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Responses to change in accessibility

Socio-economic impacts of road investment: the distributive outcomes in two rural peripheral Philippine municipalities

Jerry Olsson

Handelshögskolan vid

GÖTEBORGS UNIVERSITET

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Göteborg 2006

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Abstract
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This study describes, evaluates and analyses how a substantial improvement of road accessibility has influenced the distributional outcomes of socio-economic development impacts in a rural peripheral area in the Philippines.

The impact population consists of 75,000 inhabitants. The outcomes regarding the 500 households and firms are explored through a before-after micro-level case study, using a double difference technique and a multi-criteria impact assessment analysis. Other data were collected through key informant interviews, a traffic counting survey, road network accessibility inventories, and official documents. The data covers the years between 1990-2005. The research questions are essentially concerned with the distribution of an increased economic activity resulting from the road project. The objective is, to explore the scope of the changed conditions and outcomes primarily for the fishing sector, some other production sectors and economic activities in general, and also to investigate the changes in regional and local mobility, and household welfare.

The theoretical approach emphasizes the role of the level of accessibility within and between networks on a disaggregated geographical level taking into account different forms of *Basic Accessibility*, and the relative improvement of accessibility.

Results show that the direct road project related impacts substantially improved the study area's regional network accessibility. These direct impacts had bearing on the indirect impacts. Production, employment, trade, competition, incomes and mobility increased substantially in all major economic sectors and in new ones, and among households. In absolute terms socio-economic development and economic growth were attained within the study area after the road project. However, the improvement in accessibility differed greatly between municipalities and villages. The variations in improved accessibility severely affected the extent in which resource outtake, production, trade, and participation in activities were enabled. It also severely affected the distributional outcomes. Intravillage outcomes showed great differences. Incomes increased among all income groups in all villages, but distribution became more unequal, benefiting upper income groups. From a poverty reduction perspective, the road project was good, but not good enough. Another conclusion is that, for a road to play an enabling role, other conditions and measures must coincide. A general conclusion is that distributional outcomes at local level can be better understood by identifying disaggregated levels of intra- and inter-network accessibility and by applying different forms of *Basic Accessibility*. Another general conclusion is that we need data on household and firm level and we need to use a double difference technique.

Key words: intra- and inter-network accessibility, substantially below basic accessibility, below basic accessibility, basic accessibility, above basic accessibility, relative accessibility, road investment, Famy-Infanta road project, study area, study villages, Infanta, Nakar.

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Acknowledgements
Almost ten years ago I travelled along the Famy-Infanta road in the Philippines for the first time. I got stuck there. Since then I have been thinking about this 63 kilometres long road almost every single day. Perhaps it says something about an academic mind, about obsession, and/or my personality. Do I want to get involved with a similar road again? Often I doubt it, but still, the road has given me opportunities I never imagined would come my way.

I am forever grateful to the inhabitants of Infanta and Nakar municipalities, especially my respondents in the villages of Dinahican, Banugao, Lual, Infanta town, Poblacion, Catablingan, and Pesa. In particular, my thoughts go to those who died as mud, rocks and log debris crushed their homes in late November 2004, when the cyclone Winnie hit the study area with rage. The ugly face of poverty and ruthless people seeking profit maximization through illegal logging are to blame. The Infanta mayors, Mr. Velasco, Mr. Mortiz, and Mrs. America, and the mayors of Nakar, Mr. Avellaneda and Mr. Ruzol, authorised my research, and their staff helped me in every sense, especially Mrs. Alanes and Mr. Avila. Without my interpreter, Momar Mopera, the work would have been less complete and detailed. Numerous departments, bureaus, agencies, and libraries helped me with information and data. Thank you for your time and patience. *Salamat po* to all of you!

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Finally, at the start of this work I met Jinhwi at a hostel in Manila. I only wish that I had met her much earlier. Trust me, this work had *not* been completed if Jinhwi had not been there.

Göteborg in November 2006

Jerry Olsson

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Tables

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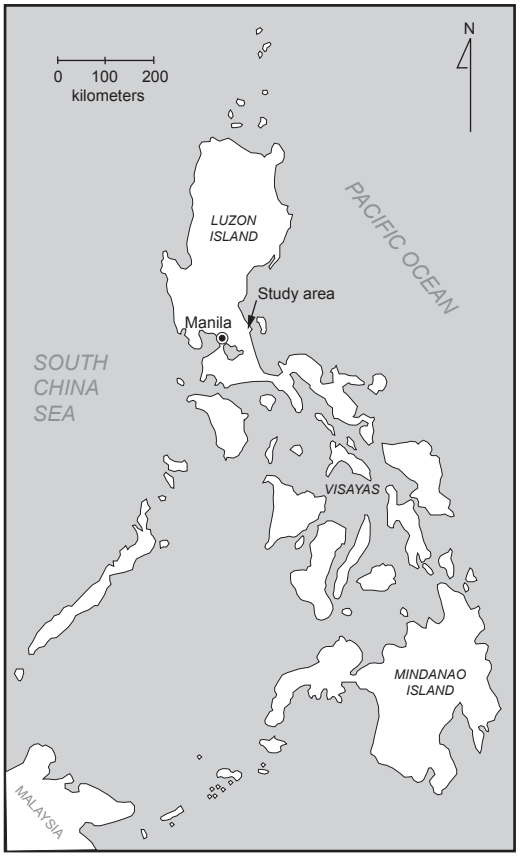
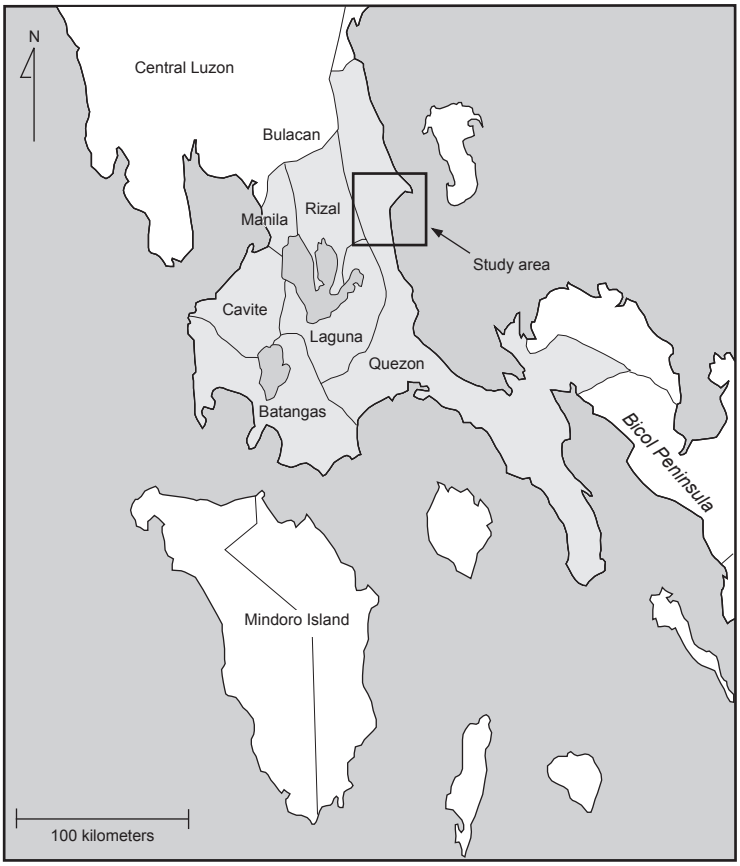
Acronyms

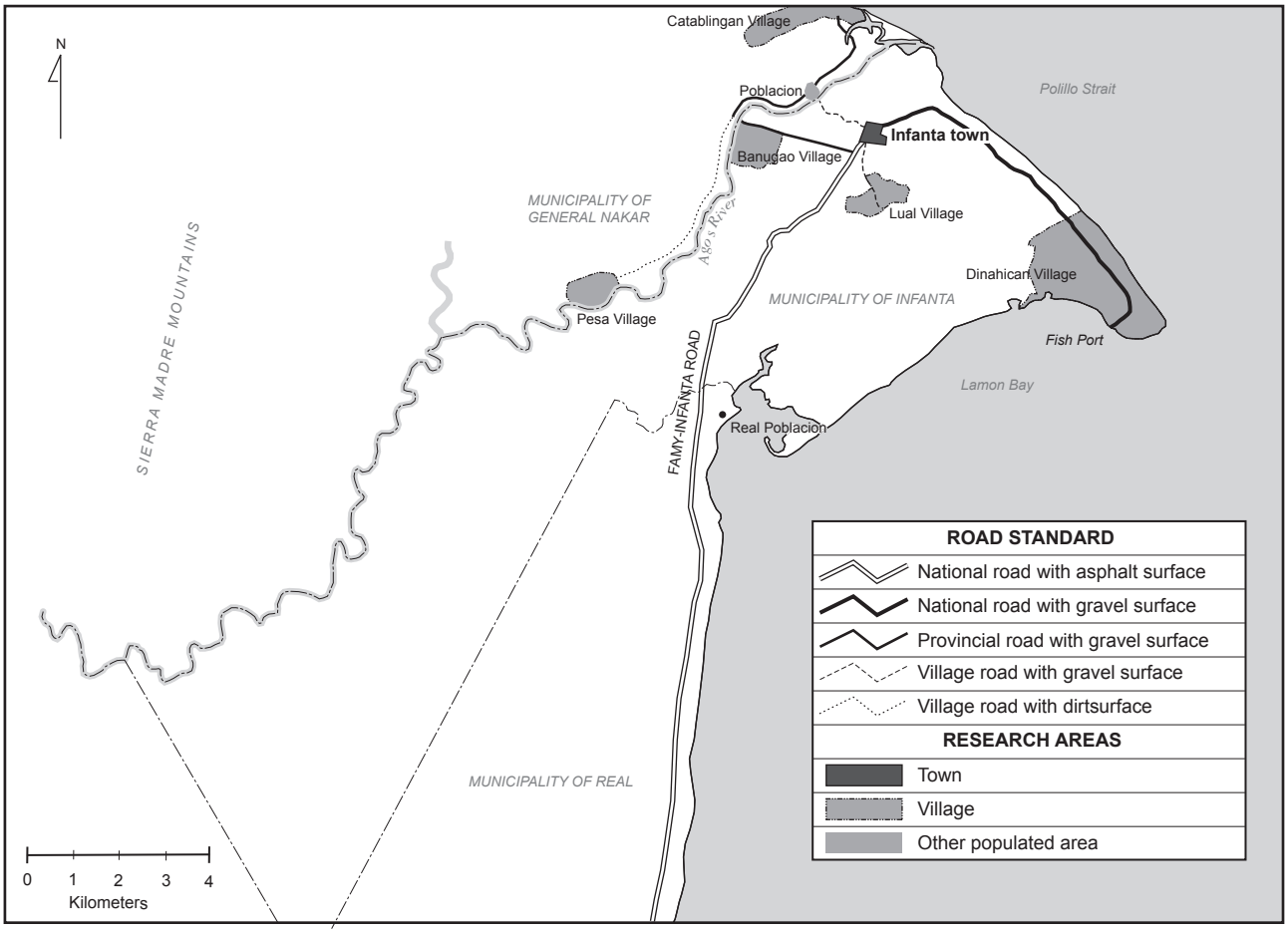
AASHTO – American Association of State Highway and Transportation Officials.
ABA – Above Basic Accessibility.
ADB – Asian Development Bank.
BA – Basic Accessibility.
BARBD – Bureau of Agrarian Reform Beneficiaries Development.
BBA – Below Basic Accessibility.
BFAR – Bureau of Fisheries and Aquatic Resources.
DA – Department of Agriculture.
DENR – Department of Environment and Natural Resources.
DPWH – Department of Public Work and Highways.
FAO – Food and Agriculture Organization.
GTO – Goods Transport Operator.
HF – Household Firm.
HR – Household Respondent.
IFRTD – International Forum for Rural Transport and Development.
IMF – International Monetary Fund.
JICA – Japan International Cooperation Agency.
KI – Key Informant.
n.a. – not applicable.
n.d. – no data.
n.d.a. – no data available.
NEDA – National Economic and Development Authority.
n.s. – no service.
NSO – National Statistics Office.
NSCB – National Statistics Coordination Board.
PIDS – Philippine Institute for Development Studies.
POEA – Philippine Overseas Employment Administration.
PPDCO – Provincial Planning and Development Coordinator Office.
PTO – Passenger Transport Operator.
SBBA – Substantially Below Basic Accessibility.
SIKA – Statens Institut för Kommunikationsanalys.
SOU – Statens Offentliga Utredningar.
UNIDO – United Nations Industrial Development Organization.
UPLB – University of the Philippines, Los Baños.
WB – World Bank.



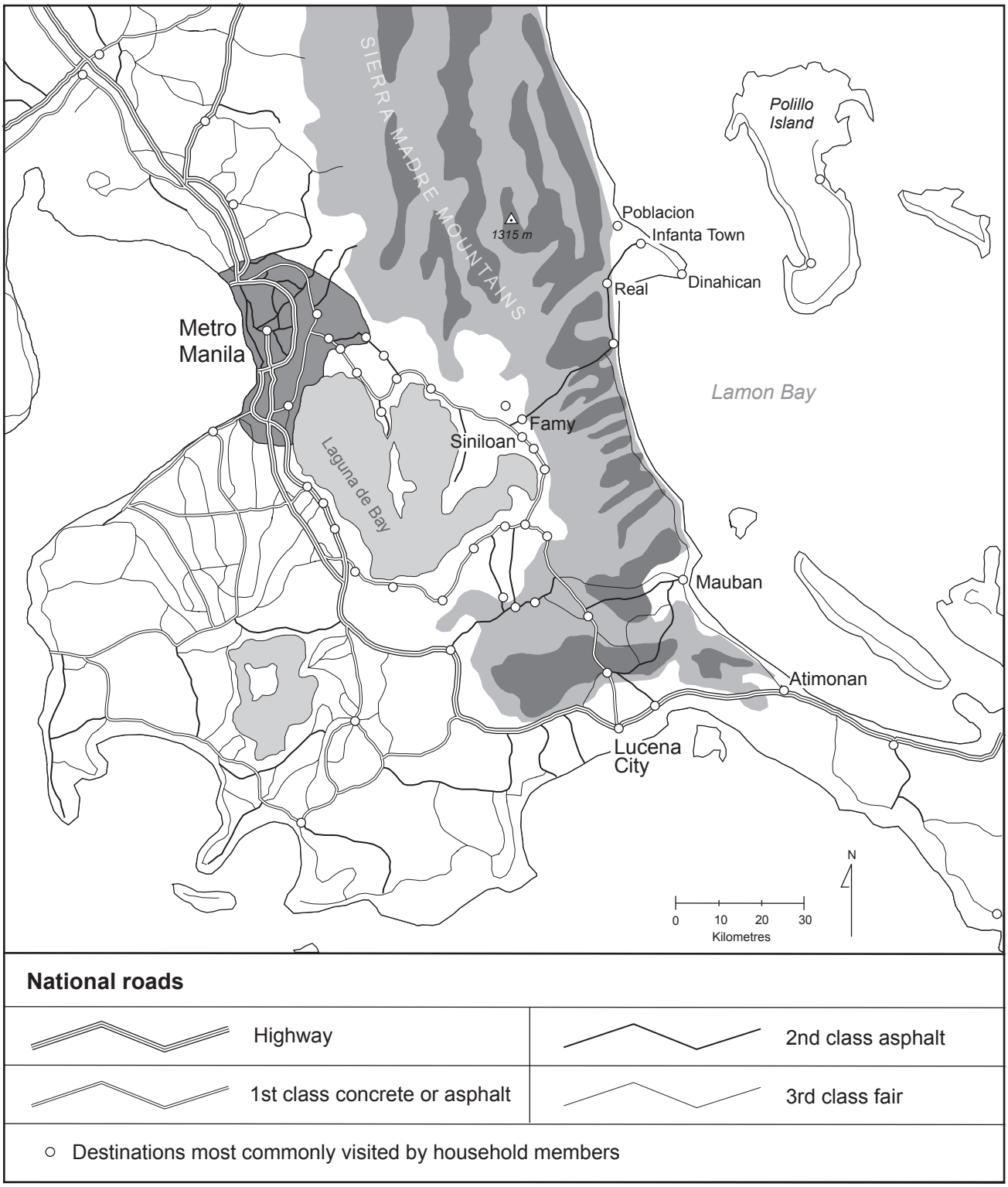
Map 1: The Philippines; major islands, seas and location of the study area.



Map 2: The national core region, Metro Manila, Southern Tagalong (shaded area) and study area.



Map 3: The study area, municipalities of Infanta and General Nakar. Road standard and research areas.



Map 4: Network containing roads classified as national roads, and destinations most commonly visited by household members.
Source: Author's digitalization

Prelude to an investigation

This study is about how a substantial improvement in road accessibility has influenced the distributional outcomes of socio-economic development impacts in a rural peripheral area. As the distribution of such impacts between various actors and at different geographical levels is not well known, these aspects are examined through a before-after local micro-level case study.

The research project was initiated during my second visit to the Philippines in 1997 when I quite by chance visited the municipality of Infanta for the first time. After a few days in Manila I had noticed that the congested traffic, the pollution, and the people living on the streets were just as noticeable as during my last visit in 1993. The newspapers noted that the traffic situation faced acute problems as the number of cars increased faster than road construction and that urbanization was on the increase.

Later, I went to Cagayan Valley and Mindoro Island, trying to find a research area. In Cagayan I visited a village where farm-to-market road communications constituted an acute problem. During the wet season, the road was impassable and the farmers could not sell their produce. Once the road was passable they lacked capital and had to sell at lower prices, a purchaser's dream. People asked how they could contribute to national development when this basic utility was absent. It was easy to imagine other villages with similar problems. On Mindoro I visited a village where investors offered farmers money to sell their land. The village advantages were closeness to the highway and a village road paved with concrete, the latter being very rare in rural Philippines. Farmers were concerned about their most valuable resource, land. What will happen if our rice fields disappear? Can we get other work? What shall we eat? It illustrated a situation where arable land is converted for non-agricultural purposes due to industrial strivings.

Being exhausted from extensive travelling, I decided to visit a place less frequently visited by foreign tourists. The tourism department in Manila suggested the Polillo Islands, located in the Pacific Ocean off Quezon province northeast coast. Not able to figure out how to get there through the travel guidebook I assumed the area was of no interest. Instead, I travelled in Laguna province. As I could not ignore the question of why it was difficult to reach northeast Quezon, I asked for buses in that direction. After many changes I arrived in Real two days later. When the locals told me the ferry did not leave for Polillo, but may leave from Infanta, 10 kilometres north, I decided to go there.

Strolling around Infanta town, I passed by the ever-present statue of the national hero, José Rizal, the municipal hall, the public market, the plaza with its basketball court, and the Catholic Church. No one knew when the ferry departed and people found it odd that a lone foreigner should wish to visit the Polillo Island. Was the intention to buy land or start a factory? The bank could not exchange US$ and did not bother to answer my question about a credit card. As I was tired, I checked in at a guest worker inn and decided to give Infanta a chance. One thing was sure, Infanta was rural, or rather, rural peripheral Philippines.

Next morning I walked towards the Pacific. When walking through a village, the farmers told me, while inviting me to plant rice, that most people lived on rice, copra, and fishing. When I reached the Pacific at midday I was surprised to see so many resorts scattered along the beach. Soon, a man approached, asking why I was there. Unfolding my map, I told him about diving in Polillo. It was nothing he had ever heard of. When he found out I was a geography student he brought his maps and we started talking. Why had he decided to establish a resort in Infanta and who spent leisure time here, I asked. He explained that the Famy-Infanta national road, the only accessible road leading into the area, had been improved in 1995. The road joins up with Manila East Road that takes you to Manila. Today, people from Manila can drive back and forth in one day. Before, it was impossible as the 145 kilometers took 7 to 9 hours, one way. If it was raining, the road was often impassable. A fishing port in Dinahican village, the major fishing community in the study area, was also in the pipeline.

What do people think of the changes, I asked further. He said that few know to what extent this changes their lives. His companion advised him to invest in 1993. He had connections in the government and got pre-hand information about the road project. He saw the opportunity, and so did others. It was of no interest to him what happened in the area, what did matter was that people got fast, reliable and convenient transport so that they could visit the resort. It was a frank statement from an investor who had grabbed the opportunity but had little concern for the community.

During the third day, a bleak picture of the situation of a couple of years earlier began to emerge. People talked in terms of *before-after* the road project was completed in 1995. Accessibility to Infanta had been severely restricted, requiring strenuous and costly efforts. People stressed that the road project was the *cause* of the economic growth and improved living conditions as investment poured in and firms were established. Instead of only being dependent on agriculture, a more diversified economy had emerged and employment and economic opportunities opened up in manufacture, service and trade. I remembered that the bank the day before celebrated its one-year anniversary. Not only resort owners saw a prosperous future, others had found their way to Infanta. Accordingly, the concept of accessibility became important and has continued to be central.

Before embarking on the bus to Manila, the old lady selling snacks told me the buses left more often after the road project. Infanta will look like Lucena City in five years she exclaimed. I had never visited Lucena City, the provincial capital, then, but I did the following year. Lucena is Manila in miniature. I left with three thoughts:

- What other impacts had the road project resulted in? Was the road project the *cause* or a supporting condition to these impacts? Who had and who had not benefited?

The Infanta area was perfect for transport research. It had been a peripheral region due to physical barriers and very poor transport conditions for a very long time. The area is surrounded by the Pacific Ocean in the east, the Sierra Madre mountain's in the west, the river Agos with no bridge connection in the north, and mangroves in the south (see map 3-4). At the same time, the area is rich in resources; fishing grounds, fertile soils, fresh-water,

forest, and people. Finally, as the road had been improved and no intervening road was present, it was ideal for a before-after study.

