various commodities. However, the depth of impacts varies among commodities, when the use of waterways and land transport in the Mekong Delta region is taken into account. Because the transportation by inland waterways takes time, it is not suitable for carrying perishable products. It is more economical when transporting the larger volume of products in longer distance. Thus, the choice of transport modes between waterways and land transport greatly depends on types of commodities, based on the consideration of the above-mentioned factors.

Specific examples include:

- Perishable products: land transport has been mainly used for carrying perishable products, such as fruits, vegetables and fishery. An Giang province is widely known for its success in agricultural diversification, promoting production and processing of these perishable product\*.
- Rice for domestic markets: To some extent, trucks have become a popular means of transportation for rice for domestic markets (particularly, high-quality fragrant rice). This is because this product

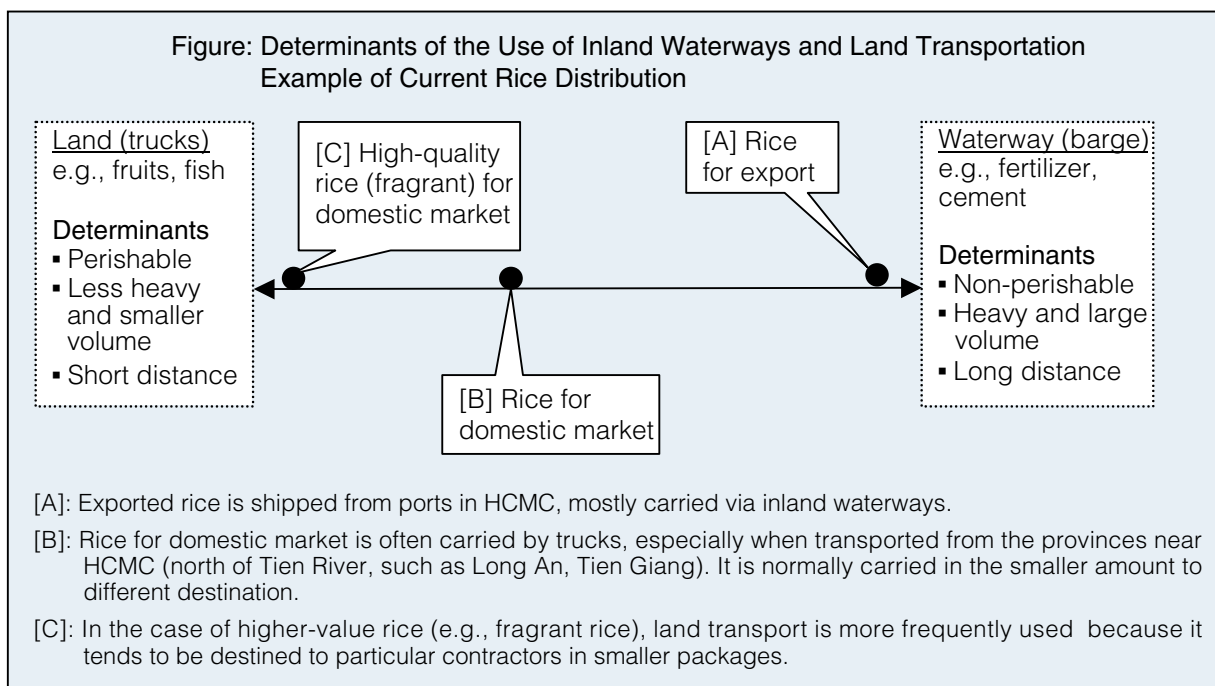
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\* The combination of agricultural diversification with rural industry in An Giang province is considered one of the three models of industrialization and modernization of agriculture and rural area in Mekong River Delta [GSO 2003c].

requires speedy handling and transaction in relatively small volume. (According to the Vietnam Southern Food Corporation, 95% of the rice for exports is transported by barge, while two-thirds of the rice for domestic markets is now transported by trucks.)

- Rice for exports: The data provided by the Saigon Port shows that inland waterways continue to be the dominant transportation mode for rice exports. This is largely because, at this moment, rice for exports is transported in larger volume thus making inland waterways much cheaper than land transport. It is also considered that waterways do not seriously damage the quality of products. For example, rice transportation from Can Tho to HCMC costs approximately VND35,000 ton by barge (taking more than 24 hours), compared to VND70,000 ton by trucks (taking 5-6 hours). One barge can transport up to 300 ton of rice, while the size of trucks is normally limited to 7-11 ton.

Thus, it is fair to say that the construction of the My Thuan Bridge and the improvement of NH1, together with complementary policy measures, has contributed to efficiency gains in commodity distribution, particularly those suitable for land transportation.



### 3. Distribution of Benefits

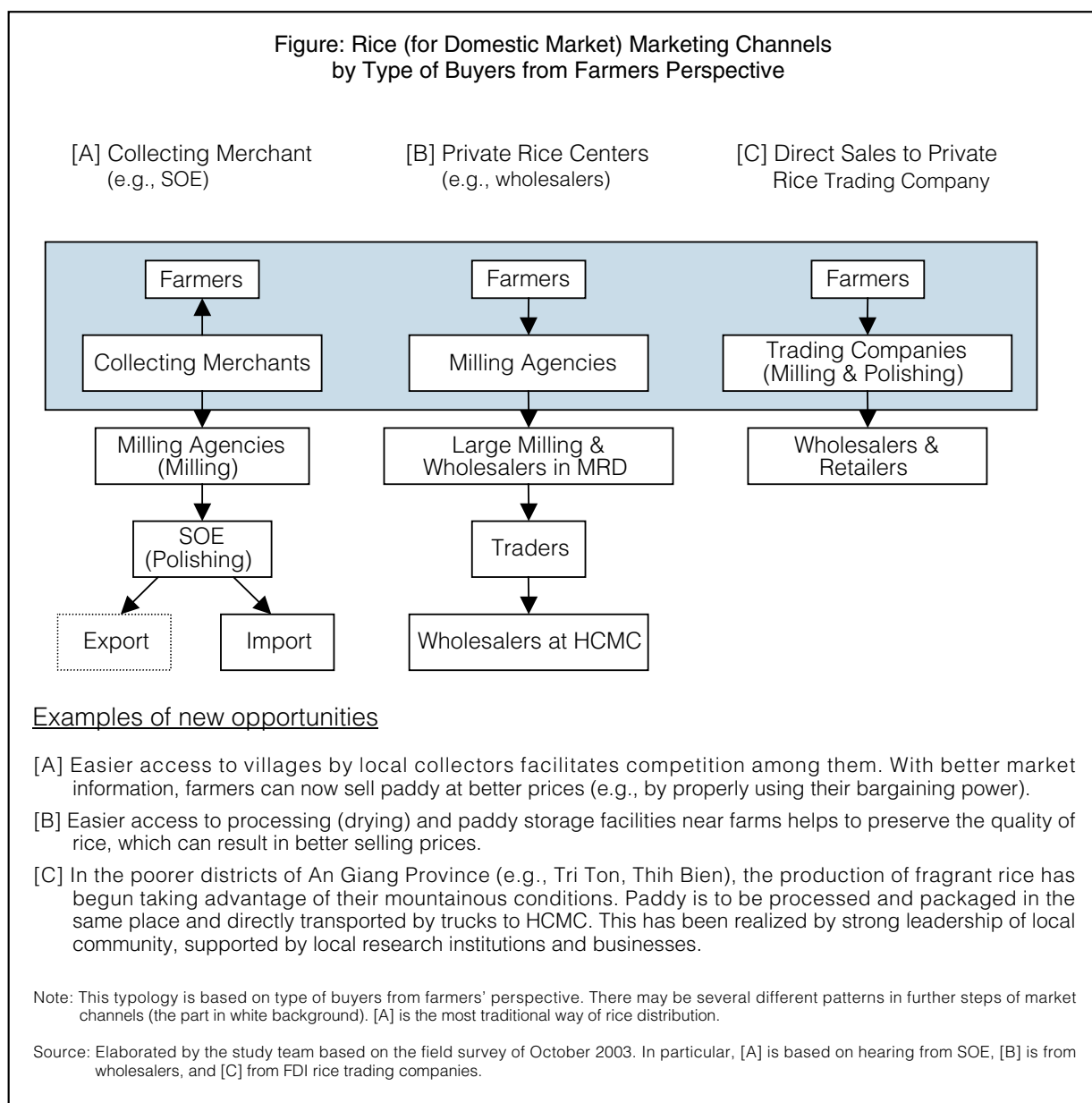
Have these changes been taking place in an inclusive manner? Answering this question requires a thorough analysis of their distributional impacts on different segments of the population. But, the preliminary findings suggest that easier land transport and the resultant efficiency gains in commodity distribution have opened new opportunities for small-scale farmers in An Giang, who have been traditionally engaged in paddy production only.