Coinciding with the questions that concerned Infanta, a number of questions concerning the Philippines in general appeared. Why had this richly endowed area not been provided with an adequate road before 1995? Had Manila been supplied with agricultural goods from other locations more cost efficiently and faster? Was the road project an outcome of a change in transport sector policy in the 1990s?

Since my first visit, I have returned to Infanta in 1998, 1999, 2001 and 2005 and I have got familiar with the place, its people, their constraints and their wishes. In 1998, I studied agricultural change in relation to improved transport resources. Except for changes in production, land value and business establishments, their relation to the road improvement was unclear. While conducting questionnaires with farmers I saw a plural place emerge from behind the façade. Infanta was not purely agricultural, where subsistence rice farmers sold produce occasionally. A majority sold rice. The society where each family owns a piece of land was an illusion. Modern inputs and methods increased yields, but this, together with rapid population growth, also brought pressure on resources.

While I felt time had been standing still, it was a glimpse of a continuous transformation. Before the first road leading into the area, allowing motor vehicles, was built in 1936 goods and passenger were transported by sea. Since then a shift to land transport speeded up. In the early 1960s, privately owned trucks appeared, and the logging industry and the small-scale export of fish to Manila started. Also, interaction with outside areas had been quite extensive among some actors. For instance, overseas workers opened up windows to their families when they returned home from working contracts around the world.

As time passed by it became apparent that the diversity among villages and households was wide. Many households and villages live in utter deprivation. Here, the household's expenses are calculated and vividly remembered in order to plan ahead and analyse previous mistakes. Others have living standards comparable to middle-income earners. There are also pockets of high-income households. Their facilities span from cars, TV and mobile phones, via air-conditioned houses to children attending universities in Manila.

It is also a society where few actors control economic activities and sectors. A pattern where maximised profit was secondary to stability without competition was present in all economic activities, spanning from fishing and copra via banks and cooking oil to gasoline stations and transport. What had happened to these actors since the road improvement? Had it had an impact on competition and what had been the consequences?

Coinciding with the changes taking place in Infanta, locals also referred to General Nakar (hereafter Nakar) that borders Infanta in the north, in a rather patronizing manner. Nakar was a slumbering municipality where economic activities were almost non-existent, public services rudimentary and living conditions were far poorer than in Infanta. Nakar shared similarities but also differences with Infanta. It is agricultural and endowed with natural resources, forest and fishing grounds, but population is low and arable land is scarce.

Nakar also has very low accessibility. Being divided from Infanta by the river Agos, accessibility is limited as no bridge exists. The municipal road network is underdeveloped.

As the 1998 study was insufficient in terms of distributional impacts, geographic premises and actor influences, I decided to include Nakar in a comparative before-after study in 1999. I also included seven study villages, four in Infanta and three in Nakar. All villages had different levels of accessibility and all, except two, had different dominating livelihood sectors. The two fishing villages, Dinahican in Infanta and Catablingan in Nakar, got special interest. Due to similar resource bases but different physical geographical features and accessibility levels, where Catablingan is disconnected from Infanta and the Famy-Infanta road and Dinahican is connected to the road, it was possible to measure and compare impacts after the road project.

Further, 'stability' in Dinahican had been 'disturbed' by the road project and by fishing migrants who had brought skills and knowledge previously not available. This stability was further disturbed by the fact that the immigrants had no initial obligations to the actors that controlled the fishing sector. The migrants, numbering several thousands, had left their islands due to, amongst other things, overfishing. Why had migrants settled in Dinahican and not in Catablingan? Had their skills influenced the production system?

Finally, as most of the Philippine waters are overfished, and demand and the population in Metro Manila and in its neighbouring industrial towns increase unabated, new fishing grounds must be found. The Pacific Ocean is not overfished and has been chosen as a site for future fish production. Hence, the fishing villages in the study area have, given that proper premises are supplied, a development potential within close reach.

Before the road project, the poor road conditions had restricted local socio-economic development as it prevented: (i) the opening up of under-exploited fishing grounds in the Pacific Ocean and idle agricultural land, (ii) the attraction of investment in production factors, (iii) increased competition through more actors and market price information, (iv) a diversification of the economy, and vi) a widening of the market and labour area.

Low accessibility restricted production, consumption, and participation in socio-economic activities in the study area (Infanta and Nakar municipalities, northeast Quezon province) until 1995 as poor transport conditions were deterrent. Since 1995, after the Famy-Infanta road project, intra- and interregional network accessibility has improved considerably, while differences between municipalities have widened.

Out of these experiences I made three reflexions: In which way had the economic development been caused and/or reinforced by the implementation of the road project? In which way had the socio-economic development impacts been distributed geographically and among actors and agents? What importance could the accessibility changes that followed from the upgraded road be given?

These reflexions formed the platform for the research project that I commenced as a Ph.D-candidate at Göteborg university in 2000.

Chapter 1

Introduction

1.1 The Philippine context

Rural development

Rural development in the Philippines has not been a success. Poor agricultural performance has been persistent since the mid 1970s as the sector has changed structurally in terms of productivity, production patterns, export incomes, and employment (NSCB 1990; 2000a, NEDA 2001, Tolentino *et al.* 2001, Balisacan & Hill 2003). Staple crop productivity has remained stable or stagnated, the contribution to GDP and its share of exports has declined, and its share of the workforce remains high (decline in percent, increase in number) (NEDA 2001, ADB 2001a, Manila Bulletin 2005). In the late 1990s, labour productivity stagnated, rice production did not meet demand, coconut and fishery productivity declined, food import exceeded export, rural poverty increased and rural income distribution had worsened (NEDA 2001).[1] Considering the agriculture sector's importance, this had direct implications on many people's lives.

Why have agriculture and the rural economy performed poorly? Traditionally, development strategies have neglected the agriculture sector and the rural economy, and they have lacked redistributive objectives. Instead, strategies have encouraged capital-intensive industries and economic activities in urban areas (Po 1977, Rondinelli 1980, de Haan & Lipton 1998, Balisacan 1998a, ADB 2000, Balisacan & Hill 2003). The industry and agriculture sector's inability to absorb abundant rural labour, the insufficient support of rural programs, the outphasing of the green revolution, and a fast growing population, contribute to poor agriculture performance and slow rural development (Po 1977, Siemers 1991, Sanchez 1991, Boyce 1993, Hill 1997, Balisacan 1998a, JICA 1999, WB 2000, ADB 2000; 2001a). The country has not experienced a huge decline in agriculture employment or an increase in more productive employment in non-agriculture sectors.

Transport infrastructure's role in regional and rural development

A recurring objective in development plans since the 1960s has been to reduce spatial disparities between regions and between urban and rural areas (NEDA 1975; 1978; 1982a,b; 1992; 1998; 2001, Antipolo 1996, Hernandez 1997, WB 2005). To accomplish this much attention has been given to the transport sector. The major part of transport and road funds between 1960-1979 were directed toward the construction of new roads and resulted in a rapid development of the road network (DPWH various years). There was also a strong focus on village roads at the expense of national roads. The policy continued until the mid 1980s (NEDA 2001).

[1] Rice was imported most of the time from 1950 to 1975 (Po 1977) and almost yearly since 1988 (NSCB 1990; 2000). Employment in agriculture was expected to increase from 11 to 22 million between 2004-2020 (Manila Bulletin 2005).

A policy shift towards upgrading, maintenance, and rehabilitation started in the mid 1990s when the backlog in the country's road maintenance was addressed. In 1992, a new development goal was to reach a newly industrialised country status by 2000. The strategy included the integration of urban and rural areas, and the industrial and agricultural sectors. To accomplish this, road network improvement was urgent, both the interprovincial network and networks in rural areas. At the same time there was the problem of reducing poverty (WB 1996). Among the rural population, almost 55 % were considered poor in 2000, up from 50 % in 1997 (NSO 2000, PIDS 2002).

Except from overall mismanagement, interregional and urban-rural disparities in infrastructure development have been blamed for many misfortunes (Balisacan *et al.* 1994, Manasan & Mercado 1999); income disparity, poor agriculture performance, slow rural development, skewed industrial distribution, persistent poverty, and low international competitiveness. Tolentino *et al.* (2001) argue that the major causes of poor agricultural performance, competitiveness, and poverty are the lack of public investment and weak governance in rural infrastructure and agriculture and fisheries technology. Poor infrastructure seperates the urban and rural economies and urban markets are encouraged to import supplies, as access to domestic rural markets is restricted.

Others (Balisacan *et al.* 1994, Hernandez 1997, Balisacan 1998b) also stress that the major economic problems since the 1970s are, partly, due to the large variations in access to infrastructure and social services between the major urban centres and the rural areas, especially Metro Manila and everywhere else. Good roads are mainly found around Metro Manila and the adjoining major industrial belt, the Southern Tagalog area (the provinces of Cavite, Laguna, Batangas, Rizal and Quezon, see map 2 and 4). Quezon's road infrastructure stock is much lower compared to the other provinces within Southern Tagalog. But regional disparities are lower than those found within regions, provinces and rural areas (WB 1996), where intraregional and locational inequality in access to infrastructure and social services has an overwhelming effect upon economic performance. Similar trends are found in Indonesia and China (Hill 2002).

Agriculture distribution systems, restricted production and competitiveness

The agriculture sector, including fishing, faces huge problems since its competitive situation vis-à-vis other countries has worsened. On the demand side, high population growth means that increased food demand can be supplied by imports or by domestic production. On the supply side, world prices of food products have declined. In addition, transport links between Manila and the rest of the world have significantly improved.

The rising population and urbanization is centred in Metro Manila, Central Luzon and Southern Tagalog. The latter two, the traditional food-producing areas, face shortage in land due to industrialization (NEDA 2004). Central Luzon is no longer the country's rice granary and Metro Manila's needs must be sourced farther away. Future production shall come from non-traditional food-producing areas, Cagayan Valley and Mindanao Island.

To supply Manila with domestically produced food is sensitive to domestic distribution costs and margins. As world food prices decline and international transport links improve, the country needs to, according to Intal and Ranit (2004), improve its transportation and distribution systems, and/or sharply improve its agricultural productivity so that domestic producers can compete with imports. To succeed with this shift, emphasis is put on the transport and logistics system, following the approach where transport infrastructure investment will put agricultural resources into work, benefit producers, and provide cities and non-agricultural employees with food. As noted by others (Palmer & Villareal 2002, Intal & Ranit 2004), a competitive agriculture sector requires an efficient distribution system. The present system is characterised by marketing inefficiency and multiple layers of trade margins resulting in, amongst other things,[2] farmers receiving low selling prices and consumers paying unreasonably high food prices. Profits remain in the intervening system where marketing margins are unreasonably high due to the traders' market power.

Poor rural infrastructure is central to the question of why the agriculture distribution system is so inefficient and why the transport costs make up the bulk of distribution costs in the Philippines (Intal & Ranit 2004, ADB/WB/JICA 2005). It has implications on competition, both nationally and internationally. Vehicle-operating costs on national roads in the Philippines doubled from 1999 to 2003 and intercity freight rates were more than 50 % higher than in Thailand (WB 2005:91). While the Philippines' total road network length is much longer, Thailand's road surface condition is superior in comparison. In rural areas this is even more troublesome. Following the huge disparities in transport infrastructure, where vehicle operating costs are at least 50 % higher on bad roads and nearly double on very bad roads (Intal & Ranit 2004:77), this results in high marketing costs and monopolized markets in areas with very inadequate infrastructure.

Transport infrastructure and fishing production

The situation in the fisheries sector is no exception. Increasing population and demand, an open access policy, improved technologies, and the promotion of fish export has brought stress on the marine ecosystem and fisherfolk, mainly small-scale fishers (WB 1989; 2004a, ADB 1997, Thomas 1998, delos Angeles 1999, Green *et al.* 2003, Williams & Choo 2003, BFAR 2004, NSCB 2005a;b). As a result, maximum sustainable yields have been exceeded for decades, fish depletion is rampant, and an overwhelming part of the fishing waters are overfished. In order to deal with this, waters not overfished can be allocated. To allocate new fishing waters, infrastructures must be provided to secure fast, cheap, and reliable transport between the production and and consumption sites.

Securing the fish demand of a growing population, poverty alleviation among fisherfolk and sustainability are important concerns of the government (BFAR 2004). Demand for fresh salt-water fish is rapidly increasing among the urban population as incomes increase and supply dwindles. For example, Manila Bay exceeded its limit long ago.

[2] Unexpectedly large harvests leave farmers with lower farm prices in a fragmented economy than in a well-functioning distribution system. Unexpected demand surges will increase imports due to the domestic system's limited capacity to cope with fluctuating production volumes and the farmers' capability to respond to market demand.

Following the development in the agriculture sector at large, fish depletion led to proposals for new strategies in the 1990s. A main objective is improved productivity within ecological limits, the optimal utilization of offshore and deep-sea, and upgraded and modernized post-harvest technologies and facilities (DA 2002a). Future production shall, among others, come from the Pacific Ocean seaboard (ADB 1999, FAO 2000, DA 2002b, BFAR 2004). Increased commercial fisheries' production from the Pacific will be attained through infrastructure provision. It will also relieve pressure on municipal fishing grounds.

Is this a path to be followed? On the one hand it should be noted that the cost of supplying transport to guarantee fast and reliable deliveries of fish is high. On the other hand, the cost to the overall economy of leaving the resource unutilized may be, as noted by Owen (1959), even higher. The welfare benefits from infrastructure investments may be larger if investments prioritise areas where distribution and marketing costs are unreasonably high and where the production potential is restricted due to infrastructure bottlenecks.

When traditional food producing areas and fishing waters close to major markets decline in importance, locations with unused resources further away must be allocated. It requires an efficient distribution system and the provision of an adequate infrastructure.

Exogenous and endogenous motives behind infrastructure investment – the example of the Famy-Infanta national road project

Investments in roads are often influenced by exogenous motives. This was also the case with the investment dealt with in this study, namely the Famy-Infanta national road project. The exogenous motives included, amongst others, the situation with overfishing in general, the following decline in supply, and unabated demand amongst a growing and more income affluent populations, both domestically and internationally. Another factor was the government's efforts to continue with an export oriented fishing strategy.

Further, as the prices of fish have increased much more than most other agricultural commodities (WB 2004b:4), export incomes have increased. Finally, owing to territorial water conflicts with neighbouring countries concerning the South China Sea on the west coast, the Pacific Ocean on the east coast is not affected by such conflicts to the same extent (see map 1). Likewise, the Pacific Ocean is one among very few offshore seas not classified as overfished in the Philippines. From this perspective it was of the uttermost importance to connect the west (Manila, export ports) and the east (Pacific) coast with an adequate road infrastructure. As such, the road project could be viewed as an *exogenously* derived improvement, mainly aiming at connecting the capital city with an area with a huge potential to increase its agricultural production. Thereby Manila's and its adjoining industrial areas' food demand could be secured. Here, the area identified as the study area 'happened to' be located within the influence area of the road project.

At the same time, the endogenous motives should be considered. The government's policy to integrate urban and rural areas, and industry and agriculture by providing adequate transport infrastructure was also a motive. As such, the road project could be seen as an *endogenously* derived improvement. In either case, the distributional outcomes of socio-

economic development impacts stemming from improved road accessibility brought about by the project are equally important to understand and to explain.

In sum, the Philippines belong to a worldwide arena where competition increases through improved accessibility, technical advances, and lower trade barriers. In this environment, poor transport infrastructure has repercussions on both domestic and international competitiveness and trade. It puts pressure on the country and the rural economy with its poor internal accessibility. As such, an adequate road network is needed. The potential to increase productivity and production, in the agriculture and the non-agriculture sectors, is restricted when internal accessibility is lacking and where obstacles and bottlenecks appear on the road to the market. Taken together this has spatial implications.

1.2 Problem discussion

Distributive consequences of road investments

Benefits accruing to industry, and other benefits, due to transportation improvements are fairly well known generally (Garrison *et al.*1959). It connects and provides people with services they need and want. In a growth perspective, transport infrastructure is an input into production and raises the productivity of factors of production, as it connects goods to markets, workers to work, and people to services. It affects welfare. Simply, transport infrastructure lowers costs, enlarges markets, stimulates competition, and facilitates trade.

Garrison also noted that the geographic differentiation of benefits from transportation improvements is not well known. Only in special cases can improvements be of equal advantage to all areas. *"The very nature of…the geographic system means a differentiation of benefits among places, and therefore…benefits from transportation improvements are almost always differentiated geographically as well as in more obvious ways (differentiation among industries, highway users, kinds of transport)"*. (Garrison *et al.* 1959:9). Almost 50 years later, the understanding of transport infrastructure investment impacts across and within local areas and among socio-economic groups in developing and developed countries are still limited (Banister & Berechman 2001, SOU 2003, ADB/WB/JICA 2005). Gannon and Liu (1997) stress that there is no compact theory available within which the distributive outcomes of transport improvements can be predicted.[3]

> *"Little is known, however, about the final incidence of gross or net benefits of transport projects by income groups. Given the presence of imperfect markets, government ownership, and regulation, there is no relevant compact theory with which the distributive outcomes of transport improvements can be predicted – especially where the conditions for highly competitive and complete markets simply do not hold"*. (Gannon & Liu 1997:13).

[3] Gannon and Liu outline, based on income groups from a poverty reduction perspective, six possible scenarios grouped into *win-win*, and *win-loss* scenarios. In the *win-win* scenarios, a project may a) benefit different income groups proportionately, b) benefit high-income groups more than low-income groups, or c) benefit low-income groups more than high-income groups. In the 1st *win-loss* scenario (wins exceed losses) benefits accrue to the lowest income groups most. In the 2nd, the poor benefit while the rich are worse off. In the final one the rich benefit and the poor is worse off.

Studies concerning whom and what sectors benefit from improvements or deteriorations in the transport system are excluded in favour of societal economic efficiency analyses. Today, the Kaldor-Hicks-criteria comprise the base for applying societal economic efficiency calculus within the transport sector (SIKA 2002a). Here, a change is sanctioned if it is possible for benefiters to compensate dis-benefiters so that the latter consider their situation at least as good as earlier on. There is no need for compensation to take place, only that compensation is hypothetically possible. Thus, the criteria disregard the distributional effects that changes bring. It allows that some individuals are worse off if it is hypothetically possible to compensate them and at the same time keep a surplus.

Many (Howe 1984, Leinbach 1995; 2000, Gannon & Liu 1997, Masika & Baden 1997, Jacoby 2000, van de Valle 2000; 2002) have noted that few studies address the distributive consequences of transport investments (income, socio-economic groups) and pay little attention to family and individual needs. An exception is Ahmed and Hossain's (1990) study of impacts among 16 villages in Bangladesh. Simon (1996) argues that new roads usually have both positive and negative impacts, expressed spatially, economically, and socially in any local context. Impacts occur on different scales between regions, localities, and between groups. Nijkamp and Blaas (1994) question whether modern infrastructure generates new benefits for the whole country or, as redistributive impacts, for particular regions, especially those located on nodal points of a network.

The heterogeneity of rural areas and among various groups

A reason for our poor understanding of distributive outcomes can be traced back to the treatment of different areas and groups. Developing areas are usually characterized as aggregates, either as countries or continents (c.f. Ullman 1980b, Castells 1996). It distorts the picture as it withholds differences within countries, regions, and smaller geographical areas: *"Even finer breakdowns reveal that one village may be poor and an adjacent one relatively well off. In many cases the explanation appears to be related to relatively better natural resources…In many cases, however, this explanation does not suffice."* (Ullman 1980b:98).

Instead, we should go beyond national and regional levels to explain differences. For example, the search for poverty-targeting indicators has shown the potential role that location attributes play in shaping differences in household living standards (Balisacan 1998b). As infrastructure qualities, land, social services and institutions vary within a region, using a regional indicator as a target instrument gives limited results. Spatial indicators at the provincial, or ultimately village level can enhance the fineness of targeting, limiting the proportion of benefits leaking out to unintended beneficiaries. Janelle (2004) agrees, stressing that within any regional economic system, there is a variability in the capabilities of people, groups, and institutions to take advantage of transport systems. Since regions or groups will not benefit uniformly, implications and drawbacks depend on these conditions, both as opportunities and constraints.

Hollnsteiner (1963), studying power structures in rural Philippines, emphasizes a strongly non-homogenous society. Contrasts between urban and rural areas were huge. The society is seen as a number of sub-societies, spread along a continuum. It replaced the stereotype

image of rural areas as being static and unchanging over time. Instead, regional variations and distances from urban areas give rise to different patterns of behaviour that differ between communities. To stress that a farming and a fishing village exhibit the same patterns of behaviour is to misunderstand the society, both in a production manner and as regards logistics. Hollnsteiner has the opinion that a society undergoing social and economic changes in varying degrees must be studied from a more realistic approach, one that takes into consideration the varieties in community interaction and behaviour.

A related problem is the absence of investigations including several actors within the same study area. Since the early 1980s, it has been asserted that the traditional [Southeast Asian] villages are more differentiated than imagined (Rigg 2001). Traditional analysis has focused on poor people and [semi-]subsistence production communities (Njenga 2003). While they make up a majority of the population in rural areas in developing countries, the exclusion of other groups and sectors restricts our understanding of the rural context, especially as non-farm activities' importance to household income grow, in particular among the poor (Sanchez 1991, Kusago 2002). Farming is sometimes not even the dominant sector of employment and source of income (Lanjouw 1999, Reardon 2003). A wide spectrum of activities exists, where different groups and sectors interact and have repercussions on each other.

Within any society, mobility increases with income, no matter what geographical and social conditions (Vasconcellos 2001). However, who benefits from transport infrastructure depends on the individual's or economic sectors' transport needs and demand for accessibility in the first place (Church *et al.* 2000, Hanson 2003). Likewise, needs and demand are affected by social group belonging, life cycle stages, the locational pattern of potential destinations, transport conditions and services available etc. (Lowe & Moryadas 1975, Moseley 1979, Church *et al.* 2000, Hine & Grieco 2003). To rely on observed measured travel behaviour as an assessment of transport demand is inadequate. It does not consider suppressed demand (lost journeys), and can mix up supply and demand.