The local authorities, researchers, and food companies noted recent changes in farm production including:

- Production of fragrant rice even in the poorer districts (e.g., Tri Ton, Thi Bien).
- Diversification into commercial crops (e.g., hyacinth, vegetables, fruits) and fishery products.
- Promotion of food processing industry, using local products such as catfish, shrimp, tapioka (mainly located along the Hau River and NH91, but some in remote districts). For example, the export of frozen fishery products rose from 5,212 ton (1998) to 12,538 ton (2001) [Statistical Yearbook of An Giang 2002]. This in turn has contributed to the creation of off-farm jobs and income.

Furthermore, there is a sign that producers of traditional rice varieties are (at least) not excluded from such efficiency gains, provided that their villages are linked to trunk roads via rural roads. The improved land transport has increased visits by collectors to villages and improved access by farmers to processing and paddy storage facilities. This has helped farmers to obtain market information and sell paddy at better prices.

More specifically, the figure below explains examples of emerging opportunities for rice farmers (for domestic market), according to three types (A, B, C) of rice distribution systems.



#### **4. Complementary Policies and Measures to Ensure Shared Benefits of Land Transport Improvement**

As stated in the above, there are complementary factors that have promoted the positive changes brought by improvement of the physical conditions of land transport. These include: (i) government policies on the deregulation of freight and distribution services; and (ii) new agricultural policies to promote diversification (i.e., Decree No. 20 issued in September 2000), agricultural research and extension, and entrepreneurship of local people.

Particularly, in order to improve production and marketing activities for small-scale farmers, local leadership has proven to be critical in mobilizing business (both local and HCMC) and technical assistance by research institutions (such as An Giang University). Rural roads (including the replacement of "monkey bridges" in the context of Mekong Delta) are also essential complement to the changes.

At the same time, the more concrete analysis is required to identify: (i) commodity-specific bottlenecks for production and distribution ("efficiency" concerns); and (ii) bottlenecks of small-scale producers in participating that new opportunities and measures to promote such participation ("equity" concerns). To this end, it is necessary to conduct in-depth analysis of constraints faced by small-scale farmers by commodity (such as rice) in the entire spectrum of production and distribution network and consider necessary policies and measures to be taken, with due attention to the local context (including good practices in the region).

Source: Interview and field visit by the study team in October 2003.

## Impact Evaluation of Bridge Construction

Due to the nonlinearity and inseparability of impact, precise quantification of the effect of a single infrastructure project in isolation is neither possible nor very meaningful. Clearly, the My Thuan Bridge will have a significant and long-lasting impact on the Mekong Delta Region. But regional growth cannot be attributed solely—or even mainly—to the Bridge. An increasing freight movement backed by strong agricultural and fishery production was visible even before the Bridge was constructed. But it is hardly deniable that the My Thuan Bridge accelerated this trend. Tourism also seems to have been boosted by the Bridge.

Nevertheless, it is not entirely a futile exercise to calculate the employment impact of the My Thuan Bridge, provided that the above caveats are duly recognized. By knowing the rough impact size, it becomes possible to judge the cost effectiveness of such a project and make a comparison with alternative use of funds.

As official statistics is plagued with gaps, inconsistencies and ambiguity in definition and coverage, its analysis must be treated with much care. Between 1999 and 2002, Can Tho province data show that the number of tourism-related business establishments<sup>1</sup> increased 23%, their gross turnover increased 53%, and tourist visits increased 42%. Provincial data on transportation is much less satisfactory as many bus and truck operators dropped out of official statistics in 2000-01 as a result of liberalization. Can Tho Ferry traffic increased 63%. If we assume that, between 1999 and 2002, the size of the tourism and transport sector grew 50% with the current estimated employment of 100,000 workers<sup>2</sup>, Can Tho has created 33,000 jobs over this period. If half of this is due to the My Thuan Bridge, an annual addition of 5,500 jobs can be attributed to it.

Another important source of job creation is domestic and foreign investment in industrial zones<sup>3</sup>. Industrial zones in Can Tho Province now have created 13,000 jobs. If one-fifth of this is due to the My Thuan Bridge, it translates to an annual addition of about 900 jobs since 2000. In the tourism and transport sector, 6,400 jobs per year in Can Tho are attributable to the My Thuan Bridge.

The economic size (GDP) of the remaining provinces in the Mekong Delta Region is seven times that of Can Tho. If we use the factor of 0.5 for these provinces since the Bridge impact may be weaker there, the Mekong Delta Region as a whole can create 28,800 jobs per year, or 0.35% of the total jobs (including farming) and 1.43% of the non-farming jobs. As noted earlier, this is an extremely rough exercise based on many heroic assumptions. But the order of magnitude should be suggestive.

Table: Estimated Job Impact of the My Thuan Bridge  
(New jobs per year)

	Tourism and Transport workers	Industrial workers	TOTAL
Can Tho Province	5,500	900	6,400
Entire Mekong Delta	24,750	4,050	28,800

Includes the income multiplier effect but excludes jobs created through bridge construction.

Notes: <sup>1</sup> In 2002, they included 29,710 trade businesses, 8,053 hotels and restaurants, and three travel agencies. The first two categories have similar average monthly sales of approximately \$560, suggesting that they are indeed small. It is possible that most of them cater to the local customer base rather than tourists, but they are all included because of the indirect multiplier effect (see below).

<sup>2</sup> Authors' estimate from the official employment data for the broadly defined "trade" sector.

<sup>3</sup> The Can Tho province has Tra Noc I and II Industrial Zones. In addition, Hung Phu Industrial Zone, adjacent to the Can Tho port, is being developed. All together, there are about 80 firms, many of which are Vietnamese enterprises engaged in food processing and garment manufacturing. One-third of investment projects (measured by registered capital) came in or after 2000.



## DFID Study of Road Network Impacts on the Poor

In order to provide complementary perspectives on the GRIPS study on the role of large-scale infrastructure in economic growth and poverty reduction, UK/DFID commissioned a study on road network impacts on the poor during July-October 2003.

The main objective of the DFID study is to examine the role of the level of connectivity or rural communities into the transport network in promoting poverty reduction and growth, focusing on three topics:

- How do rural populations perceive and rank the utility of rural roads, and what factors affect usage?
- What are the identifiable differences between: (i) communities where rural roads are well-linked to the provincial and national road network; and (ii) communities where there is no linkage?
- What measures can be taken to promote more integrated approaches to road development-improving coordination, transport service development, etc.?

The study consists of: (i) qualitative, participatory field survey [DFID 2003]; and (ii) quantitative survey (including a field survey and database/literature review) of road connectivity and its impact on rural poverty reduction. In both cases, field surveys were carried out in the same locations-five communes in three districts of Lai Chau province and four communes in two districts of Hung Yen province. These provinces are included in the second Rural Transport Project (RT2), funded by the World Bank and DFID.

The following summarize the methodology of the study.

### 1. Sampling Framework

Two provinces, Hung Yen and Lai Chau, have been selected. Hung Yen is a small province close to Hanoi in flat, irrigated terrain. Its strategic transport infrastructure is relatively well-developed (including the fact that National Highway No.5 from Hanoi to Hai Phong passes through the province, and it has a dense and extensive network of rural roads though much remains to be done to improve their standard and condition. Lai Chau is a large, remote, northern province far from Hanoi, in difficult mountainous terrain. Its strategic transport infrastructure (national highways) remains under-developed, the rural road system is limited in extent and generally of low standard and in poor condition.

At the district level, two districts in Hung Yen and three districts in Lai Chau have been sampled, to represent different levels of strategic road (highways) connectivity. Then, two communes have been surveyed in each of the two districts of Hung Yen and in two of the three districts of Lai Chau, to represent different levels of rural road access. In addition, in Lai Chau, one commune without an access road has been selected. (The main features of road network conditions in the surveyed communes are shown in the Table below.)