From these observations, the main problem in this study is defined as follows: *The socio-economic development impacts stemming from road infrastructure investment and their distribution among actors, economic sectors and geographic locations are poorly understood during the process[es] of societal change.*

This problem should be one of the core objectives of transport geography. Spatial dimensions are important, as the geographic concentration of economic activities has implications for the distribution of benefits and human needs. It is useful for investment decisions, as post-assessments of the impacts of an actual project after implementation. Finally, in most developing countries a large share of the population and a majority of the poor reside in rural areas, sustaining themselves on agriculture or fisheries. Accordingly, the distributive impacts of transport-led development in such countries were considered among the most important research agendas in the early 1990s (Knowles 1993), despite having being acknowledged 25 years earlier (see Leinbach 1976).

1.3 Purpose and research questions

Following on from the problem discussion, the main objective of this study is to *describe, evaluate and analyse the distribution of direct and indirect socio-economic development impacts stemming from a substantially improved road accessibility situation. It is done by studying households, firms, and economic sectors in a rural peripheral area in the Philippines from 1990 to 2005.*

While stressing that improved accessibility influences impacts, I also focus on how other conditions and measures, either by themselves or by interacting with improved accessibility, influences impacts. Thus, to take into account general and place-specific conditions and the context wherein impacts take place is equally important. To achieve the main objective of the study, four research questions were formulated:

The *first research question* concerns the ways in which the local fishing sector's production and distribution system have changed after the implementation of the road project? What have been the outcomes in terms of fish landings, employment, incomes, investment in production factors, level of competition, deliveries and delivery destinations, and fishing conditions concerning supply?

The *second research question* concerns the ways in which other production sectors' and economic activities' conditions have changed after the implementation of the road project. What have been the outcomes in terms of production, costs, investments, incomes, employment, and distribution and marketing? How have the changed conditions affected local revenues and business establishments, and land use and values? The sectors dealt with are the banking sector, the passenger and goods transport market, rice and copra farming, and the fuel market.

The *third research question* concerns changes in household welfare aspects. In which ways have welfare changed in terms of employment, income, and the purchasing of goods and services after the implementation of the road project, and how do households perceive their own living conditions?

The *fourth research question* concerns the households' geographical mobility. In which ways have their regional and local mobility changed in terms of dependency on and attitude towards public transportation after the implementation of the road project? What have been the observed changes in transport demand and trip frequency, modal choice, choice of destination, and travel time?

So, the approach is double. From a theoretical perspective it is a study of how the transport system effects socio-economic development by using the concept of accessibility as an analyzing tool. Empirically, this is studied by including several geographical levels, actors, and economic sectors through a local micro-oriented study, where impacts stemming from substantially improved road accessibility are studied in a before-after manner within two areas. One area has been affected to a great extent in comparison to the other area.

Finally, the conditions found in the study area are not unique, but illustrate the situation found in many other peripheral areas in the Philippines and in developing countries in general. Thus, the findings in this study are hopefully also valuable for other areas operating under similar conditions.

1.4 Disposition

In the next chapter, the theoretical approach is presented. The first part gives a synthesis about the relationship between transport infrastructure investments, economic growth and socio-economic development from different perspectives, as well as possible benefiters and dis-benefiters. This part improves the wider contextual understanding of what has happened within the study area in this work. The second part discusses how transport infrastructure investments can, or rather should, be approached. This part also includes my personal reflections concerning the limitations of the theories presented and what ought to be included. In the third part, the concept of accessibility, here identified to be of central importance when studying distributional outcomes from road investments, is elaborated on from different perspectives. In the final part, a reflection of how accessibility influences socio-economic development is given. Here I argue for an alternative approach when using accessibility as an analytical tool. Of central importance is the fact that we are not dealing with a single road investment (or section thereof), but with several inter-connected road networks and different levels of accessibility between and within the networks. Finally, at the end the relevant concepts in the study is presented, and the tools used for the evaluation of the distributive outcomes is outlined.

In chapter three and four, the study's study approach is outlined, namely the changes that have taken place in road network accessibility. Chapter three presents the change that has taken place in inter-regional accessibility since the completion of the Famy-Infanta road project. Chapter 4 presents and analyses the changes that have taken place in terms of inter- and intramunicipal accessibility. It also includes a presentation of the historical and present conditions and measures that have shaped the study area and that have contributed to the similarities and differences between the two municipalities under study.

Chapter 5 is a method chapter that describes and motivates my methodological approach and my choice of analysis method. It also describes and motivates the choice of study area and actors, data collection methods, and interpreter. The data collection methods for the empirical study include questionnaires, key informants, manual traffic counting surveys, network accessibility inventories, and assessments of official documents and other secondary data. Alltogether, close to 1,000 questionnaires and interviews were performed with almost 500 household respondents, household firms, transport operators, and key informants in 1999, 2001 and 2005. The comparative before-after micro level case study spanned between 1990-2005. The chapter also includes a critical discussion concerning methodological limitations when studying transport infrastructure investments.

Chapter 6 through to chapter 10 presents the results of the empirical study. The chapters follow the study's four research questions. Thus, in chapter 6 and 7 the changes that have

taken place within the local fishing sector, here represented by the major fishing community and a much smaller fishing community in respective municipality, before and after the implementation of the road project, is presented. In chapter 8, focus is on the changes that have taken place within other sectors, markets and economic activities since the implementation of the road project. Chapter 9 and 10 deal mainly with impacts on the household level, where the former focuses on the distribution of welfare impacts and the latter on changes in spatial mobility behaviours.

In chapter 11, the study's most important results and conclusions are summed up.

Chapter 2

Theoretical outlines and conceptual discussion

2.1 Introduction

The main aim of this chapter is to provide an analytical framework that will be applied on the empirical study. As discussed in the introductory chapter, while it is clear that road investments influences socio-economic development, it is less clear how the impacts of such investments' are distributed, geographically and among actors. To bring further understanding and knowledge about this, I believe that we must go beyond traditional assessments of accessibility as an analytical tool. Secondly, we must realise that we are dealing with several inter-connected road networks at the same time. Accordingly, the chapter elucidates on concepts identified to be of central importance to understand the research problem and analyse the distributional outcomes of socio-economic development impacts stemming from improved road accessibility. Central concepts are different forms of *basic accessibility*, *intra- and inter-network accessibility*, and *relative accessibility*.

Sections 2.2 give a brief synthesis of the relationship between transport infrastructure investment, economic growth and socio-economic development. This section also works as a background to understand the societal transformation process that has taken place in the study area. Section 2.3 deals with how transport infrastructure is studied using different approaches and identifies conditions needed to take into consideration. Section 2.4 elaborates on the concept of accessibility from various perspectives. In section 2.5 I put forward my assessment of accessibility, and my reflections concerning the relationship between accessibility and socio-economic development. In section 2.6 the concepts used for the evaluation and analysis of the distributive outcomes are outlined.

2.2 The influence of transport infrastructure on socio-economic development

Mobility is necessary in all societies and economic systems to various degrees.[4] However, the ability for people and goods to move around is at present almost taken for granted in developed societies (Berger 2000, Hanson 2003), or as stated by Hanson: *"... we have become numb to the notion that mobility – indeed, transportation – is at the heart of contemporary economic, social, political, and cultural life"*. (Hanson 2003:469).

Constantly declining transport costs and time distances have enabled increased flexibility and specialisation of human activities. At present, transport costs share of production costs are negligible in many economic activities. However, it is premature to neglect transport costs, especially in regions where the major industries' transport costs still form a large part of the total production costs, or where traffic bottlenecks are removed (Bayliss 1981,

[4] Vilhelmson (1999) identifies three mobility patterns in time and space as the industrial society has developed, spanning from geographical stability characterised by the agricultural society to geographical flexibility in the mature industrialised society via early industrialization characterised repetitive mobility pattern (commuting).

Tapper 1985, Button & Gillingwater 1986, Chandra & Thompson 2000). In transport cost sensitive industries (e.g. raw materials, agricultural goods with low value per unit of weight, perishable goods) an adequate transport infrastructure is essential. Also, transport costs are hidden in broad statistical groupings, and costs are often incorrectly computed, including only one stage in the production process (Vanhove 1999, Peters 2003).

The production function approach – the passive versus active role

The role of transport infrastructure in economic development is viewed as passive or active. Historically, the former has dominated. The main mechanism by which transport infrastructure capacity and quality affect economic growth is through reduced costs, time and money. It enables the reorganisation of production, it influences land-use and market area, improves productivity, and stimulates investment. Increased productivity through reduced in- and output costs enables scale economies (people can travel further to obtain their needs). A larger market area implies higher labour productivity through reduced travel time, which is also valid in the service sector (Lundqvist 1996).

When interaction costs between regional economies decrease, exchange can increase so that each region can make better use of its advantages, specialize further,[5] and allocate their resources more efficiently. Eventually, overall average productivity increase in all regions and firms can invest in and adapt new technology to a larger production capacity. In this sense there is, excluding competition, a relationship between improved transport infrastructure and regional growth.

In the production function approach, transport infrastructure plays a role next to labour and capital. Lack of the former reduces productivity in the latter. Garrison *et al.* (1959) argue that for change to occur a change in the transportation system is not sufficient. It is necessary that a transport demand is already present as it is a derived demand, dependent on demand for consumption and investment in other sectors.[6]

One critique towards the demand perspective is that conventional transport models rely on the actual use of transport as evidence of demand (Moseley 1979). Here, statistical relationships between actual use and household attributes estimate future trip-rates. According to Moseley, this is, at least in a rural context, unrealistic. It is impossible to stress that household trips are independent of the quality of transport available, and the price and location of facilities. Derived demand models neglect these considerations.

In the active role, transport infrastructure has a catalytic function as an inter-sectoral link (Garrison & Souleyrette 1996, Garrison *et al.* 2003). Transport improvements facilitate expansion and innovative opportunities in other sectors, by connecting technologies and

[5] The specialization effect, enabled through canals and roads, was the engine for economic growth in England, according to Adam Smith (Ville 1990).

[6] During the 1940s and 1950s, many economists supported the idea of balanced growth, where progress in infrastructure and direct productive activities (capital, land, labour) went hand in hand (Ville 1990). Hirschman (1958) criticised this, meaning that the indivisibility of infrastructure worked against balanced growth. Instead unbalanced growth with disequilibrium was necessary. Progress in one sector would trigger off induced investment in the other as bottlenecks occurred. An increase in industrial output would eventually strain existing infrstructure stock and result in investments.

enabling interactivities. It also plays an active role in making new resources available, even if investment decisions mainly follow derived demand (Owen 1959). Asp (1975) acknowledges a transport-generating factor resulting from a new or improved road. Except for diverted transports (the major part), new and additional transports can be produced when the ability to interact between places improves.

That increased transport infrastructure capacity will induce growth in traffic has gained ground recently (Berger 2000, Vickerman 2000, Noland 2001, SIKA 2002b, Halden 2003). As supply may reduce travel expenses, suppressed demands can be released, especially where a previous demand existed but expenses exceeded benefits. Production may also be restricted by high transport costs, so that, in the absence of a road project, additional output would not have been produced.[7] But for supply to affect demand, a situation of prior dynamism must be present (Wilson 1966, Hilling 1996; 2002, Banister & Berechman 2001). Resources, as well as people, must be available to develop them. Transport infrastructure can enhance and interact with these factors but not replace them.

Finally, others (Johansson 1989, Gannon & Liu 1997) argue that transport infrastructure investment plays a leading and a complementary role, and might shift in relative importance with the accumulation of transport stock. Impacts are largest initially and from thereon decline, changing from a leading to a complementary role. But its role is ambiguous, as causality may run in both directions. The relationship is a reciprocal one.

Distributive outcomes of transport infrastructure investment

The issue as to whether transport infrastructure investments result in dispersed or concentrated production has a long history. Friedman (1966) developed, but later rejected, a model where a modern urban core expands through the urban hierarchy and across the rural periphery, progressively reducing urban-rural disparities and producing a homogenous, fully integrated and developed space.[8] Reliable and efficient transport ensured the movement of people and goods. Initially, centripetal forces drain the periphery of resources in favour of the core. Later, diseconomies of scale outweigh agglomeration economies in favour of rural areas, as land, labour and congestion costs are lower.

The new economic geography school also emphasizes the relationship between scale economies and transport costs (Krugman 1991). In general, when costs are high, local production serves local markets and production is decentralized. As transport cost reduces, concentration strengthens as producer returns increase while still serving distant markets. Larger scale economies outweigh lower transport costs. But eliminated transport costs may lead to production being moved from locations with high production costs towards locations with low costs. Only in cases of goods with very high or low levels of transport costs will there be clear-cut location implications.

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[7] It also benefit customers that used the road before a project, and those using a different road or another transport mode.

[8] In neo-classical economics, regional incomes tend to become more equal as capital, labour etc. move from one region to another seeking the best possible returns until nothing can be gained from further movement since returns are uniform. A competitive market should tend towards regional equality, subject to constraints on the spatial mobility of factors. While regional incomes may converge, individual regions may move toward the national average in various degrees.

Whether, or to what extent, interregional convergence or divergence occurs after market integrations are, amongst others, according to Nijkamp *et al.* (1994), hinged upon: i) the degree of cost reduction in each region as a result of scale economies and market expansion, and ii) efficiency rises in firms as a result of rationalisation. The critique is (Batten & Karlsson 1996, Vickerman *et al.* 1999) that improved interregional accessibility may trigger the comparative advantages of core areas and works against peripheral areas.[9] Also, scale economies and a decline in public transport services require that people has access to and ability to use a car (Kilvington 1981). Carless people's accessibility declines.

Competition in the transport industry

Increased competition through reduced transport costs will, theoretically, benefit the entire society as input and output costs decrease, consumers enjoy lower prices, firms improve productivity, and the variety of goods widens. This is a key component of the wider economic benefits stemming from improved transport infrastructures (Peters 2003).

Low accessibility often results in monopolised or oligopoly markets. Here, transport costs are high and production is inefficient and expensive. Spatial monopoly is control over a market by virtue of location where one firm or individual sells the entire output of a commodity or service (Johnston *et al.* 2000). Distance from competitors or ways of bounding space gives a producer control over a section of the market. Another instance is when firms divide the market among themselves, enabling them to raise prices above-normal profits in the area that they control.

The two-way road argument

Improved links between urban and rural areas make it easier for urban firms to market their products, capture local market shares, and get access to rural goods and labour. Local production, previously protected by remoteness, may be destructed, and the area may be drained of the young and educated (Owen 1987, Nijkamp & Blaas 1994, Leinbach 1995, Hoyle & Knowles 1998). At the same time, people in rural areas can benefit from the technology, market knowledge, and capital in urban areas. Competition from outside may also be welcomed as it puts pressure on local firms to improve their competitiveness (Lundqvist 1996). However, opening up peripheral areas 'too fast' without any initial protection may take firms (the customer perspective is usually neglected, Lundqvist 1996) by surprise and without time to build up competitive production. In areas with a specialised local economy, competition may not alter anything.

Competition in rural areas in developing countries

There are several reasons why low competition is common in rural peripheral areas in developing countries. According to McCall (1977), high initial costs for vehicles and low

[9] Vickerman *et al.* (1999) criticised EUs transport infrastructure investment approach, stressing that an efficient transport network is essential for Europe to compete globally. Instead it can lead to further divergence between high and low accessible areas by improving links between highest-level centres.

accessibility led to the establishment of monopoly situations in local market centres and villages. The first vehicle-owners were innovative and often engaged in other entrepreneurial activities, combining trading and marketing with transportation. The initial capital to buy a vehicle may have derived from this, or from loans, partnership with other local entrepreneurs, or from agricultural sales.

Hilling (1996) argue that people with entrepreneurial abilities can capitalize in competitive situations due to their skills and the opportunities created. Others (UNIDO 1980, ADB 2002) stress that vehicle operators and traders are usually winners no matter what rural road conditions. Where roads are bad they can monopolize routes and with good roads they benefit through lower costs, more reliable transport, and increased load capacities. Also, the strong ties between transport operators and consumers leave few options for the latter whom to use as an operator (Tolley & Turton 1995). Finally, transport operators take risks and they, it could be argued, should be rewarded for this. But while high passenger fares and freight rates are charged to cover high operational costs on poor roads, it is also due to monopolistic profit (Carapetis *et al.* 1984).

Turning to consumers, Black (2001) had never seen transport cost savings being passed on to consumers, and MacCall (1977), relating to studies in New Guinea, Iran, and the Philippines, shows that public investments in transport facilities seldom lead to lower transport costs or increased competition. Others, Leinbach (1976) in Malysia and Kessides (1993) in Thailand (and Kojima & Tsuzuki 2001 in Japan), found that reduced transport costs from improved roads in rural areas resulted in a shift away from local goods in favour of buying demand for urban goods. Finally, Howe (1984) argues that even when transport costs fall substantially, the impact on crop production is not likely to be large if the farming or the transport services are regulated or monopolized. However, land ownership is, especially in rural and agricultural areas, a key parameter in determining if, and how people can take advantage of opportunities that a road may bring (ADB 2002).

Non-economic motives for transport infrastructure investments

Transport infrastructure investments may be justified on non-economic grounds: *"We are possibly in error in viewing transport simply in terms of demand and economic activity and disregarding the varieties of non-economic considerations"*. (Hilling 1996:11). This perspective has quite a long history. When studying social benefits from improved transport in Malaya, Hughes (1969) found that if social development is a goal, a rural road might be desirable, even where the roads alone could not qualify on normal economic grounds. Others (Wilson 1966, Leinbach 1976) stress non-economic values of new transport capacity can be of overriding importance, even when there is no obvioius economic value.

The debate about whether accessibility disrupts access to social facilities, not only economic activities, has emerged again. This is a rural problem since distance to facilities is larger in rural areas. As a result, from distributive and equity perspectives, the concept of need-based has emerged (de Silva & Tatam 1996, Hilling 1996, Hoyle & Knowles 1998). Here, transport is seen as social infrastructure for the provision of services: improved

access to health, education, provision of electricity and rural banks, human contacts etc. (Binswanger *et al.* 1993, Hilling 1996, ADB 2001b, IFRTD 2003).

In summary, it is possible to stress that transport infrastructure investments are surrounded by certain agreements and consensuses, such as:

- there is a necessity of a minimal transport infrastructure base for socio-economic development to take place, but it is not sufficient (except for in extreme cases),
- the economic impacts of transport infrastructure are the increased productivity that takes place via changes in transport costs and accessibility,
- if no resources are available to develop and/or if there is no human ability to develop resources, an investment will not generate development,
- impacts may be positive, negative and/or neutral at the same time,
- impacts are dependant on timing, the location of additional road capacity, the levels of actual demand, and the existing structure of the network.

Contrary to the consensuses identified above, there is little consensus on who and who does not benefit from road infrastructure investment on various spatial levels and among different economic sectors and consumers. *"The theory linking transport influences to social and economic change has not really been refined much beyond the general and aggregated levels...* (Leinbach 1995:338). Given an area's specific conditions and various actors' access to resources, distribution must be studied case by case.

2.3 Transport infrastructure approaches – context- and place-specific premises

Hägerstrand (in Carlestam & Sollbe 1991) describes how geographers first choose a problem scenario and everything that belongs or is attached to it. Then, exclusions are made to make it comprehensible. Hägerstrand argues that processes take place side by side, sometimes in cooperation, but more often in conflict. Instead of discovering conformable laws, the purpose is to understand the principles of how the ideal becomes deformed in real life. How people, society, technique, and nature interact in new configurations. While each sector (e.g. transport sector) demonstrates independence, it also influences and is influenced by processes in other sectors. Viewing the world as a meeting place, where processes are constantly at work, allows for a comprehensive view.

In a similar vein, Elliot Hurst (1974), but also Lakshmanan and Chatterjee (2005), pleads for a comprehensive treatment of transport, a systems framework, instead of units. They mean that the character of transport as a whole and in detail, at any particular time, and throughout history, is determined by its interrelations with physical and social forces and conditions. To understand transport means simply to analyse these interrelations.

> *"...there can be no adequate theory of transportation which has regard only to some aspect of its social function, as the economic aspect. That is not the only aspect, nor can one truly say that it is more important than the others. All are coordinate, equally indispensable to social progress"*. (Cooley 1894 in Hurst 1973:163).

Since then environment and location specific conditions have been acknowledged when explaining and understanding regional and local differences stemming from transport investments. Instead of the description and/or statistical explanations that dominated the field (still a problem in economic appraisals of transport projects, Grant-Muller *et al.* 2001), attempts to explain and understand transport geography within a socio-economic context and the operational and behavioural milieu of the decision maker are sought.

Edmonds and Relf (1987) mean that transport offers an approach to regional or spatial analysis. By studying the transport sector, the number and direction of people and goods transported to, from and within a region the geography of its economy can be approximated. *"The economic relations and connections between areas are reflected in the character of transportation facilities and in the flow of trade"*. (Ullman 1954:311). If a planning, construction, and operational history of the transport industry are included, an image of how the region evolved can be derived.

Implicit among the approaches is that a region's potential to benefit from improved accessibility is conditioned by its geographic, climatological, socio-economic and political conditions. According to Hägerstrand (in Carlestam & Sollbe 1991), it is fruitless to take one object out of its context when studying distributional outcomes. However, while it is tempting to try to combine all factors into one meta-theory, the complexity of their relationships and the imprecision in describing the human behaviours which affect the factors, makes it very hard to achieve (Kagermeier 2000). Instead, transport should be viewed as a trans-disciplinary field, taking into account as many factors as possible.[10] The transport system is but one part of societal change, not a prerequisite.