In sum, the sampling framework covers:

- One commune without any road access
- Four communes in a remote province (Lai Chau), but with four different levels of strategic and rural road access: (i) poor strategic and rural; (ii) poor strategic but good rural, (iii) good strategic but poor rural; (iv) good strategic and good rural.
- Four communes in a well-located province (Hung Yen) but with different levels of strategic and rural road access, the same four cases as the above (i)-(iv).

This allows a series of comparisons to be made, for both the participatory perception and quantitative connectivity surveys.

- Between a remote, sparsely populated, "difficult" province and a densely populated province, well-connected into the strategic road network and close to Hanoi.
- Between the two provinces, four comparisons of communes with same characteristics of strategic and rural road access.
- Within each province, between communes with different road access characteristics.

Table: Road Network Conditions in Surveyed Communes

	Hung Yen Province				Lai Chau Province				
	My Hao District		Phu Cu District		Tam Duong District		Dien Bien Dong District		Muong Te Dist.
	Hung Long	Duong Quang	Nhat Quant	Tong Phan	Ban Giang	Na Tam	Hang Lia	Na Son	Ta Tong
Province Level	<ul style="list-style-type: none"> <li>• Rural road network is good. High rural road density, road conditions are good.</li> <li>• Close to trunk, commercial and industrial center.</li> </ul>				<ul style="list-style-type: none"> <li>• Bad rural road network. Low rural road density, bad road conditions.</li> <li>• Far from commercial and industrial center.</li> </ul>				
District Level	<ul style="list-style-type: none"> <li>• Close to trunk (NH5), commercial and industrial center.</li> </ul>		<ul style="list-style-type: none"> <li>• Far from trunks (NH5, NH39), commercial, and industrial center.</li> </ul>		<ul style="list-style-type: none"> <li>• Close to trunk.</li> <li>• Far from commercial and industrial center.</li> </ul>		<ul style="list-style-type: none"> <li>• Far from trunks, commercial and industrial center.</li> </ul>		<ul style="list-style-type: none"> <li>• Far from trunks, commercial and industrial center.</li> </ul>
Commune Level	Rural roads are "fair."	Rural roads are "good" (upgraded in 2002, very bad before).	Rural roads are "good" (by RT2).	Rural roads are "bad."	Rural road to commune center is "fair."	Rural road to commune center is "fair" (by RT2).	Road condition to commune center is "poor." RT2 road is fair.	Road condition to commune center is "poor."	No road to commune center. It is difficult to access.

Source: TDSI/DFID [2003], Table "Appreciations of Conditional Approaches by Road."

## 2. Participatory Field Survey

(1) : To generate understanding of people's perceptions of the utility of the road network that serves them

(2) Methodology:

- In the survey, a participatory method was used to invite ideas and perception from five focus groups representing interests/groups within the commune: (i) the poor; (ii) the average income; (iii) the rich and businessmen; (iv) women in female-headed households; and (v) commune cadres.
- The above was complemented by in-depth discussions/interviews to develop case studies of the access circumstances of individual households. (In total, 45 focus group discussions and 90 individual discussions/interviews were conducted.)
- The sequence of specific steps followed included: (i) mapping; (ii) ranking the importance of roads (and reasons behind); (iii) ranking the satisfaction of road usage (and reasons behind); (vi) changes in infrastructure/socio-economic/environmental/ technological aspects of local residents and community at large; and (v) perception of participants on the impact of road network on poverty reduction and economic growth.

### 3. Quantitative Field Survey

(1) Purpose: To examine the effects of different levels of, and changes in, connectivity on access to services and facilities for rural communities and particularly the poor, and the broader impacts of improved access.

(2) Methodology:

The following base-data are collected at the provincial, district and commune levels.

- Socio-economic situation
- Connectivity and access situation: road network, road condition, transport services and costs, availability of transport, key places to which people need to travel, map
- Rural transport projects

In doing so, quantitative questionnaire interviews were carried out with a sample of households covering household social and economic circumstances, and travel and transport patterns. Sampling frame:

- Lai Chau: For 4 communes with roads, 8 interviews at center, plus 6 in a remote village. For a commune without roads, 10 interviews around commune center.

Reference: *Participatory Perception Study of Road Network Impact on Poverty Reduction and Growth* [DFID 2003] and *Road Infrastructure Impacts on Poverty Reduction and Growth* [TDSI/DFID 2003].

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