Following the approaches above, a preliminary conclusion would be that the different perspectives in section 2.2 should be balanced in order to understand how transport infrastructure investments influence socio-economic development and how this is distributed geographically and among actors within peripheral areas. These impacts are influenced by specific conditions, such as;

i) accessibility characteristics, ii) human and physical resources, iii) various actors' access to resources, iv) prior production systems, competition, economic activity, and v) other external and internal conditions and measures.[11]

An analysis of the relationship between transport infrastructure and socio-economic development should therefore consider their mutual interdependence. Transport should not be studied in isolation or viewed as 'the' essential factor, but within its societal context. Accordingly, road investment is viewed as an enabler and a releaser in this study. While acknowledging all of the conditions above, section 2.4 focuses on accessibility characteristics and how accessibility is viewed from different perspectives.

[10] By factors Kagermeier includes; traffic, economy, technological level, individual decisions, standard of life, regional structure, politics, natural environment, social values and norms.

[11] The list of external and internal conditions is almost indefinite. They must be related to the area and problem in focus. Edwards and Steins (1998) mean that contextual factors define what is feasible in terms of the supply of products and services from a resource, and what is desirable, by establishing the demand factors.

2.4 Accessibility characteristics

Defining and measuring accessibility

When something is accessible it indicates that this something is possible to reach or get access to (Forsström 1999). As human existence and functioning is largely based on the ability to participate in activities, especially as activities and production are increasingly spatially distributed, accessibility is important. We have to 'be at places' and to 'be there on time'. In reverse, low accessibility is a problem.

Accessibility has received many definitions (see Pirie 1979, Geurs & van Eck 2001) and has, according to Rietveld and Bruinsma (1998), been [mis-]used in many different ways. Generally, accessibility is defined as the ease, the ability or a combination thereof, with which one place can be reached from all other places, or the potential of opportunities for interaction and participating in human activities in space, often measured in time and monetary costs or distance (Daly 1975, Mitchel & Town 1977, Beenhakker *et al.* 1996, Coyle *et al* 2000, Ali-Nejadfard & Edmonds 2000).

General accessibility may be calculated from a single location to all other locations in a region (cf. population potential). It can also be related to the geographical content of other areas in the study region: access to employment, markets, health facilities etc. (Ahmed & Hossain 1990). How many facilities are reached within a certain time interval? Others barriers that modify accessibility are income, ethnicity, class etc. Accessibility can also be measured in the percentage of a population within a given distance from a road, or tarred road quality. General for all measurements are to come up with an access ratio.

Hilling's (1996) definition is network-oriented. At one level it is related to connectivity, the number of links that must be traversed from a node to reach all other nodes. At another level it is the number of places where one can join the network, which is easier on smaller roads than on motorways.

Literature covering developing countries sometimes view accessibility from a basic human rights perspective, especially when applied to rural transport infrastructure (Vasconcellos 1997, Lebo & Schelling 2001). Basic access is defined as; *"The minimum level of rural transport infrastructure service required to sustain socio-economic activities"*. (Lebo & Schelling 2001:1). The approach gives priority to the provision of reliable, all-season access, to as many villages as possible, over the upgrading of individual links to higher than basic access standard. Lebo and Schelling stress that passability or reliability is one of the most important aspects of basic access among operators in developed countries. First priority is vehicle safety. Operators will often not travel if they consider a road impassable.

According to Forsström (1999), although dual interpretations of accessibility exists, the commonest point of departure is in people's conditions and activities in a physical setting, as within time-geography. Within time-geography, accessibility has, according to Hägerstrand (1974), at least two sides, one legal/social (age, ability to pay, occupation etc.), and one physical (the ability to command the transport facilities needed for reaching desired destinations at desired times).

Banister (1983) and Cullinane & Stokes (1998) also have the opinion that accessibility and mobility are inter-linked and must be addressed simultaneously. Mobility is the ability of an individual to move about. Operationally it can be divided into the number of trips made by all modes for all purposes, and the ease of movement, including personal characteristics and the availability of private vehicles and public services. The latter acts as a constraint on the first. As accessibility comprises the proximity to activities and the ability to move to these, it covers both the activity spectre and the mobility.[12]

Vilhelmson (1999) argue that mobility derives from people's needs and obligations to fulfil activities scattered in time and space, in part formed by their access to transportation networks. Others (Nijkamp & Reichman 1987, Nijkamp & Blaas 1994) view mobility only as a derivative of infrastructure supply, where the road (hardware) determines the locomotion and automotion (software).

To sum up, at its simplest definition, accessibility is the ease one place can be reached from another. It combines at least four elements: the location of a place within a region; the location within the region of the activities to which access is being measured; the freedom and/or constraints of individuals to decide whether or not to participate in various activities; and the form of the transport system.

For accessibility to play a key role in analysing transport infrastructure investment we must get a deeper understanding of it and apply accessibility in different contexts. In section 2.5, the final assessment of accessibility used in this study will be presented. Before we reach this stage however, the concept is elaborated a bit further. Accessibility should be related to inter- and intra-network accessibility, basic accessibility, relative accessibility, accessibility for whom and for what. These issues are dwelt on below.

Network accessibility

The primary purposes of building transport networks are to provide a physical base for transport systems and to be a part of a regional growth strategy (Forsström 1999). Irrespective of purpose, a common goal is to facilitate high accessibility. Therefore, in transport geography it is believed that spatial organisations and the distribution of human activities are effected by its transport system (road network, operational services), especially in theories based on accessibility.

Transport systems deliver services to producers of goods and services in a society. In a spatial perspective they are, more or less, concentrated to places. These places, or nodes, have different geographical locations. The nodes are connected to a network through links, roads. A certain number of nodes in certain locations can be linked in numerous ways and form various network constellations (see e.g. Bunge 1962 for a review). A completely

[12] Törnqvist (1996) refers to accessibility and mobility as range and reach. Range is the technical scope, the possibilities to transport goods, people, and messages offered by various transport means. Reach is dependent on an individual's biological and mental capacity, the ability to include the surrounding world in a mental sphere of interest. Törnqvist does not include other opportunities (income, age etc.) that affect individuals' mobility. Other related concepts to accessibility, such as proximity, availability, affordability, are dealt with but not focused on in the text.

connected road network is one where all nodes are linked with each other. In such a network the ability to participate in activities and for goods to move around is, theoretically, ultimate if other accessibility attributes are met. Thereby, a network has connectivity qualities. Variations are related to the extent links in a network are connected. Thus, connectivity can be described for the total network, or different parts thereof.

Intra- and inter-network accessibility

While a national/regional transport network is a system on one level of an urban system, the central places (nodes in a place system) with their internal transport network are subsystems on a lower level. As roads traverse geographical boundaries, networks overlap each other. On the one hand, transports in the overall network are dependant on the conditions in the internal place networks. On the other hand, transports to and from the respective places are influenced by the overall network conditions. Each central place region has its internal network (and activities: good and service production, consumption, intraregional transports), while interregional links connect and integrate regions. In this sense, we can distinguish between inter- and intraregional networks (Johansson 1993).

Banister and Berechman (2001) argue that a network consideration is needed, where each project is considered within the framework of a local, regional or even national network. For growth to occur, it must be the result of improvements at the network level, not at the single project level. The growth effect can be very different when a project links two disjointed networks than to add a link in an established network. According to Rietveld (1995), the qualitative aspects of connectivity between peripheral areas and the entire country have received little attention. Interconnectivity, broadly defined as the potential access to all relevant nodes in a network, includes the physical distance friction, and the quality and structure of the entire network. The internal quality of the transport system in a region must be combined with the external in order to measure the full extent of accessibility to the region. If concentration falls on the accessibility of major gateways, the real constraint on development, internal access to those gateways, is lost. Penalties can be introduced where network discontinuities are present. To take barriers in the landscape into account when modifying measures of accessibility was noted by Ingram (1971).

In line with the above, Johnson (1970) stressed that rural areas with poor development in developing countries need three types of roads to generate development: i) commuter roads to carry daily traffic to and from work and to allow for the clustering of the population into villages, ii) farm-to-market roads to permit access to district markets and avert monopolistic conditions, and iii) truck roads allowing areas to obtain goods and services from other areas. Johnson shows that the problem is not only a matter of providing roads, but foremost to provide connections between networks.

Mabogunje (1981) has a similar view, stressing that transport, as an instrument for moving goods within a country, cannot be regarded as neutral in respect of its development or national integrative effect. The ideal sequence model (see Taaffe *et al.* 1963) of transport notes only the growth in network density and volume of traffic on the major routes. It misses the fact that a major weakness of colonial and neo-colonial transport systems is

poor interlinkages and intermodal connections. To further strengthen the links between the major routes is to further strengthen spatial disparities.

The record of rural areas and villages not connected by roads in developing countries is long (Carapetis *et al.* 1984). Transport infrastructure and services in many former colonized countries have a combination of organic and hierarchical networks. The latter was implemented by the colonial administrations, such as the roads and railways built by the British in India, the Dutch in Indonesia, and the Americans in the Philippines (Corpuz 1999). Long-distance routes, built for modern transport and transport of goods from the hinterlands to ports for export, were imposed on traditional networks and trade patterns (Hoyle & Smith 1998). A large part of the economy and many areas were not connected to this network. Thus, the development potential was differentiated in terms of areas' accessibility to these networks (Slater 1975, Ullman 1980a, Simon 1996, Hilling 1996).

Thus we are, in reality, dealing with several networks at the same time when studying the geographical outcomes of road investments. The level of accessibility between these networks influences and shapes the location, efficiency, productivity, reliability of activities, and people's potential to participate in activities. Through an analysis of the levels of inter- and intra-network accessibility, we can better analyze the importance of accessibility between households/individuals and services and workplaces, and production (sectoral disaggregation) and market sites. This is a central precondition in this study.

Road characteristics

In line with the discussion on network accessibility, it is important to identify the network segment attributes. According to Thomas (2002), it is widely recognized that some roads in a network are more important than others, such as trunk roads. While motorways make up a small share of the total length they very often concentrate economic activities due to higher capacity (Hilling 1996). As these roads usually connect bigger cities and markets, it is important to have good accessibility to these roads. However, whether this benefits the local community is questioned by Tsunokawa and Hoban (1997).

Forsström (1999) stresses that road standard, capacity, bearing, connectivity, passability and trafficability are important in studying accessibility. Trafficability has bearing on the speed a vehicle can be conveyed. Passability is the ability to use a road at any time. Capacity measure how many vehicles can use a link under optimal speed without this resulting in congestion and below optimal speed. Bearing is the maximum allowed weight for the fully loaded heaviest vehicle to use a particular road. Low bearing on a link excludes certain vehicles. If still used by heavy vehicles, it results in severe road and vehicle deterioration. Taken together, their levels give the conditions that shape a road's, or a section, maximum traffic potential, speed, load capacity, and transport costs.

Others (Nijkamp *et al.* 1994, Howe 2001) note that infrastructure performance is less and less a matter of quantity, while reliability and journey time are becoming more important. Empirically this was noted by Malawian women stressing that due to potholes in the roads leading into the urban centre, both public and private transport operators withdrew services

(Narayan *et al.* 2000b). Instead, they had to walk to work or stay at home. Carapetis *et al.* (1984), found a correlation between the type and quality of infrastructure and the type and quality of transport services in rural areas in developing countries. A common problem here is that villages are dis-connected. *"In isolated tropical communities, an all-weather road passable in the rains tends to be seen as the key to much else"*. (Narayan *et al.* 2000b:76).[13]

Basic access

More recently, the basic access approach (see page 22) to rural transport infrastructure has emerged again as a key issue. It gives priority to the provision of reliable, all-season access, to as many villages as possible, over the upgrading of individual links to higher than basic access standard. According to Lebo and Schelling (2001), rural transport infrastructure, or rural transport network, is the rural road, track and path network on which rural people perform their transports, including walking, transport by non-motorised and motorised vehicles and haulage and transport of people by animals. Rural transport infrastructure includes intra- and near-village transport networks as well as the roads providing access to higher levels of the network. Once again, it is common (JICA 1999) to acknowledge the connection of rural roads, and the rural road network, to major arterial (distribution) roads, leading to urban areas and major markets.

Lebo and Schelling also consider the provision and affordability of transport services, the availability of other means of transport, passability throughout the year, and the location and quality of these services. According to this view, roads have the ability to work as enablers, but roads are *not enough*. Rural households spend considerable unproductive and wasted time on transport activities. The basic access approach is considered in this study.

Accessibility and rural peripheral areas

Defining rural areas depends upon whether attention is directed to economic, lifestyle, demographic, and/or geographical criteria (remoteness from urban centres) (Moseley 1979). Rural areas are also often referred to as peripheral. Giannopoulos and Boulougaris (1995) note that being on the periphery usually means low development, depopulation, few economic opportunities, and low productivity of production forces. Philip *et al.* (2001) note that peripheral areas have other common problems, such as physical distance, accessibility to services, and the dominance of primary production activities. However, due to peripheral areas' non-homogenous characteristics, there is a great deal of diversity.

Geographers have traditionally defined peripherality as a spatial phenomenon. It has been defined in terms of distance from centres of social, political and economic activity, even when this meaning is imprecise (Philip *et al*. 2001). Its imprecision mainly stems from a focus on central place concepts of core-periphery, where the latter is too aggregated and does not allow for differences within an area or that peripheral places are found both in urban and rural environments. Spatial peripherality is linked to, but not necessarily the

[13] Mazlumol-Hosseini (1991) found in his Philippine study that the vehicle type used depended, mostly, on village location and the quality of the road connecting the village to other nearby rural areas and towns.

cause of, economic and social peripherality. Spatially peripheral areas may be economically and/or socially affluent.[14]

Peripheral is also interpreted as inaccessibility (Keeble *et al.* 1988), often quantified by some variant of market accessibility, but also to suppliers, other services and information. As such, the level of accessibility determines the locational advantage of an area relative to all areas. A deficiency is that Keeble *et al.* use geographical regions and measure the accessibility by a given transport mode to a specific node that is representative of the region, and thereby do not consider the spatial continuation of accessibility. For Vickerman (1998), spatial peripherality implies discontinuities (missing links, physical barriers) that affect the economic organization and market structure in peripheral regions.

Taken together, peripheral areas share certain characteristics, such as:

- Transport infrastructure provision is poor. Roads connecting networks are lacking, in poor condition, have low capacity, and/or are hampered by physical barriers. But, as noted by Banister (1983), the level of accessibility is also unequally distributed in rural areas, both between and within individual locations.
- Transport costs' share of total production and trade costs are 'unrealistically' high (Limão & Venables 2001). The transport sector is also characterised by high time consumption, low load capacity, and irregularity and insecurity.
- The above works as a disincentive for production and participation in activities. As a result, the market area is small and local markets' and firms are unlikely to emerge. Instead, goods and services are scarce and expensive, and markets and production systems are protected. Low competition is common.

Absolute vs. relative accessibility

The causal power of the network as a system is, according to Forsström (1999), little understood. Altered accessibility in one part of a network has implications on overall accessibility. Given the indivisible characterisitic of a network, accessibility is continuous in space and brings about different levels of accessibility between locations. Therefore, not only absolute levels of accessibility, but also relative levels must be considered when studying transport infrastructure investments.

Only when a region's relative accessibility is influenced markedly or when a region gets considerably improved intraregional transport standards towards other regions can the regional competitiveness and attraction change (Van Gent & Nijkamp 1987, Lundqvist 1996, Vickerman *et al.* 1999, Black 2001). A simultaneous improvement in central and peripheral regions does not necessarily benefit the latter. According to Janelle (2004), the impact of higher-order linkages enhances the strategic position of some areas and diminishes that of others. It also changes the entire spatial form of the economic system by altering the functional distances between places. Invariably, transport improvements tend

[14] Economic perspectives on peripherality tend to be linked to concepts of economic development, competitiveness and comparative advantage, while a spatial component is not readily apparent.

to be greatest in those areas and between those places that already possess high economic status. These places converge most significantly in time-space.

Accordingly, we are at loss if we treat accessibility as a uniform concept. Owing to roads' indivisibility, an area must be divided into units where the relative improvement of each unit is set against others.

2.5 Inter- and intra-network accessibility; its influence on socio-economic development on different geographical levels

In order to achieve a more balanced perspective on how transport infrastructure investments influence socio-economic development impacts and how such impacts are geographically distributed within peripheral areas and among different groups, the problem should be placed in a local context. The operational definition of accessibility should be broadened in order to give it local relevance.

Different levels of accessibility are expressed on a wide spectrum of transport conditions (cost, time, reliability, flexibility, load capacity, safety). For accessibility to play a key role in analysing transport infrastructure investment, we must distinguish between inter- and intra-network accessibility, different forms of basic accessibility, relative accessibility, and differences in demand. Local accessibility is attached to activities within a community, while the activities at regional centres are dependant on regional accessibility. These concepts enhance the hierarchical structure of the community.

The above accessibility conceptions have implications on production system organization, productivity, service outlets, investment, labour markets, competition, and people's ability to participate in activities. This affects employment opportunities, incomes, transport demand etc. They are an expression of the conditions for societal transformation.

The assessment of accessibility in this study – an operational concept

In this study, accessibility is assessed as; *the ease with which people/goods can interact with/reach other places and activities, and the ease with which this can be done, in terms of time, cost, passability, connectivity, and transport services provided.*

Following the assessment above, accessibility can be applied and used as an analytical tool to measure impacts when absolute and relative inter- and intra-network accessibility change due to road investment. As accessibility differs among users and activities, passenger and goods transport means are included.[15] Sacrifices, travel and waiting times, and vehicle operating costs, and fares are also included. The less the cost of transport, the more places that can be reached within a certain budget, the greater the access.

[15] Moseley (1979) argues that to say that a village enjoys a certain level of accessibility is to summarize much too crudely the position of various socio-economic groups [or firms] within the same village. The measure of accessibility, to be useful, should reflect this. It is the spatial dimension of accessibility with which we are concerned, but the score-sheet that we use should have social dimensions.

Passability, connectivity and transport service include the optimum mode of conveyance for the access (truck, walk), seasonality and frequency of access, and whether there exists a link between a location and the network exists. As to passability; the ease that a place can be reached is low where roads cannot accommodate all vehicles and where a road or a section thereof is not passable throughout the year. Also, different road types allow various speeds. Connectivity follows an operationalization of accessibility put forward by Rietveld and Bruinsma (1998:38). A node has access to a network if a link exists. It deals with physical barriers, such as the need to use ferries when bridges across rivers are absent.

As to transport services; the ease with which a place can be reached is low where transport services are poor in terms of departures, operators, means, and regularity. Traditionally, reference has been made to the role of physical infrastructure, while the transport services that affect the mobility of users has been largely ignored (IFRTD 2003). From a rural peripheral context it is easy to qualify transport service. To borrow the words of Moseley:

> *"Generally they* [those applying conventional transport models in a rural context using derived demand models] *subsume measures of the difficulty or unpleasantness of making trips into a generalized cost function which includes (in the case of public transport) the fare paid, the time spent walking to and from the route, time spent waiting and travelling, etc. …But in the rural context the duration of the trip is a relatively small consideration: much more important is whether the trip is possible at all!"*. (Moseley 1979:55).

My inclusion of operational services takes it departure (influenced by Moseley 1979, Handy & Niemeier 1997, Vickerman 1998) from an opinion that a main accessibility problem in peripheral areas is lack of choice, such as destination, mode, route, frequency, reliability and timing. Vickerman (1997; 1998) argue that a measure of accessibility emphasizing aspects of choice is more likely to represent a genuine measure of economic welfare, especially when applied to individual economic actors and/or regional economies, instead of measures of accessibility to a region. Owing both to different economic sectors and the differences between freight and passenger transport, very different accessibility landscapes depending on the specific needs can be revealed.

Some studies are focused on accessibility indicators calculated for cities or aggregated regions represented by their key nodes, but ignore the fact that accessibility is continuous in space (Vickerman 1997, Vickerman *et al.* 1999). To move beyond simple accessibility-potential models, variations in mode quality on different links and to measure the connectivity of a region to interregional transport networks should be added, allowing for variations in the quality of transport within and between regions.

The way of assessing accessibility in this study is becoming increasingly accepted (van de Walle 2002, Halden 2003, Reneland 2004). According to Reneland, there are several forms of accessibilities, depending on who you are, how and when you travel and between what start- and goal-nodes you travel. Van de Walle (2002), when studying inaccessibility, accounts for the existence of passenger and freight transport services, access to different levels of roads, and whether commune-level road runs through the commune.

Accessibility and socio-economic development

In this study socio-economic development is understood as expanded participation in economic activities through the creation of a system that draws more people into production and trade, increase incomes so that more people can buy basic goods, save and invest, and get access to services necessary to improve their lives. In rural peripheral areas it is about transforming [subsistence] agriculture and other rural sectors into employment- and income-generating elements of the national economy. As such, development is, on the one hand, about economic growth, and, on the other hand, about distribution.

Transport investment can reinforce socio-economic impacts and cause spatial disparities to increase or decrease when levels of accessibility change. While benefits may accrue to all places, relative benefits vary, given roads' indivisibility. The level of accessibility to trunk roads and urban areas influences spatial outcomes. If places find themselves in a situation where their accessibility to transport services and transport costs worsen relative to the population average, then these places' households and firms are less able to participate fully in social activities, production and consumption. While improved accessibility does not assure these places' inclusion into society, it makes it easier to achieve (but not necessarily positive for all due to increased competition). The intraregional distribution of impacts can be understood when relative transport costs vary due to transport investment.

Thus, transport infrastructure has enabling qualities, a releasing role, and may speed up a socio-economic development process. From a local perspective, the relative level of accessibility after a road project is central, especially if the local road network is linked to the wider network (and markets, population centres) by only one accessible road. While acknowledging the importance of all road types, if the improved road is a trunk road, the scope of impacts may be more extensive. On village level, accessibility to an area's main urban centre and to the road linking the study area with the wider network is of central importance. The level of inter- and intra-network accessibility on regional, local, and sub-local levels influences production and resource utilization through marketing costs.

Accordingly, accessibility must be dealt with on several geographical levels. We must acknowledge that we are in reality dealing with several inter-connected networks (and parts thereof) where accessibility is continuous in space. Measures of disaggregate levels take different locations' accessibility within an area into consideration.

Inclusion of different forms of Basic Accessibility

To bridge the gap between theory and practice, levels of inter- and intra-road network accessibility need to be classified in order to function as an analyzing tool. To do this, the concept of basic accessibility is included. *Basic Accessibility* is here assessed as: *Sufficient road standard and capacity for present demand, with reliable all-season accessibility for all means of transport, with limited periods of inaccessibility.*

Transport network is the rural road, track and path network where people perform their transports with motorised or non-motorised vehicles. It includes intervillage transport networks and roads providing access to higher levels of the network. The latter may

include municipal and provincial urban centres and markets. The approach gives priority to the provision of reliable, all-season access, to as many villages as possible, over the upgrading of individual links to higher than *Basic Accessibility* standard. The assessment of *Basic Accessibility* stems from my opinion that passability and reliability throughout the year are central aspects of accessibility. It also includes operational transport services, the provision and affordability of services, and the choice of modes.

Thereafter *Basic Accessibility* can be widened and add *Substantially Below Basic Accessibility*, *Below Basic Accessibility*, and *Above Basic Accessibility*.

- *Substantially Below Basic Accessibility* is assessed as: Road standard and capacity is substantially below present demand. No motorized accessibility within one kilometres of a household or village throughout the year and/or suffering from a missing link.
- *Below Basic Accessibility*: Road standard and capacity is below present demand. Motorized accessibility with interruptions during substantial periods of the year.
- *Above Basic Accessibility*: Road capacity above present demand. Reliable all-season accessibility for all means of transport.

Disruptions in passability are central as it is severely affected by weather conditions, especially in environments with difficult weather conditions and in particular when coinciding with a poorly developed road network. Depending on the road's initial standard and capacity, its passability will differ in various degrees. Roads that under 'normal' conditions are passable with all vehicles may have a low passability during heavy rains. It results in the fact that four-wheel vehicles, especially trucks, cannot make use of the road. When these weather conditions continue for a long period (e.g. monsoons), the road's passability deteriorates further. Not just during the time period when weather conditions are difficult, but also after as the road surface could have been wiped out or been severely destroyed. Heavy rains also result in mudslides etc. on roads crossing mountain ridges.

The situation described above can result in the fact that production and people's participation in activities are reduced to a minimum or come to a standstill. Self-sufficiency production may be practiced from time to time when export and import costs are unproportionally high in comparison to other areas. Here the transport operator's extra maintenance costs and costs of shouldering delays are passed on to producers and customers. It becomes very difficult to compete with other producers on the market and participation in activities is brought down to a minimum and only includes essentials, such as a visit to a hospital.

From the discussion above I stress that *Basic Accessibility* must be attained, both from an intra- and inter-network accessibility perspective, in order to achieve socio-economic development. It is a necessary condition. The condition is not achieved if the level of accessibility falls short of *Basic Accessibility*. If, on the other hand, both intra- and inter-accessibility exceed *Basic Accessibility* it will have no effect, other than that future demand of transport services is covered/mortgaged. However, the latter can influence the relocation of firms and economic activites and/or the establishment of new firms.

Except for the network accessibility, the road investment type, extent, road segment attributes, and the location of a project also influences the impacts. Further, an area has its own spatial extension where organisational, socio-economic, and geographical contexts are dispersed. Impacts are related to access constraints and opportunities to other resources, such as other infrastructures, individual assets, physical and human resources, education and knowledge, socio-economic status, institutions, initial competition and competitiveness. Finally, external conditions and measures (government policies, demand, prices etc.) influence impacts. The level of interaction and timing of factors influence the level of impacts. The transport-development relationship is both time-and place-specific.

2.6 The tools for the evaluation and analysis of the distributive outcomes

In conclusion, the relevant concepts in this study are *inter- and intra-network accessibility* (regional, local, and sub-local), *Substantially Below Basic Accessibility* through to *Above Basic Accessibility*, and *relative accessibility*.

The distributional outcomes on various geographical levels and among actors stemming from transport infrastructure investment are not well known. Too seldom the distributional outcomes reach below the national or region level. Following Wilson (1966), if economic growth is really a question of people, aggregative approaches miss the essence of the process of development and the individual responses. A more disaggregated approach gets closer to reality, to the way people live, behave and react in specific circumstances. After all, socio-economic activities take place in particular locations, industries and occupations, and with a particular set of social contacts.

To understand the distributional outcomes on more disaggregated levels, we should apply *Substantially Below Basic Accessibility* through to *Above Basic Accessibility* in an intra- and inter-network perspective. This also identifies the relative improvement in accessibility between places in times of road investment. It is of central importance for the distributive outcomes, owing to the fact that road infrastructure is indivisible and accessibility is continuous in space. Accordingly, some places, populations and resources are more accessibile than others.

To the best of my knowledge, no comparative empirical study has used accessibility as it is assessed here as an analyzing tool when studying distributional outcomes of socio-economic development impacts stemming from a road investment, especially in a rural peripheral area in a developing country.

Chapter 3

The Famy-Infanta national road project

3.1 Introduction

The decisions and objectives behind the Famy-Infanta national road project and the effects the project had on the study area's intra- and interregional network accessibility are presented and analysed in this chapter. It also discusses how the project was related to developments taking place within the agriculture sector, including fishing. The issue of whether the road project aimed at rural development and/or national interests are briefly discussed. The chapter is based on secondary material.

3.2 The inter-connecting qualities of the road and the conditions within the area of influence

Northeast Quezon province is connected to the industrial and population core, Luzon Island, by one accessible road only, the Famy-Infanta national east-west lateral road (see map 4). The road is a link in the arterial road network. It forms part of the main trunk line system and it provides interconnection to the north-south backbone. The road has, given that it connects urban areas, regionwide and interregional traffic movements.

With to poor road quality and low inter- and intra-network accessibility in the country in general, the 63 kilometres long Famy-Infanta road was no exception from the general case. Before 1995, heavy rains, causing mudslides and poor surface conditions, made the road dangerous and impassable, sometimes for weeks. These conditions severely restricted transport services to and from the study area. Between 1993-1995 (April) the road underwent considerable improvements through the 5th Asian Development Bank-financed road improvement project (ADB/DPWH 1998).

The road starts by traversing the flat terrain of Famy (see map 4) in an easterly direction for three kilometers before reaching the west foot of the Sierra Madre mountains. From there the road ascends and traverses the Sierra's through rough terrain and a winding route. At 15 kilometres the road gradually descends, passing a minor valley at 22 kilometres and then passes through a steep mountain side-slope down to near Pacific Ocean elevation at Tignoan river valley. There the road crosses the river at a new alignment, the site of the new bridge in Tignoan. From thereon, the road runs along the coast through Real municipality and eventually ends up in Infanta municipality's urban centre, Infanta town.

The impact area of the road, which also defines the study area, is located along the Pacific coast. Manila and Lucena City (provincial capitol) are located 145 and 132 kilometres from Infanta town in a west and a south direction respectively (see map 4). The study area has a long history of being peripheral due to physical barriers and poor land transport conditions. The Sierra Madre is a barrier in the west, the Pacific in the east, and the river

Agos, without a bridge connection, divides the two municipalities that make up the study area in the north.

3.3 Road characteristics before and after project implementation

Savings in money and time from transport infrastructure investments are realised through shortened road length, reduced curvature and grade, upgraded surface type and condition, widened roadway, improved security measures, pavement design, and increased axle load requirement.

Due to a long history of overloading, mainly of lumber trucks, pavement design and axle load requirements for future traffic were of great concerns in project proposal as a means of preventing surface destruction (DPWH 1989, ADB 1996). Pavement and axle load studies in 1985 showed that legal weight limits were exceeded in 33 % of the cases by two-axle trucks and 70-80 % by trucks with three axles or more (ADB 1996:17). Of weighed vehicles, 24 % still exceeded the legal limits in 1995 (Ibid 1996).[16] Therefore, total project costs increased from an estimated 240 million pesos in the late 1980s, to a final sum of 670 million (DPWH 1989:I-1, ADB/DPWH 1998), equivalent to eleven and almost 23 million US$ in 1989 and 1997 respectively.

A major constraint to the capacity along the road was the mountain section, especially the narrow width around curves, the low bridge capacities, and severe alignment. Water crossings are the most essential intervention to secure basic access (WB 2001a:45). Bridges included three temporary and two old steel bridges with weight restrictions not exceeding six tons. Some streams had to be crossed by fords. As a result, travel speed was low. The situation worsened during bad weather conditions.

The Famy-Infanta road characteristics ***before and after 1995*** is presented in table 3.1

Table 3.1: Famy-Infanta road characteristics before and after project implementation.

Road characteristics	Before 1995	After 1995
Road classification	National	National
Road surface	Gravel	Asphalt
Road condition	Poor to very poor	Good
• 0 – 2.2 km.	fair to poor	
• 2.2 – 35.2 km.	bad to very bad	
• 35.2 – 60 km.	fair to poor (1980s) – bad to very bad (1990s)	
Pavement configuration:	–	80 mm. AC, 170 mm. base, 150–180 mm. subbase
Width (meter)	4–6	6.1 + 1 m. shoulders
Alignment	Very severe	Severe
Curves	468 with severe curvature	178 curves straightened

Source: NEDA 1982a;b, DPWH 1989, ADB/DPWH 1998.

[16] Overloading is a general problem on all road types, but of special concern is heavily loaded lumber trucks on small roads with a gravel surface (Vägverket 2003).

Accessibility between the local network in the study area and the regional network improved considerable after the road project. Improvements followed those expected from such a project, considering its initial conditions (NEDA 1987). Travel way and shoulder were widened, and the road body was strengthened. This, together with drainage, slope protections, and the straightening of curves enabled faster and cheaper transports, increased passability, and improved comfort and safety throughout the year for all types of vehicles. It also allowed a much higher vehicle load capacity.

3.4 Road project objectives

Objectives

One type of road planning is where the DPWH identify a project and perform a feasibility study that is approved or not by NEDA. Large projects, often externally assisted, are prioritised in this manner. The Famy-Infanta road was such a project.

Investment decisions and objectives are influenced by political, economic, military, and administrative considerations. The road project was surrounded by much uncertainty. During the 1970s and 1980s there were plans to build a highway between Manila-Infanta, the Marikina highway (NEDA 1982a;b). The highway was considered a development road, and the study area would serve as an important agriculture resource base for Manila's growing population (NEDA 1977). Flows in the other direction were not expected to be great. The highway was also expected to divert traffic from the Famy-Infanta road. Therefore, maintenance was insufficient and the road condition deteriorated and traffic declined. In 1989, when it was decided to proceed with the road project, there were three main objectives:

- to reduce transport constraints to enable more efficient goods and passengers movements,
- to stimulate the economy through faster, cheaper and more frequent transport services,
- to enhance the accessibility of rural people to markets and social services and facilities (ADB/DPWH 1998).

Traffic surveys and an estimation of the local economy were conducted to enable engineering and economic analysis and to project impacts in a with and without road project scenario. The economic internal rate of return had to be at least 15 %, including vehicle operating costs, maintenance and time savings, and development benefits, such as employment and incomes (12 % if excluding development benefits and time savings) (DPWH 1989:I-4). The survey estimations were favourable.[17] Access to social services was mentioned but not dealt with in length, neither before nor after project implementation. The zone of influence was almost solely dealt with in relation to Metro Manila. Lucena City was not mentioned.

[17] A decrease in cost arising from an additional monetary unit spent on increasing the capacity of the transportation network can be compared with the rate of return for expenditures from other investments to access the wisdom of making more (or less) money available for transport system improvements.

Rationales behind project objectives and zone of influence
In the Philippines National Road Improvement Project Report it is stressed that:

> *"The Famy-Infanta road is very much a development road which connects the east coast to the rest of the Luzon Island through the connection to the national highway system, and sets free the previous isolation due to the Sierra Madre mountain range. To ignore development benefits is to put this project at disadvantage, and ... passengers value their time"*. (DPWH 1989:VII-7, 11).

The quotation indicates the low accessibility in the study area and its peripheral character. The agriculture sector, making up a lion part of the local economy, was expected to benefit from the project (DPWH 1989). Especially the fishing sector was expected to grow when accessibility to Manila improved. Increased selling prices for farm goods would induce farmers to increase production and reduced farm input costs would enhance production and productivity. As incomes increased this would generate demand for products, services, and transport. Generated traffic, mostly passenger, was assumed to last five year after project implementation. The zone of influence from the road project was widely defined:

> *"The zone of influence of a road from the development point of view is an area within reasonable travel distance of the road. This area is expected to enjoy benefits greater than those accruing to people from the broad traffic catchment area. The latter can be very large depending on the overall nature of the road network. The actual extent of the development zone of influence is difficult to demarcate"*. (DPWH 1989:A-111).

It can be questioned what *'within reasonable distance'* is, or what is meant by *'impacts are felt at a considerable distance from a road project'*. While a major development impact was assumed to affect the agriculture sector, the fishing and rice-farming subsectors was expected to benefit most. But, this conclusion was aggregated, as it was supposed to include a large majority of the study area's households. No household survey was performed to shed light on benefits and benefits among different groups. For example, which groups within the fishing communities would benefit or would not benefit?

Viewing the road as a way to influence economic development in the area was contrary to the view of the government's main planning body, NEDA (1982a:I-7-8). NEDA meant that lower transport costs, expected in regionally integrated economies, would, in general, not compensate for the economies of scale available with large-scale, high volume operations in national production centres. As the country functions as an integrated unit with Manila as the hub, other islands, excluding its immediate neighbourhood, function as resource sub-regions. Long-distance road freight movements mainly have Manila as the main origin/destination.

However, NEDA also stressed that efficient inter- and intraregional economic linkages should be supported. While the rehabilitated and improved arterial network would easily handle the future interurban traffic, new roads that penetrated areas with agricultural potential were desirable. Still, these roads would not bring rapid and radical changes in the quality of economic activities in the regions affected, nor have any substantial direct

impact on income distribution between and within the region. The most immediate impact assumed was a considerable increase in personal movement.

3.5 Summary

The Famy-Infanta road project improved the study area's inter- and intraregional network accessibility considerable. Through this improvement, opportunities to trade, participate in activities, and increase production and productivity improved. The allocation of funds to the project was based on economic considerations. Viewed from a national perspective, only taking societal economic efficiency impacts into consideration (reduced transport costs, money and time, and travel safety), the road project investment was beneficial. Capital devoted to the road was more valuable than if it had been assigned to some other activity. Seen from a capital outlay perspective, the road project was a substantial one. Especially when considering that the investment took place in a developing country and that the zone of influence was a rural peripheral area.

Before the overfishing in the Philippine waters set in and a shift away from traditional farming areas had started, there was complementarity between Manila and the study area, but also intervening opportunities (where to get foodstuff from cheap and fast) and low transferability. As the demand for foodstuffs, especially fish, in Metro Manila and its adjoining industrial cities increased and overfishing became rampant, the distance from where fish supply could be drawn depended on the speed and reliability of the transport service. From this national perspective and given that the Pacific Ocean is not overfished (but a future production site) the road project was essential to extract fish resources. As such, the study area was one solution to the supply problem. Outside areas' dependence on the study area as a food supplier has increased.

While the agriculture sector, in particular the fisheries, was believed to benefit from the road improvement, no household or economic sector survey was performed in order to identify its distributional outcomes. That is, who were benefiting and who were not. Accordingly, and following the objectives preceeding the road project, it is important to assess these outcomes.

Chapter 4

Infanta and General Nakar municipalities

4.1 Introduction

This chapter introduces and outline the conditions the two study municipalities had, before and after the completion of the Famy-Infanta road project. This is important to understand when studying the distributive outcomes of impacts that have taken place. Focus lies on the municipalities transport system and levels of accessibility levels. Also, a historical and contemporary profile of their physical and human resources, theirs key economic sectors, and the region wherein they participates and functions is given. As I believe a road project must be studied in accordance with the specific conditions of an area and that resources are unevenly distributed, geographical outcomes are better understood if disparities are identified. The chapter is based on secondary and primary data from household respondents (HRs), key informants (KIs) and passenger transport operators (PTOs).

4.2 Location, physical barriers, and distances

The study area is located between physical barriers in northeast Quezon province (map 4). Both municipalities are located behind the Sierra Madre mountain ridge in the west and the Pacific Ocean in the east. Nakar borders Infanta in the north and the river Agos divides the two municipalities. Real municipality and mangroves borders Infanta in the south. Distance from Infanta town to Manila (national capitol), Siniloan (regional trade centre), and Lucena City (provincial capitol) are 145, 60, and 132 kilometres respectively. From Infanta town to Nakar urban centre, Poblacion, is four kilometres. So, given that transport conditions are sufficient, the study area is located relatively close to Manila in terms of travel time. Being located between the Pacific and the Sierra's there are no dry months and the area is often hit by typhoons as it belongs to the country's typhoon belt. This has repercussions on agricultural production and industrial location.

4.3 Development of transport routes – connection to the wider space economy

While the level of accessibility to Manila has been important for all area's socio-economic development since the arrival of the Spaniards, to reach the study area has not always been easy. Physical barriers and poor transport conditions have restricted movements. But to characterize the study area as a self-sufficient agriculture enclave without trade relations is to simplify. Trade has taken place, but been restricted.

Its peripheral location, physical barriers, closeness to the Pacific, small population, and its livelihoods has influenced transport route development. The development and changes in transport routes in the study area from the late 19th century until the late 20st century is dealt with in this section. It also illustrates the development of the local economy and the production patterns usually arising in peripheral areas protected from outside competition.

The Spanish, Japanese, and American era

As the Spaniards founded Infanta in 1696, raw material trade has a long history. In the late 1870s, Chinese mestizos traded in coconut oil, the most important goods at the time. The oil was shipped south along the coast at least once a week to Atimonan and Mauban and thereon to Lucena City and Manila (see map 4) (Infanta EP 1999). Copra, corn, cacao and honey were also traded, but not rice, the main staple food crop.

Movement in a westward direction took place in 1879. A Frenchman that arrived in Siniloan from Manila by crossing Laguna de Bay by boat proceeded from thereon by horse across the mountains to reach Infanta (see map 4). Perhaps a road between Siniloan-Manila did not exist or was disadvantageous to sea transport. The population of Infanta was around 10,000. After staying around one month, three images of Infanta remained with the frenchman: i) the area's isolation due to its physical geography and poor infrastructure, ii) the dependency on boats for passenger and goods transport, and iii) the continuous rain which overflowed streams and made roads impassable.

Coastal trade increased in the early 20th century as the Manila Transportation Company operated a steamship during the 1920s and 1930s, servicing Infanta, Mauban, Polillo, and Baler (Corpuz 1999). Due to this and the fact that the Americans built a railway south from Manila, Lucena City became an important regional fishing port and agricultural trade centre. This trade pattern was present until World War Two.

People also used the sea route to Mauban, then transferred to bus for Atimonan or Lucena City. A household respondent (hereafter HR) attended high school in Atimonan in 1925 (HR No. 60, Infanta town 2001). It was cheaper and more convenient than to Manila, which required either a two days walk to Famy and from thereon bus to Manila, or travel through Mauban to Lucena and from there to Manila. The boat from Infanta to Mauban departed daily (passenger capacity above 100) and took 6 hours. The bus between Mauban-Lucena City took 2 hours and between Lucena City-Manila 3 to 4 hours. Thus the shorter land route to Manila took around 2½ days, compared with 12 hours using the combined sea and land route.

Lucena City's trade position was reinforced through the construction of the South Luzon Express Highway, connecting Manila with Legazpi City in the southern part of Luzon Island. By means of this highway its importance as a regional urban centre and a terminal station grew (Corpuz 1999). Lucena's role strengthened further during the 1970s through regional medium industrial development strategies.

Construction of the Famy–Infanta road: diversion in passenger and goods transport

The Famy-Infanta road was built by Americans mainly between 1923-1928, but did not open for traffic until 1936. Old respondents remember travelling in a westward direction by motor vehicle at this time. In the earlier days, no service existed. Within Infanta town horse-carts were used for passenger and goods transport. There were no roads that led to the surrounding villages. In 1938, Tayabas Bus Company started a daily service, though not during rainy season, to Manila. It lasted at least until 1940 as one respondent

remembers travelling to Manila for the first time in 1940 at the age of 13 (HR No. 78, Infanta town 2001). Two vehicles could not meet on the road. During the Japanese occupation between 1941-1945, traffic was restricted. Only the Japanese transported supplies. This continued until after liberation because respondents remember walking to Famy after 1945 (HR No. 2, Dinahican 1999, HR No. 33, Lual 2001). This also had to do with the bombing of the bridge across the river Tignoan.

On maps from the early 1950s, the road to Infanta is classified as an unpaved 2nd class highway (Ullman 1960). While AT-bus serviced Manila in the late 1940s, Batangas Laguna Transport Bus serviced Manila at the end of the 1950s. Despite being a highway, travel time was a minimum of 12 hours, one way, indicating the poor road condition. But this did not deter people from applying for work and purchasing goods in Manila. The bus departed early in the morning and arrived late at night. The building of a highway also indicates that the study area was an important resource depot. Passenger demand itself was not sufficient to motivate the building of such a road as the population was below 20,000.

The diversion of the copra trade, traded in as long as remembered, and of passenger traffic from sea to land continued, but volumes was low. Infanta was a small retail and distribution centre in the 1940s. *"Traffic to those centres was so small that it did not register in the traffic-flow counts,…"*. (Ullman 1960:214). During the 1950s, diversion towards the road continued, due to money and time saving and less spoilage. The previous combination of sea and land routes included many on/off loading before reaching the final destination.

In early 1960s, private trucks were introduced in Infanta, mainly owned by Chinese mestizos. *"I travelled to Manila for the first time in 1967 at the age of 54 in Mr. Go's cargo truck"* (HR No. 60, Infanta town 2001). Manila people financed the trucks. Thus, capital from outside stimulated the local economy. New opportunities emerged, especially in logging, as the road could accommodate trucks. Until the late 1980s, lumber transport made up more than half of all truck movements, indicating the economy's dependence on demand from outside. During the 1960s, small-scale fish trade started as well.

The 1980s and onwards

Between the 1960s and early 1980s bus services were interrupted from time to time due to low profit margins. Instead jeepneys, with higher margins facilitated services. In 1981, a bus company started a service to Manila. No other operator was interested (PTO: OB1, Infanta town 1999). In 1992, another company started to operate the same route. But due to using too small buses, the good reputation of the older company, jeepneys' ability to operate despite landslides, and higher operating costs, the new operator could not compete and pulled out in 1994 (PTO: OB2, Infanta town 2001). In 1993, one bus company started a direct bus link to Lucena City. Earlier another company had services to Siniloan. From thereon passengers transferred to buses or jeepneys destined for Lucena City.

Poor road conditions restricted human activities until 1995. Between 1993-1995 the Famy-Infanta road underwent considerable improvement, whereby the study area's regional road accessibility improved substantially, from a situation *Below Basic*

Accessibility to one *Above Basic Accessibility*. Hence, it took almost 60 years before the study area had an access link in good condition and with high capacity to the wider network and to major urban centres and markets.

4.4 Intra- and intermunicipal transport networks and services

This section outlines the patterns, scope, and condition of the intra- and intermunicipal transport networks and services. The study area belongs to a wider network made up of two separate, but connected, networks, the regional and the local. In the regional network, the Famy-Infanta road links the study area, the local network, with the remaining parts of Luzon Island. In the local network serving the municipality, provincial and village roads connects points of production in the villages to the local urban center (Infanta town) and the Famy-Infanta road (figure 4.1). An accessibility index for the villages is established. It is used to analyse the distributional outcomes of impacts from improved road accessibility.

Road network patterns and network accessibility

Infanta intramunicipal network accessibility is relatively high. The road density is high and the connections of its 33 villages to Infanta town are good. The network consists of two national, 10 provincial, 86 village roads, and 12 municipal streets (all within Infanta town). The Famy-Infanta national road enters Infanta in the west and ends in the southeast at the Pacific Ocean, linking Dinahican fishing port to the network. Provincial and village roads branch off the national road and connect all village centres. At village level, the network is made up of tracks, trails, and bridges, connecting neighbourhoods to the village centre. Rivers and creeks, not used for transport purposes, traverse almost all villages.

Nakar's size, few big population centres, and physical barriers in north-south (e.g. rivers), restrict the growth of Nakar's network. Long distances make the connection to Poblacion and inbetween villages expensive. In the south, around Poblacion, roads stretch in three directions. One towards the Pacific, another westward along the river Agos. A third road has a circular form, starting and finishing in Poblacion. Nakar is disconnected from Infanta. There is no bridge connection across Agos, despite promises since 1956 (HR No. 31, Poblacion 1999). The provincial road (see figure 4.1), that is supposed link Nakar to the national road and to Infanta is not functional in practice. Neither is there a coastal road, connecting the 60 kilometres between south and north. Sea transport must be used.

Due to topography Nakar has more than a 100 rivers and creeks running in a west-east direction, restricting connection between villages as few bridges exists. Rivers function as passenger and goods transport routes, mainly for illegal logs, down to the river mouths where unloading to big boats takes place. But transport on rivers is dependent on water bearing capacity. It causes problems during the rainy season when rivers are over-flown, as well as during drier periods.

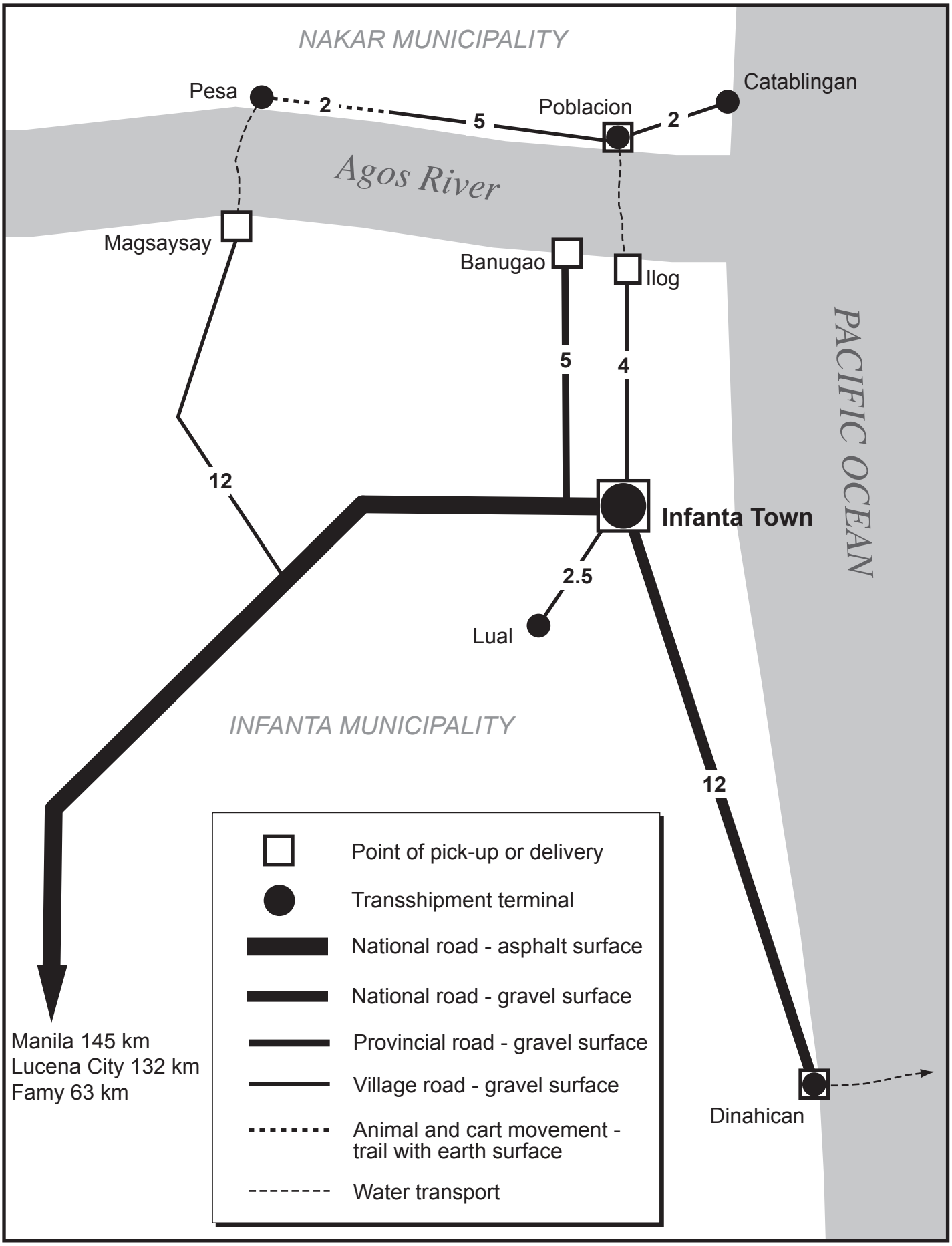

Figure 4.1: Intra- and intermunicipal network connections, including study villages and urban centres in 2001. *Source:* Author's fieldwork.

Road network expenditures, length and surface paving

As private sector investment in the road sector in the Philippines is negligible in general and in rural areas in particular, the local governments shoulder the expenditures. While almost no funds were allocated towards the transport sector before 1997 in Infanta, Infanta local government's transport sector expenditures have mainly been allocated through the municipal economic development fund since then (for details, see appendix 1). Transport sector expenditures were very high between 1997-1999, and high but declining between 2001-2004. Contrary to the national average where local government spending in transport contracted compared to before the early 1990s (Balisacan & Hill 2003), the opposite was true in Infanta. Even though no disaggregated data exist before 1991, the poor investment record between 1991-1996 indicates this. However, expenditures are insufficient as the road network deteriorates faster. There is no expenditure data available in Nakar.

With additional financial responsibility through the local government code in 1991, road investments are affected, especially in cash-strapped peripheral rural areas. Where funds to upgrade roads are to be raised can be questioned. Deterioration has reached levels where the local governments ability to cover costs and technical skills is not possible. Investments are also dependant on priorities. While the local tax base grows, theoretically, as the population increases, a large majority belongs to groups exempted from income tax. As such, these people contribute little to revenues, but still demand social services.

The municipal agriculturist applied for, but did not receive, funds through the national Department of Agriculture in 2001 to gravel 21 kilometres of earth roads, many not passable during the rainy season (Key Informant 1, Infanta 2005 – hereafter KI). The National Irrigation Administration's maintenance in 2004 was funded by the national government (KI2, Infanta 2005). No private or private-public road project has been implemented. Being rural and agricultural makes it difficult to attract private capital. The DPWH is, from time to time, engaged in the last 12 kilometers of the Famy-Infanta road, connecting Dinahican with Infanta town (KI3, Mauban 2005). 200 meters was concreted in 1999. Work started again in 2001. In 2005 approximately 6 kilometres is covered.

Network length and road surface condition

Both Infanta and Nakar road networks are characterised by a large share of village roads and an overall poor road surface condition (see table 4.1).

Table 4.1: Road network length and road surface pavement in Infanta and Nakar (Km. & %).

								Village road surface %		
Mun.	Tot Km.	National Km.	Provincial Km.	Village Km.	Paved %	Gravel %	Earth %	Con-crete	Gra-vel	Earth
Infanta	211	61	38	112	15	67	18	8	76	16
Nakar	60	0	11	49	–	30	60	n.d.	n.d.	n.d.

Source: Infanta and General Nakar MAR, various years.

Despite Nakar's larger size, Infanta's road network is one and a half times wider. Since 1988, only 12 kilometres of roads have been built in Infanta. Village roads make up a huge share of total network length, especially in Nakar. As there are no national roads in Nakar the network is not part of the national backbone of arterial roads.

While road surface condition is poor, the condition is much better in Infanta. Total paved surface increased to 15 % in 1995 due to the road project. Between 1995-1998, 36 roads were partly paved with concrete, regraveled, maintained, or rehabilitated (Infanta MAR 1995; 1996; 1997, KI4, Infanta 1999). One third of the road length was classified as having 'good' surface condition, regardless of pavement and road type. The remaining had fair, poor, or very poor conditions. Despite poor surface condition, village roads in Infanta were classified as having all-weather standard, a road passable throughout the year, in 1999, except during extreme weather conditions (Infanta EP 1999). But this did not define whether all the roads were passable with trucks throughout the year, most likely not. The only improvement in Nakar was the graveling of the Poblacion-Catablingan road in 1999.

Bridges

Owing to the many rivers and creeks in the study area, bridges are crucial for the establishment of an integrated transport network. In 1998 there were 71 bridges in Infanta, but only 22 in Nakar, despite the more than 100 rivers and creeks (General Nakar EP 1998, Infanta EP 1999). While a little less than half of all bridges were passable without any remark in Infanta, half of the bridges were timber footbridges, not able to accommodate heavy vehicles and loads. Around 90 % of the bridges, a majority of them being timber bridges, were impassable in Nakar.

Operational transport services

Tricycles, carrying six passengers and load, dominate land transport in Infanta and Nakar. Thirteen tricycle associations service all villages from Infanta town. Jeepneys service Infanta town–Magsaysay and sporadically to Dinahican. Two tricycle stations are located in Nakar's Poblacion. Few need to walk long distances in order to embark upon a tricycle, as most houses are located close to the village road. Timetables do not exist. Busy service hours are from 6-10 a.m. and from 2-6 p.m. The association policy is that a tricycle should be full before departure, but it varies in practice. After 6 p.m. chartering is common.

Owing to many nodal and modal splits, the villages in Nakar are disadvantaged vis-á-vis Infanta villages in terms of travel time and costs (see figure 4.1). Tricycle transports from the study villages in Infanta go directly to Infanta town without any modal or nodal splits, while those traveling from Pesa and Poblacion must change two times (one way) before reaching Infanta town and those traveling from Catablingan must change three times.

While the distances from, for example, Dinahican and Catablingan to Infanta town are 12 and 6 kilometres respectively, maximum travel time to Catablingan is 70 minutes longer back and forth (see table 4.2). This deters participation in other activities. "*We cannot cross the river Agos during the rainy season. This results in a situation in Nakar where people with money stock goods and sell at high prices*". (HR No. 38, Catablingan 1999).

There are boat services all around the clock across the river Agos during normal weather conditions. In 2001 Agos could be crossed from three service stations, down from four in 1997. The fourth station disappeared during a flood. One crossing accommodates four-

wheeled vehicles, but it is expensive. It cost 50 pesos/one way to transport an owner type jeepney across Agos in 2001 (HR No. 27, Poblacion 2001). Since 1996, motorized boats are available from two stations, but when currents are strong Nakar is still disconnected, sometimes for weeks. Transport is also possible by boat along the coast, but low demand and weather conditions result in high costs and infrequent departures. Sea transport is restricted to Infanta. A ferry service between Dinahican and Polillo Island started in 1998.

Road investments' implications on intra- and interregional network accessibility

In table 4.2 below, each village's physical and operational transport attributes and conditions in 2001 are outlined.

Table 4.2: Physical and operational transport attributes and conditions in 2001, distributed by villages.

Vill-ages	Road & water links*	Main road class	Connect Famy-Infanta rd.	Km. to Infanta town**	Km. to main link ***	Road quality/capacity (main link)		
						Surface / surface condition	Width (m.)	Passability to Infanta town: months / with trucks
IT	8 & 0	Nat.	Yes	–	–	Concrete / Good 100 %	6.1	12 / Yes
Din.	1 & 1	Nat.	Yes	9–12	0–3	Gravel / Good 40 %	6.1	12 / Yes
Ban.	2 & 1	Prov.	Yes	3–5	0–0.1	Gravel / Good 30 %	6.1	12 / Yes
Lual	4 & 0	Vill.	Yes	2.5–4	0–0.5	Gravel / Good 40 %	4	12 / Ltd.
Pob.	3 & 2	Prov.	No	5–6	0–0.2	Concrete / Poor	4	Ltd. / Very Ltd.
Cat.	2 & 0	Vill.	No	2–4 / 6–8	0–0.5	Gravel / Fair	6.1	Ltd. / Very Ltd.
Pesa	0 & 1	Vill.	No	7–8 /12–15	1–1.5	No road / No road	-	Very Ltd. / No

Vill-ages	Effective tricycle travel time Infanta town (min.)	Available transport services	TC passenger fares Infanta town (pesos)		Transport costs Agos river (pesos)	Load time tricycle (min.)	
			Min.	Max.	TC & MC /Passenger	Min.	Max.
IT	–	TC, OB, MB, Jeepney	–	–	–	–	–
Din.	24	TC, Jeepney, Ferry	15	–	–	10	25–30
Ban.	10–12	TC, Canoe	9	–	–	5–10	30–45
Lual	10	TC	6.5	–	–	10–15	60–120
Pob.	18	TC, Canoe	10–14	17–21	35 & 10–13 / 3–10	5–10	15–45
Cat.	28	TC	20	27	35 & 10–13 / 3–10	3–5	30–60
Pesa	30–35	Canoe	16	19	25–35 & 10–15 / 2–5	15–30	60–120

IT:Infanta town, Din.:Dinahican, Ban.:Banugao, Pob.:Poblacion, Cat.:Catablingan., Nat.:National. Prov.:Provincial. Vill.:Village. TC:Tricycle. OB:Ordinary bus. MB:Minibus. MC:Motorcycle.

* Number of road links, passable with four wheel motor vehicles connecting the village.

** Distances from Catablingan and Pesa are for Poblacion and Infanta town respectively.

*** Minimum and maximum distances from houses within the village to the main village road.

Source: Author.

The villages with best physical and operational transport attributes and conditions were in ranked order: 1. Infanta town, 2. Lual, 3. Banugao, 4. Dinahican all in Infanta, followed by 5. Poblacion, 6. Catablingan, and 7. Pesa. The last three villages are all located in Nakar. Based on the findings in this chapter and chapter 3, in table 4.3 the study area's, the municipalities', and the villages' level of inter- and intra-accessibility before and after the completion of the road project are classified following the assessment of *Substantially Below Basic Accessibility (SBBA), Below Basic Accessibility (BBA), Basic Accessibility (BA),* and *Above Basic Accessibility (ABA)* outlined in chapter 2.

Table 4.3: Level of intra- and interregional, -municipal, and -village road network accessibility, before and after 1995, distributed by study area, municipalities and villages.

	Study area		**Infanta**	**Nakar**
Period	Intra-/interregional	Intermunicipal	Intra-/interregional	Intra-/interregional
Before 1995	BBA	SBBA	BBA	SBBA
After 1995	ABA	SBBA	ABA	SBBA

	Infanta villages*				Nakar villages**		
	Infanta town***	**Dinahican**	**Banugao**	**Lual**	**Pobla-cion*****	**Catablingan**	**Pesa**
Period		Intervillage	Intervillage	Intervillage		Intervillage	Intervillage
Before 1995	BA	BA	BA	BBA	BBA	SBBA	SBBA
After 1995	BA	ABA	ABA	BA	BBA	BA	SBBA

* Towards Infanta town. ** Towards Poblacion. *** Intravillage accessibility.
Source: Author.

Accessibility improved considerably in the study area after the road project. In particular, Infanta's interregional accessibility improved substantially, reaching *Above Basic Accessibility* after the road project compared to *Below Basic Accessibility* before. It certainly contributed to Infanta's improved opportunities to make use of its resources. Improved accessibility from Infanta villages to Infanta town and to the national road contributed to this.

In comparison, Nakar's intermunicipal and -regional accessibility was still *Substantially Below Basic Accessibility* after the road project through its disconnection from Infanta due to the lack of a bridge connection across the river Agos. This, together with an underdeveloped local road network, contributed to Nakar households' opportunities to make use of their resources were much more dis-advantageous, despite the fact that access to physical resources were, at the outset, similar between the two municipalities.

Following the discussion in chapter 2, the changes in accessibility outlined in table 4.3 are of central importance when analysing the distributional outcomes of socio-economic development impacts since the completion of the road project in the remaining chapters.

4.5 Physical resources

Land classification and land use

While natural resources cannot be affected by road development per se, they influence land use and resource allocation. In this way, they determine the economic development potential. Soil fertility can determine the potential to make use of a road project, increase and/or diversify production.

Infanta's 34,276 hectares are located in the centre of its sub-region. The eastern and northern parts are low-lying plains, while the west and southwest are hilly and mountainous. The latter covers around 60 %. Nakar is almost three times bigger. Most of the land area is, except from a narrow coastal plain and the river valleys, mountainous with high slopes.

Farming, especially rice-farming, is suitable in Infanta. Good rainfall and temperature (PAGASA, Infanta 1998), fertile soils and abundant fresh water favour Infanta. High slopes, limited arable land and fertile soils are restriction in Nakar. One third and 15 % of

Infanta and Nakar areas respectively are classified as alienable and disposable. Fertile soils covers 16 % of the land area in Infanta, while only 1 % in Nakar. Three quarters of the total rice-land, 4,900 hectares, in Infanta is irrigated, while only 13 % of Nakar's 2,200 hectares. Agos River Irrigation System, established in 1959, serves 23 Infanta villages (KI3, Infanta 1999). Despite abundant water resources, Nakar communal system covers only 11 villages. Most of them are located in the municipality's southern parts.

The forest is the major resource in Nakar. Out of 135,000 hectares 126,000 are classified as wood and forestlands (General Nakar EP 1998:2-18). More than 80 % is second growth forest and the remaining is primary forests located at the top of mountains and steep slopes. Wood and forestlands covers only six hectares in Infanta. Coconut cultivation covers 5,200 hectares in Infanta and 4,800 in Nakar.

Bordering the Pacific Ocean, the area is adjacent to rich fishing grounds, the Polillo Strait and Lamon Bay. Offshore fishing in the Pacific is difficult and requires big vessels. Infanta has the advantage of being situated in a sheltered embayment, while Nakar suffers from a straight coastline unable to give shelter to big fishing vessels and a fishing port. The coast also gives opportunity for the development of tourism.

4.6 Human resources

Population, household size, and population origin

The population of both municipalities is growing fast (see table 4.4). Infanta had a growth rate of 5.5 % between 1995-2000, making it the second fastest growing municipality among Quezon province's 41 municipalities (NSO 2002).

Table 4.4: Total population and average household size 1990–2000, distributed by municipalities.

	Infanta		Nakar	
Year	Total population	Average household size	Total population	Average household size
1990	35,300	6.1	18,000	5.4
1995	39,700	n.d.	21,100	n.d.
2000	51,000	5	23,700	5.2

Source: General Nakar CLUP 1998, Infanta CLUP 1999, NSO 2002.

The urban population in Infanta (made up of Infanta town and three adjacent villages) was 19 % in 1995. Between 1990-1995, the urban and rural populations grew 0.6 and 2.7 %/year respectively (Infanta EP 1999:II-18). There are two urban settlements in Nakar, Poblacion and four villages in its vicinity, and Umiray in the north.

The growth in Infanta is a result of high fertility rates and the physical resources that have attracted migrants (Infanta CLUP 1999:II-9). Business, trade, and production opportunities since the road project have reinforced this attraction. Finally, the status of Infanta town as a service, trade, and educational centre in north Quezon province further reinforces this. While giving a potential for big consumer and labour markets and tax revenues, it also puts pressure on expenditures and resources.

Education opportunities and levels

The population in Nakar has a disadvantaged position vis-à-vis the Infanta population concerning education. Of the total population in Infanta, 13 % against 4 % in Nakar had either attended college or had finished college up to graduate and post-graduate level in 1995 (General Nakar EP 1998:5-11, NSO 2000). In Nakar, half of the population above the age of five had only elementary level or had finished elementary school. Almost 10 % had not been to school.

There are 17 elementary schools, five high schools, and two colleges in Infanta, while there are 27 elementary schools, five secondary schools, and one high school in Nakar. Elementary schools are distributed among the villages. High schools and colleges are mainly located in the urban areas. The two colleges were established in 1983 and 1993. At the private college the number of students increased from below 200/year between 1994-1996 to around 350 between 1997-2001 (KI5, Infanta 2001), excluding 1998. At the public college students increased from between 180-190 in 1992 to above 500 in 2001 (KI6, Infanta 2001). At the private college, Infanta students constituted 71 % to 85 % between 1994-2001, while Nakar students only 5 % to 8 %. At the public college, students from Infanta made up almost 90 % between 1990-2001, while Nakar students only 3 %. Nakar's situation compared to Infanta is disadvantageous in terms of human resources.

4.7 Employment patterns and economic structure

Employment statistics are not kept on a regular basis in Infanta or in Nakar. Owing to the natural resources available in both municipalities, it may be assumed that a huge share of the work force would be employed in the primary sector. However, it must be remembered that the Philippine bureaucracy and government sector is quite extensive. Table 4.5 shows sector employment in 1995.

Table 4.5: Sector distribution of employment 1995, distributed by municipalities and Infanta villages (No. & %).

	Infanta		Infanta	Dinah-	Banu-		Nakar	
Sector/subsector	No.	%	town %	ican %	gao %	Lual %	No.	%
Primary	5,932	45.0	6.0	64.0	30.0	56.5	4,879	75.0
Farming	4,637	35.0	5.5	5.0	29.5	56.5	2,793	43.0
Fishing	1,295	10.0	0.5	59.0	0.5	–	345	5.5
Forestry	–	–	–	–	–	–	1,738	26.5
Secondary	1,819	13.5	18.5	9.5	38.0	9.0	269	4.0
Manufacturing	670	5.0	4.0	3.0	34.5	2.5	132	2.0
Electricity, gas, water	73	0.5	1.5	–	0.5	–	12	–
Construction	1,076	8.0	13.0	6.5	3.0	6.5	125	2.0
Tertiary	5,480	41.5	75.5	26.5	32.0	34.5	1,352	21.0
Trade	1,374	10.5	24.0	11.5	4.5	4.0	334	5.0
Services	4106	31.0	51.5	15.0	27.5	30.5	1,018	16.0
Total	13,241	100	100	100	100	100	6,505	100

Source: General Nakar EP 1998: 6–15, Infanta EP 1999: IV–13.

The agriculture sector plays a dominant role in the study area, especially in Nakar. A majority of the workforce is employed in this sector. The tertiary sector is almost at par with the primary sector in Infanta, but its importance varies between villages. The

secondary sector, while showing huge disparities between municipalities and villages, has a minor role. Official employment data can be criticised. Data most likely only include the household primary income source. For example, six percent of the households in Infanta town are registered in farming. Data in this study show that the households in Infanta town are engaged in farming to a much larger extent, although not as a main income source. Also, a study among rice-farmers in two Infanta villages showed that 80 % of the households had additional incomes (Olsson 1999).

Agriculture sector (farming, fishing, forestry)

Infanta depends to a large extent on rice farming for its livelihood and is a major producer. Irrigated rice-lands constitute 7 % of Quezon province's irrigated rice lands, and in 1995 Infanta's palay (unmilled rice) production made up almost 9 % of Quezon province total palay production (PPDCO 1998, KI1, Infanta 1999).

Out of 36 villages, 33 are engaged in rice farming. Despite small landholdings and high tenancy rates, most rice-farmers in Infanta sell some produce. Yields are higher than the national average. Some villages are extraordinary in terms of high intake of inputs, access to credits, better infrastructure etc. (Olsson 1999). Corn and vegetables are other seasonal crops. Coconut, and to a lesser extent fruits and bananas are the main permanent crops. Infanta is self-sufficient in vegetables during dry months, but not during the wet season. Livestock and poultry breeding are largely done on a backyard scale for local consumption. There is no meat processing and Infanta has a deficit in beef production.

Rice is the main crop in Nakar and the municipality was more than self-sufficient at the end of the 1990s. Contrary to Infanta, over 60 % came from non-irrigated lands and 38 % came from upland rice. Coconut is the leading perennial agricultural crop. The municipality is dependent on outside resources for vegetables, fish, and meat.

Weather is a problem in both municipalities. Due to typhoons, farmers harvest only twice a year, while farmers west of Sierra Madre, being sheltered by the mountains, up to three times. El Niños affects the agriculture economy and the farmers. Food prices remained quite stable during the El Niño in 1997 as NFA rice imports kept down prices for the urban population (Datt & Hoogeveen 2003).[18] The relative stability of the price of rice, despite a substantial reduction in production, meant that the incomes of farmers that were adversely affected by El Niño declined.

Fishing

In the future, an increasing share of Philippine's fish production is expected to come from the Pacific Ocean. As such, the location of the study area makes it interesting. In Infanta 11 out of 36 villages are fishing villages, while there are nine out of 18 in Nakar. Dinahican is the dominating fishing village in the study area. Fishponds, almost all privately owned, are found in 17 villages in Infanta. Before 1995, municipal fishing

[18] The government has monopoly in rice importation since the 1970s in the pursuit of its governance objective by managing and ensuring food security of the nation (Philippine Daily Inquirer 2001).

dominated in Infanta, while commercial fishing hardly existed. Commercial fishing is not practised in Nakar. Fish prices were kept from rising by the favourable impact of El Niño on domestic fish production (Intal *et al.* 1998). While fishing sector data is limited and inconsistent, table 4.6 shows some fishing sector characteristics in the municipalities.

Table 4.6: Fishing sector characteristics in Infanta and Nakar, excluding aquaculture and inland.

Characteristics	Infanta 1995	Infanta 2001	Nakar 1998
Fishing families	1,025	1,050	276
Fishing villages	11	11	9
Good fishing season	n.d.	March – October/November	March – September
Fishing grounds	Municipal and offshore	Municipal and offshore	Municipal
Motorised vessels	274	552	98
Non-motorised vessels	348	320	178
Commercial vessels	2	36–40	0
Fish processing industry	0	0	0
Fishponds (hectares)	1,177	n.d.	n.d.
Ice-plant	0	1	0
Fish port	1 (old – inadequate)	1 (new – adequate 2001)	0
Major markets	Infanta town, Manila	Manila, Lucena C., Infanta town	Municipality

Source: General Nakar EP 1998, Infanta EP 1999, KI1, Infanta 2001, Author.

Fishing operations are more widespread in Infanta and, given vessel sizes, more extensive in scope and volume. Accordingly, post-harvest facilities are available, fishing is practised during longer periods, and fish is brought to markets outside the study area. Due to physical geographical features, Infanta has a coastline that can give shelter to a fishing port and to big fishing vessels. The straight coastline in Nakar cannot offer such shelter. Except from fishing, the shore in Nakar has mainly functioned as a on-loading place for timber. Large vessels can dock near shore and take in cargo. Today, small-scale loggers transport logs by rafts, and fliches by pump-boats. Due to steep slopes and lack of capital, stationary fishery is rarely practiced in Nakar.

Forestry

Notwithstanding rampant deforestation in the Philippines, especially during the 1960s and early 1970s (Ross 2001), timber reserves in the study area were estimated to be sufficient, at least until the 1990s. *"But, in so far as stock of trees in Sierra Madre mountain is concerned, a considerable amount of logs still awaits to prospective loggers. Along the influence area of the project is a wide area where trees of different species are already suitable for logging"*. (DPWH 1996:3-9). And despite a very rough topography, high costs and the difficulty of extracting logs, Burley (1973) notes that closeness to and demand in Manila and export justified investments in logging in the Sierra Madre mountain ridge. Production costs, including transport, were lower than profits.

A logging ban was imposed in 1978 (DPWH/ADB 1998). The DENR authorizes logging and sawmill permits, and the transport of forest products are regulated by laws. No individual or company are allowed to cut hardwood trees, transport forest products, manufacture furniture or semi-finished wood products, or operate sawmills without a legal Certificate of Origin (KI7, Manila 2001). The certificate shows the origin of the lumber used in production. Without a certificate the production is illegal according to law.

Despite the log ban, logging is still ongoing (General Nakar EP 1998:6-3). It has been an economic driving force since the 1960s and involves many households and villages. Logging attracts people because it involves large money, fines are low, and timber export is corrupt (Remigio 1994, Montinola 1999, KI7, Manila 2001). Lack of any other income source is another reason.

Loggers are aware of forest degradation, but cannot afford to consider it as income is at stake.[19] As there is no official logging, production figures are not available. In Infanta, minor forest products like softwood, rattan, and bamboo support small-scale furniture makers and handicrafts. In Nakar, most logs go to export, transported directly to processors by sea. This harms the economy. While providing employment temporarily, exports deprive Nakar revenues in value added processing.

Secondary sector

The secondary sector contributes least to the economies of Infanta and Nakar. Its share of employment, 14 and 4 percent respectively, is much below the national average. Manufacturing in Infanta includes bakeries, hollow blocks making, furniture shops, rice-mills, boat building, furniture making and illegal activities. Manufacture in Nakar is almost non-existent. Small-scale processing of fliches, charcoal, boat building, and furniture making are present, but not officially documented. There are also rice-mills.

Why then this absence of rural industries in rural Philippines? Hill (2002) notes that poor rural infrastructures, the weak provision of industrial extension services, and an unequal rural income distribution contributes. Others sources (WB 1995) note the inefficient transport system while Serafica (2000; 2001) expensive electricity and low level of electrification. In a comparative study between the Philippines and Taiwan Ranis and Stewart (1993) found that electricity level and road network provision helped to explain differences in rural industrialization.[20]

Other factors restrict industrial development in the study area. Typhoons cause material destruction and harsh weather conditions in general result in unreliable electricity supply, sometimes for days (KI8, Infanta 2001). Others are high interest rates and no telephone communication until 1994.

Finally, historically, direct local consumption and export of agricultural products has left little room for value added accrual to the local economy. Import of most manufactured goods resulted in outflows of capital. Cottage industries mainly produced for the local market and did not attract capital from outside. Taken together it has resulted in high production and input costs, and unreliable deliveries.

[19] Commercial logging in Nakar was intensive and extensive until 1978, including five companies between 1972–1978. Four had timber licenses, authorised to cut approx. 150,000 cubic meters/year, but in reality cut only 100,000 cubic meters/year. There was one legal logging permit in Nakar between 2000–2001 (KI7, Manila 2001). Infanta has a selective log ban. Softwood and coconut tree logging is legal but restricted.

[20] Despite an improvement following the acute power shortage in 1992, high power costs continue to severely restrict industry's competitiveness (Madella 2005). In 2001, 76 % of the villages were electrified (Serafica 2001:2). But electrification of households is completely different.

Service and trade
Rural agricultural areas in the Philippines have traditionally been characterised by oligopoly markets (JICA 1999) with high farm-input prices hampering production. Merchants, usually coming from the big landowners, often control local markets. Processing and marketing of rice is also limited to a few actors, resulting in low selling prices for producers. The system is protected by low competition.

The service sector's importance for the economy and employment is substantial, especially in Infanta, where the sector employed 42 % in 1998 double that in Nakar. In 2001, very few service outlets were lacking in Infanta. The situation in Nakar is the opposite. Tourism has a huge potential and its importance is growing, but only in Infanta. Due to location, facing the Pacific, and improved accessibility, daily commuting from Manila is possible. The service sector has expanded and owing to its capacity it is likely it will continue to expand in the future and grow in importance, especially in Infanta.

Nakar's dependency on Infanta is large and priority from the provincial government is low. Nakar is considered to be a village at the bottom of the settlement hierarchy (General Nakar OHP 2006), being only a destination for eco-tourists. The public market, hospital and fire brigade in Nakar are not operating. Construction of a hospital started in 1995 but has not been completed. The police force is limited. In Infanta there is a wet and dry market. The new market, an initiative to strengthen Infanta's trade position, opened in 1999. There is one public hospital, 36 health stations and private clinics, a fire brigade, and a police force in Infanta. Nakar has one health center and 14 village health stations.

4.8 Other conditions and measures – their influence on the study area

The necessary conditions for local development to take place are several and difficult to achieve. Societal transformation takes place in a wider context, including many intricate relationships. The road project took place during a time when many sectors in the Philippine's had just gone through or were going through changes. For instance, the economic growth between 1993-1997 was relatively high. Also, the Asian crisis in 1997 affected the Filipino economy relatively little (Intal *et al.* 1998, Datt & Hoogeveen 2003). In this section those conditions and measures believed to be of importance are dealt with.

The telecommunication market
Communications are a way of getting information about market place prices, maintaining good relations and contact with business partners, family members etc. residing elsewhere. In 1994, a telephone system was installed in Infanta. Until 2001, three operators facilitated public calling centres.[21] Since 1996 private telephone lines were possible. The network is poorly distributed as line instalment is expensive and depends on location in relation to

[21] Before the Philippine telecommunications reforms in 1993 the industry was almost monopolized and services were very insufficient. The national telephone density rate for residential lines was as low as 3.5 % 1993 (Serafica 2000:8). Overall density grew to 9.08 % in 1998, but only 40 % of the installed lines were subscribed and highly skewed towards urban areas, particularly Metro Manila (Serafica 2001:4).

Infanta town and village roads. Between 1999-2001 there was one calling centre in Poblacion. It closed in 2001 when it burned down. There are telegraph services in both municipalities. In 2001, there were no internet or mobile phone connections. After the implementation of the telephone system, the flow of information and connection between people and firms improved considerable.

Bank sector reforms

To create new firms, and consequently jobs, access to capital is needed. In developing countries there is often a shortage of capital, partly due to the lack of financial resources and to the lending policies of the banks. Bank services also simplify money transfers between people and firms.

Historically, access to capital and financiers has been very limited in rural Philippines because of the lack of bank financing. Few households have had access to lendings from banks. From the early 1980s and continuing during the 1990s, the bank sector went through reforms (Intal *et al.* 1998). In 1993, the entry of domestic banks and bank branching was deregulated, and in 1994 the entry of foreign banks was made easier. As a result, the number of bank branches increased from 2,698 in 1990 to 6,745 in 1997.[22]

Before 1996, there was only one bank within the study area. It was established in 1972 in Infanta town. Since then a quite dramatic change has taken place within the bank sector (see chapter 8). There is no bank in Nakar.

Socio-economic networks – ties and bonds

Marketing, production, and consumption take place in wide social relations. In an ideal market system where poor transport, oligopolies, and an ineffective legal system do not exist, impersonal relationships between sellers and buyers are sufficient for commercial market transactions to work. However, if real conditions are considered, actors' reduce risks by building up a steady clientele instead of optimising profit from each transaction.

In the Philippines, socio-economic ties partly determine economic transactions. Such agreements, also known as the suki system, are common between traders and producers who habitually trade with each another, being one another's suki. The traders also extend credit. Since facilitating financial help can be risky, to minimise risks the relationship is also built on social and personalised non-corporate bonds, obligations, and trust. To be successful is a matter of acquiring as many suki as possible. Suki does not apply to any special person or role in the trade network. All sellers have suki from whom s(he) buys and sell. The system flourishes under monopolized or oligopoly production and trade systems. When costs are brought down and competition sets in, it withers.

[22] The rural bank system is comprised of few commercial banks, thrift banks, specialised government banks, and family-owned banks (WB 1995; 1996). The latter have played a significant role in the development of the rural economy. Unlike commercial and thrift banks, rural banks mostly mobilize and reinvest resources in rural areas. Rural bank development was largely spurred by large subsidized government funds during the 1970s and early 1980s. Subsidies were later removed, resulting in an advantageous situation for banks with stronger financial situations.

The copra industry – the decline of a world leading sector

Between 1975-1980, the Philippines exported 75 to 82 % of total world demand of coconut products, mainly coconut oil (Bunge 1983:146, Hawes 1987:56). The oil comes from copra, the dried coconut meat. While Quezon province is an important coconut area, the importance of copra has dwindled. In 2000, coconut products share of total export was below 1 %, down from 10 % in 1987, and the value of the copra oil export has declined since then (Krinks 2002:116, United Nations 1984:810; 1990:174; 2004:810).

Fluctuating copra world market and excessive processing capacity have resulted in large coconut areas being idle (Montinola 1999, Leinbach & Ulack 2000, Steinberg 2000, Krinks 2002). Copra is also pressured from substituting products, rising taxes in important markets, a monopolised market, and low productivity (Hawes 1987, Krinks 2002). The latter is a result of the old and low quality of trees, poor processing techniques at farm level, insufficient fertilization, and a tenure system with few incentives to innovate.

Despite this situation, copra is still an important income source and fluctuating prices have meaning when set in a human context. Around 14 million people in the Philippines derive some income from the coconut industry and between 40-80 % are considered poor (Steinberg 2000:21, Krinks 2002:117).[23] A majority of the small-owner operators make their living from small land units where incomes can drop 50 % during bad years. The situation for tenants and the landless labourers is worse.

Copra is still very important in the study area. Many families support themselves as copra farmers, especially in Nakar.

Overseas workers

Labour export as a government policy, mainly to earn US$ remittances and alleviate labour oversupply, dates back to the 1960s (Gonzalez 1998). In 2004 there were above 8 million Filipinos residing abroad (POEA 2006). In 2005 alone, remittances from overseas workers reached 10.6 billion US$ (BSP 2006). Average yearly remittance per overseas worker was around 3,000 US$ in 1994, while the GNP per capita was 989 US$ (Gonzalez 1998:75). Although remittances are very high in comparison, the initial investment for overseas employment is expensive. Most workers must put themselves in debt or sell assets just to aquire the capital needed to finance the application process.

At the household level, remittances are used for children's education, household expenses, unforeseen emergencies, property acquisition, business ventures, or savings (Gonzalez 1998). As many households get remittance, the value of the peso against the US$ affects spending and investments. The exchange rate of 1 US$ was between 24-27 from 1990 to 1996, while it increased to 41 in 1998 and to 51 in 2001 (IMF 1997; 2003).

[23] Coconut growers usually receive way below the selling prices at the markets and are withheld information of selling prices (UPLB 1991). According to Hawes (1987), the former is a result of copra passing through many hands and because farmers often receive payment in advance. Growers are also often tied to local traders. Withheld information is also tied to farm location. Areas with poor infrastructure and communications, are most severely affected.

While it is a minor factor influencing the number of overseas workers, the level of accessibility is important, as applicants are required to visit the agency often to process papers, attend trainings etc. Thereby, the application process is also costly in terms of time (Gonzalez 1998). In places with low accessibility where many are poor and few have relatives in cities where they can stay without payment, this process is more expensive.

Policy reforms in agriculture and agricultural trade

International and national measures affect agriculture production through trade regulations and government incentives. The third trade reform in 1986 included the removal of agricultural export taxes and the liberalization of fertilizer imports (FAO 2003). The latter resulted in a skyrocketing of prices since the early 1990s. Still, instead of competing with cheap imports by investing in an adequate transport system, domestic producers have been protected through high tariffs (FAO 2003, Intal & Ranit 2004). Under the World Trade Organization, tariff commitments for agricultural commodities have the highest rates of protection. Trade liberalization intensified during the 1990s (Mangabat 1998).

The agrarian reform community (ARC) program was launched in 1993. An ARC is a village or a cluster of adjacent villages where a critical number of farmers and farm workers are awaiting full implementation of the comprehensive agrarian reform program. ARCs were seen as growth points in the countryside (BARBD 1997). An ARC has access to i) social infrastructure building and strengthening, and ii) economic and physical infrastructure support services. The latter includes the provision of credit and physical infrastructures, investment and marketing assistance, and technology management.

In the study area, study village Lual and village Miswa formed an ARC in 1995. They were chosen because of the presence of agrarian reform beneficiaries, its combined size (221 hectares out of 279 are rice-lands), and its accessibility to Infanta town (KI9, Infanta 1999). Rice farming is the main income source (Infanta SEP 1995). Harvests average 8,000-9,0000 kilos hectare/year (Infanta ARCDP 1996:5). The ARC can be reached by most transport means. When the ARC was implemented the section-wise concreting of the village road and the improvement of feeder roads and footbridges took place.

4.9 Summary

The study area has a long history of being peripheral, mainly owing to very poor land transport conditions and the presence of other physical barriers. Accordingly, interaction costs with areas outside the study area have been unrealistically high and have, as a consequence, influenced production, consumption, trade, the level of competition, people's ability to participate in various activities, and information flows in negative ways.

There were several similarities between the municipalities, but even more differences. Both are agricultural with vast natural resources. Arable soils and fresh water are available in both municipalities, but to a larger extent in Infanta. Almost all riceland in Infanta is irrigated, while almost nothing in Nakar, despite huge water resources. Both are located

along the Pacific Ocean coast, but while the coast in Infanta gives shelter to vessels and a fish port, Nakar's coastline is straight and cannot give shelter. Nakar large forest resources are unproductive as long as the log-ban is under operation.

Infanta also outperforms Nakar in other resources, such as human resources, education facilities, transport infrastructures, road network conditions, government support, other infrastructures, public facilities, physical shape and feature etc.

The study area is located relatively close to Manila, the national centre. Despite this, poor transport conditions hampered human activities until 1995 when the improvement of the Famy-Infanta road was completed. As a result, the study area's level of accessibility improved, especially Infanta where interregional accessibility shifted from *Below* to *Above Basic Acessibility*. Likewise, its intramunicipal accessibility improved.

In comparison, Nakar's interregional and intramunicipal accessibility were still *Substantially Below Basic Accessibility*. The lack of a bridge connection across the river Agos disconnects Nakar from the regional network and Infanta. Nakar's sheer size put pressure on the connection of villages to the urban centre and connection between villages. Thus, the difference in accessibility between the municipalities increased in relative terms. It contributed to Infanta's improved opportunities to make use of its resources, while the opportunities in Nakar were much less advantageous.

The local economies in Infanta and Nakar have relied on and will continue to rely on the agriculture sector (farming, fishing, forestry) in the future. Resources are abundant and production conditions are favourable. Inadequate infrastructures, together with harsh weather conditions have restricted the development of a manufacturing industry in the study area and also put limits on agriculture production. The service sector has capacity to expand, especially in Infanta. Owing to its more favourable conditions, Infanta has opportunities to develop a more diversified economy in the future.

Other internal and external conditions and measures affecting the municipalities also give different opportunities. While each condition and measure is important in itself in various degrees, their interaction determines the scope of impacts, the pace and spatial outcomes. In some cases the road project most likely could not influence some sectors in any major way. Likewise, dependency on accessibility differs between sectors and actors. For example, the fishing sector is completely dependent on high accessibility to outside markets owing to fish being a perishable product. Others, such as furniture makers, rice and copra farmers and dealers are less dependant. Their goods can be stored and wait for higher selling prices.

Chapter 5

Data collections: methods and sources

5.1 Introduction

This chapter gives a presentation of how the empirical study has been organized and planned. Before this is done, section 5.1 contains a discussion about methododolgical problems that contributes to the poor understanding of the research problem in focus here. In section 5.2, I present my criteria for choosing the study area, the two municipalities, seven study villages, and almost 500 households and firms included in the empirical study. In section 5.3, I discuss the advantages and disadvantages of using different assessment methods. It also contains a discussion on the complicated relationship pertaining to causality and the relationship between direct and indirect socio-economic impacts.

Section 5.4 outlines my methodological approach and my choice of analysis method. Section 5.5, present the methods used to collect data. They include questionnaires, key informant interviews, a manual traffic counting survey, transport network inventories, and official documents. Alltogether, almost 1,000 questionnaires and interviews were performed. The data and information from these sources make up the basis for answering the four research questions. Finally, in section 5.6 issues concerning fieldwork, authorization, usage of an interpreter and respondents are dealt with briefly.

Studies of transport infrastructure investment impacts, including the economic conditions in a study area before and after project implementation, are very rare (Weisbrod 2000, Vickerman 2002). Pre-studies are most common despite the fact that they do not check the accuracy of appraisal after a project is completed and in use. Thus, there is a lack of consistency in the methods used to analyse economic development. The results are not universally accepted as such studies give insufficient attention (or excluded altogether) to unique local conditions that can affect the nature of economic development opportunities (Weisbrod 2000). Instead, impacts are exclusively related to a road project, either due to the difficulty to identify, select, include or exclude other conditions in the analysis and/or the assumed inherent capacity of transport as a societal transformation factor.

Neither is the distribution of benefits and losses well known, and they have often been neglected in project appraisals (Adler 1987). According to Leinbach (1995), poor understanding of transport needs, the social and economic impacts, and distribution is partly related to inherent problems with income data collection in developing countries. It is why few transport investment impact studies study the effect on incomes and their geographical distribution. The shortcomings of modelling human reactions, of considering socio-economic cultures, and of responses departing from assumed behaviour (from a western perspective) are additional problems (Leinbach 2000). There is also a resistance to use quantitative and qualitative methods jointly, and to include several research units on various spatial levels (Grant-Muller *et al.* 2001). This chapter also deals with how some of these problems have been dealt with and partly circumvented.

5.2 Selection of the study area and the actors

How to choose a region to study a particular problem has always troubled geographers. Ullman (1980a) thought of regions as working tools to reach a goal related to spatial analysis. Researchers working with small areas are often accused of only being able to see discrepancies while geographers working with large areas are accused of producing aggregates and general statements. The latter have, according to Hägerstrand (in Carlestam & Collbe 1991), left out the regional variations. Models of human behaviour, either as individuals, members of a household, or as a company owner, over space have been almost entirely oriented towards mass probabilistic behaviour.

> *"Nothing truly general can be said about aggregate regularities until it has been made clear how far they remain invariant with organizational differences at the micro-level"*. (Hägerstrand 1970:144).

These large aggregates are often presented without explicit statements about the assumed social organization and technology that exist at the micro-level from which the individual tries to deal with his situation.

A third option, chosen in this study, is to seek a middle ground where the largest valid region for a specific purpose is sought, but one that does not average out significant differences. The choice stems from a belief that universal laws are difficult to establish and instead of generalising on a too aggregated level we can, following Hanson and Hanson (1993), contribute with small-scale qualitative and quantitative studies of human behaviour in specific spatial contexts.

Despite the fact that it is acknowledged that regions and areas are heterogeneous in their character, regions are commonly divided between the homogenous (uniform) and the nodal (functional) (Vanhove 1999). The former is characterized by similarity in one or several criteria, a dominant economic base or production structure, physical or cultural conditions. A problem related to homogenous regions is that most regions usually contain both rural and urban areas. The latter is defined on the basis of the spheres of influence or trading areas of a certain place, most commonly cities, and usually fluctuates with city size. According to Williams (1984), there is also an administrative type of region where it is possible to collect general data on the basis of administrative areas. In a comparative study we need data from the areas chosen to compare impacts.

The choice of region in this study follows the homogenous and the administrative. While acknowledging that it is difficult to identify a homogenous region of the size such as the one chosen here, the region is partly homogenous due to its predominantly agricultural production orientation and similar physical resource endowments. It is also homogenous in terms of climate. I am aware that the administrative region in itself also includes a nodal (functional) perspective, since any administrative region has one, or several, urban centres, as well as a concentration of major road links.

Northeast Quezon province

A region with a history of poor transport conditions, only accessible by land through a road that had undergone major improvement, was sought. Also, the region should be natural resource based and located far from major markets. Northeast Quezon (map 2-4) province matched those criteria. It has a long history of being peripheral due to poor road conditions. The Famy-Infanta road, the only accessible road connecting the area, underwent improvement from 1993 to 1995. It improved the study area's level of interregional network accessibility to *Above Basic Accessibility*.

Several physical barriers have also contributed to northeast Quezon's province peripheral character and the study area's production system. It is located behind the Sierra Madre mountain ridge, a river without bridge connections divides the northern part, and the eastern part borders the Pacific Ocean. The area is rich in natural resources and the climate is different to that found inland. Being sandwiched in between the Pacific and the Sierra's there are no dry months and the area is frequently hit by typhoons and tropical storms, severely affecting production. Taken together, northeast Quezon province has a long history of *Below Basic Accessibility* to the remaining parts of Quezon province, the country's major economic centre, Metro Manila, and to the industrial towns in the provinces of Cavite, Laguna, Batangas and Rizal (see map 2 and 4).

Municipalities

A homogenous region may be composed of several more or less distinctive homogenous sub-regions. While the larger homogenous region is characterized as agricultural, different types of agriculture may dominate within the region. Also, a homogenous region may be scarcely populated, but there may be one or only a few urban centres.

A Philippine municipality is defined as a political corporate body, endowed with the facilities of a municipal corporation, exercised by and through the local government in conformity with the law (NSCB 2001). The municipality consists of villages within its territorial boundaries, one of which is the seat of government at the town proper, *Poblacion*. Of 1,600 municipalities in 2000, 41 belonged to Quezon province, among them Infanta and Nakar. The criteria for municipal selection were:

- i) intra- and interregional and municipal network accessibility, ii) socio-economic structure, and iii) physical and human resources.

Both municipalities have similar resource bases, including forest, copra, arable land, fertile soils, abundant fresh water, and fishing grounds. In Infanta, 33 out of 36 villages are engaged in rice farming and 11 are classified as fishing villages. Three villages make up the urban centre, Infanta town, with around 5,000 inhabitants. Rice-fields and roads leading to the villages surround the town. The road network in Infanta connects all villages with Infanta town. Infanta's local network is connected to the Famy-Infanta road. Infanta is the service, trade, and population centre of northeast Quezon province. The total population was 50,000 in 2000, and population density almost 400 inhabitants/km^2.

In Nakar, all 21 villages are engaged in rice farming and nine are fishing villages. While Nakar is disconnected from the Famy-Infanta road due to the lack of a bridge across the river Agos in 2001, it was still located within the zone of influence. Nakar's road network is almost non-existent a couple of kilometres north of the urban centre, Poblacion (1,000 inhabitants). Due to Nakar's size and underdeveloped road network, it is difficult to define Nakar as an integrated area. Economic activities among Nakar 23,000 inhabitants (16 inhabitants/km^2 in 1995) are very limited. Trade to/from Nakar go through Infanta.

Villages

There are around 42,000 *barangays* (hereafter villages) in the Philippines. A village is the smallest political unit into which cities and municipalities are divided. It is the basic unit of the political system and is administered by elected officials, headed by a village captain (NSCB 2001). A village consists of *sitios* (neighbourhoods), clusters of households that form the basic building blocks of society above the family unit. Some basic social and economic facilities are usually found in the largest sitio.

In 2003, a new urban area definition was approved (NSCB 2004). A village is considered urban if: i) it has a population size of 5,000 or more, ii) it has at least one establishment with a minimum of 100 employees, or iii) it has five or more establishments with a minimum of ten employees, and five or more facilities within the two kilometer radius from the village hall. Rural areas are all *poblaciones* or central districts and *barrios* that do not meet the requirements for urban classification.

Following this definition, of the seven villages included in this study, *Infanta town* and *Dinahican* in Infanta and *Poblacion* in Nakar are urban. *Banugao* and *Lual* in Infanta, and *Catablingan* and *Pesa* in Nakar are rural. Village selection also followed other criteria:

- *Major income source(s):* As the study area is predominantly agricultural, the selection of villages represented the agriculture sector's diversity, enabling studies between road improvement and different types of production. The two urban centres in each municipality were chosen due to their diversified economic structure, together with their status as administrative and nodal centres.

- *Accessibility and distance to urban centre:* Since all villages in Infanta are accessible by land, road condition, capacity, and distance to Infanta town were prioritised. In Nakar, network connectivity was important. Accessibility to Nakar is restricted and the intramunicipal road network is underdeveloped. One village with and one without a road link to Poblacion were chosen.

- *Average village income:* Income is mainly related to resource endowments. Through local government data, villages with average household incomes above, below, or average with the municipality average were chosen.

In table 5.1 below some basic characteristics among the seven study villages and close to 400 households included in this study are shown.

Table 5.1: Basic village and household characteristics (percent, elsewhere noted).

Village	Total population & average household size (number)						Household members*	Urban / rural	Distance to Infanta town & Pob. (Km.)
	1990		1995		2000				
	Total	Average	Total	Average	Total	Average	Average 1999		
IT	4,394	5.9	3,972	4.8	4,559	4.7	4.0	Urban	–
Din.	2,504	5.8	3,508	4.9	6,051	4.8	4.8	Urban	9–12
Ban.	1,586	7.3	1,844	5.3	2,395	5.0	4.9	Rural	4–5
Lual	674	4.0	759	5.5	828	5.2	4.9	Rural	3–4
Pob.	n.d.	n.d.	946	5.6	947	4.9	4.4	Urban	5–6
Cat.	n.d.	n.d.	1,446	5.6	1,454	5.0	5.2	Rural	8–11 & 3–5
Pesa	n.d.	n.d.	697	5.4	790	5.4	5.7	Rural	12 & 7–8

Village	Major income sources	Accessibility to Infanta town & Poblacion**	Parents formal education (level, graduate)		
			Elementary	High-school	College
IT	Diversified	Basic Accessibility (intravillage)	8	33	59
Din.	Fishing	Above Basic Accessibility	44	42	13
Ban.	Rice, wood-craft/furniture	Above Basic Accessibility	35	35	30
Lual	Rice	Basic Accessibility	24	45	29
Pob.	Diversified, rice	Below Basic Accessibility	21	22	57
Cat.	Rice, fishing, copra	Substantially Below Basic Accessibility & Basic Accessibility	44	43	12
Pesa	Forestry, rice, copra	Substantially Below Basic Accessibility & Substantially Below Basic Accessibility	53	45	2

Village	Respondent age-groups and origin						In-migrants origin			Time for in-migration		
	29-34	35-44	45-54	55-64	>64	Study area	Luzon Isl.	Visayan Isl.	Minda-nao Isl.	Before 1980	1980s	1990s
IT	16	26	16	21	21	83	81	13	6	68	13	19
Din.	30	30	18	9	12	51	33	49	18	9	47	44
Ban.	29	16	34	21	–	75	57	36	7	38	16	46
Lual	25	25	20	18	13	95	100	–	–	–	100	–
Pob.	23	27	23	10	17	75	90	10	–	46	27	27
Cat.	29	23	25	17	6	84	60	40	–	40	30	30
Pesa	27	29	29	6	9	91	100	–	–	33	67	–

Note: IT:Infanta town. Din.:Dinahican. Ban.:Banugao. Pob.:Poblacion. Cat.:Catablingan
* Average household size in 1999 based on author's data. ** On major village road.
Source: Total population & household average: General Nakar CLUP 1998, Infanta CLUP 1999, NSO 2002. Remaining; HR, 1999; 2001.

Except for the similarities and differences already identified (see chapter 4), table 5.1 shows other similarities and differences:

- Huge population growth among Infanta villages, while almost stable in Nakar. Populations in Dinahican and Banugao increased considerable, in Dinahican due to extensive in-migration. Out-migration partly explains the low increase in Nakar. The low increase in Infanta town is due to a structure mainly composed of older people.
- Excluding Pesa, all villages' average household sizes declined, especially in Infanta.
- No distinctive differences in respondents' or childrens' age-groups.
- A large share of all respondents originates from their respective municipality, especially in Nakar. The big exception is Dinahican (50 % from outside).
- Excluding Dinahican, Banugao, and Catablingan, in-migrants origin and in-migration time period show no distinctive differences. Most of the in-migrants originate from Luzon Island and arrived during the 1980s or later (see map 1). Eight out of ten migrants from Luzon originate within a 150 kilometres radius from Infanta town.

- Education level is high in general, especially in Infanta. While respective municipalities' urban centres have very high levels, Banugao and Lual have high levels, Dinahican and Catablingan have low levels, and one has extremely low, Pesa.

Research actors

Acknowledging the inter-connection that takes place between actors, various actors were selected to better understand impacts. As the actors are spatially separated and possess different levels of accessibility, a study of distributional outcomes is enabled. Also, micro data enables aggregation from household and household firms to village to municipal and finally to study area level. Below follows a presentation of the actors included.

Households

A total of 388 households were included in the empirical study. A reason for collecting household data is that such data enables us to measure how impacts have altered household living standards, measured in incomes, access to other assets and resources etc. Also, households have a dual role in the economy. They are an input into the production process as a share of the production costs, and they play a significant role in the economy as consumers of products produced within and outside a region.

Following the income source criteria for chosing study villages, this was also a criteria for choosing households.[24] For example, given the fishing sector orientation in the study village Dinahican, a majority of the households included are fishers. Given the time span of the study, households established after 1990 (1992 in some cases) are excluded. A person who lives alone is a separate household. This limited the number of households possible to include. The households included in respective study village were spread out over the whole village. With the exception for village Dinahican, no village is divided into distinct income areas. It counteracted a bias toward income-poor or income-rich households.

Finally, the income poor or rich are, given the limited area and the knowledge of my interpreter and village people easy to identify, and thereby possible to avoid if it would distort the sampling. Since the household is treated as a unit here, intra-household differences are mainly excempted and only dealt with concerning a few impacts.

As many households have several incomes, it is difficult to classify households according to distinct employment groupings. The households are divided into main occupation and employment, and sub-sectors and skills. A majority of the households included follow the general pattern of the rural population in the Philippines (ADB 2000). They are related to the agricultural sector (farming, forestry, fishing) as landless rural workers (agricultural and non-agricultural), small farm owners and tenants, small-scale municipal fishers and casual labourers (both in urban and rural areas). A large majority of the households are

[24] A household in this study follows the National Statistical Coordination Board (2003) definition: *an aggregate of persons, generally but not necessarily bound by ties of kinship, who usually live together under the same roof and eat together or share in common the household food.* Members comprise the head of the household, relatives living with he(r) and other persons who share the community life for reasons of work or other consideration.

income poor and possess few material assets. The pattern in the study area follows, to a large extent, the general pattern in the Philippines where rural poverty is most common among: i) landless agricultural workers, tenants, and leaseholders, ii) small farm owners and cultivators, and iii) small-scale municipal fishers (WB 1996).

Household firms and transport operators

A total of 60 and 22 household firms and transport operators (goods and passengers) respectively were included in the empirical study. These actors provide us with data (destination, production, frequency etc.) that help us understand the level of economic activity and the level of interaction between areas. Also, operators' cost structure affects production (input and distribution), demand, and competition. Table 5.2 shows details of the household firms and the goods transport operators included in this study.

Table 5.2: Household firms, household firms with own vehicle and goods transport operators in Infanta town, Dinahican and Banugao 1990–1994 and 1995–2001, distributed by type of business.

	Infanta town		Dinahican		Banugao	
Household firms	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001
- Electrical appliances	1	1	–	–	–	–
- Construction supply/firm	4	4	–	–	–	–
- Hardware	3	3	–	–	–	–
- Copra	4	4	1	1	–	–
- Petrol station	4	5	–	–	–	–
- General Merchandise	3	3	–	–	–	–
- Dry goods	4	4	–	–	–	–
- Liquified petroleum gas retailer	1	1	–	–	–	–
- Tailoring	2	2	–	–	–	–
- Agriculture inputs (fertilizers, pesticides etc.)	1	1	–	–	–	–
- Cooking oil distributor	1	1	–	–	–	–
- Fish-dealer	–	–	13	16	–	–
- Fishing vessel owner	–	–	7	13	–	–
- Furnitures, wood craft, semifinished goods	2	2	–	–	7	7
- Lumber	–	–	–	–	3	3
- Sawmill	–	–	–	–	1	1
Number of household firms	30	31	21	30	11	11
Household firms with own vehicle	8	12	7	10	4	5
Goods transport operators (No.)	4	4	–	1	–	–

Note: A HF can have several businesses and houseold firms can own several vehicles.
Source: HF and GTO, Infanta town, Banugao, Dinahican 1999; 2001; 2005.

Household firms include dealers, wholesalers, and retailers. A *dealer* buy and sell merchandise and goods. (S)he stands between the producer and the broker and consumer. A *wholesaler* buys or imports commodities, usually in large quantities, for resale to persons other than the end user. A *retailer* purchases commodities from a wholesaler and then resells it to the public. Firms established before and after the road project was included, the latter due to the interest to find out their motives for establishment.

Household firms also commonly own vehicles. Usually a distinction between professional (transporting goods to customers for payment) and non-professional (transporting goods with own vehicle) transporters is made. It is common in the Philippines (NEDA 1975) only to include the former, despite the knowledge (AASHTO 1998) that many industries

(agriculture, wholesale, retail, service industries) rely more on non-professional transport. In the end transportation's importance in the economy is under represented. Both services are included in this study.

To make a distinction between goods transport operators in rural Philippines is difficult as the size, function, and market area between operators differs. The various operator roles presented by Davis (1973) in a study about a Philippine marketplace follow, to a large extent, the present situation. Here, actors relevant to this study are described.

Carriers are intermediaries who themselves may produce small proportions of the goods sold, but primarily buy small quantities of goods produced by others (mainly relatives, neighbours) and transport these to markets for sale. Carriers prefer to sell goods wholesale to professional retailers (often on credit), thus placing the risk on the latter. If prices are high and demand strong, carriers also retail. Those with long trade experience tend to have personalized, long-standing relationships at both ends of the distributional network; producers in the countryside and sellers in the marketplace. Carriers also bring back small quantities of goods to the countryside and sell in general stores or door to door in villages. The small scale is due to low income and poor transport conditions as they use public transports, walk, or hire jeepneys for special trips. As they use public transport, only limited quantities can be carried. The difference between capital needed for public transport and for one's own transport is huge.

Middlemen use the marketplace as a source of supply. Middlemen have much larger capital, have access to private transport, and move goods mainly to higher-order markets. Their access to capital enhances their opportunities for profit, since they can undertake ventures on scales not possible for marketplace sellers. The largest part is transported from the Poblacion to markets in Manila. As the middlemen have access to capital to organize this transport and to finance the seller in distant markets, they often exert monopolistic and/or oligopoly control over the external marketing. Many also buy goods directly from rural producers and some buy prior to harvest. But the marketplace is most important, as it is easier to obtain large quantities without visiting dispersed and distant farms. This increases prices slightly, but it reduces transport costs and spoilage. Second, since rural producers see middlemen as sources of capital, middlemen can limit this by purchasing in the marketplace. Third, the marketplace has the widest possible variety of goods.

Truck ownership data on a municipal level do not exist. Instead, village captains and vehicle owners were asked. About 75 % of all truck owners in Infanta are included. In Nakar there are three trucks. Trucks present before and after the road project were included due to the same reason as firms. Those using their vehicle for only personal purposes were excluded and operators not based in the study area were also excluded.

All inter-/intraregional passenger transport operators in the study area, except one, are included (table 5.3). All intramunicipal tricycle associations servicing the study villages and the only jeepney association providing regular intramunicipal services are included.

Table 5.3: Inter–/intraregional and intramunicipal routes, modes and number of operators 1990–2001.

Service back/forth Infanta town	1990–1994 Mode	Oper-ators	Service back/forth Infanta town	1995–2001 Mode	Oper-ators
Manila	Ordinary bus (OB)	2	Manila	Ordinary bus (OB)	2
Sta. Cruz	Ordinary bus (OB)	1	Lucena City	Ordinary bus (OB)	1
Manila	Jeepney (J)	1	Siniloan	Jeepney (J)	3
Siniloan	Jeepney (J)	2	Real	Jeepney (J)	3
Real	Jeepney (J)	3	Manila	Minibus (MB)	2
Dinahican, Banugao, Ilog Lual, Poblacion	Tricycle (TC)	5	Dinahican, Banugao, Ilog, Lual, Poblacion, Magsaysay	Tricycle (TC)	6
Magsaysay	Jeepney (J)	1	Magsaysay	Jeepney (J)	1

Source: PTO, Infanta town 1999; 2001.

5.3 Assessment methods

Methodological aspects of an impact assessment

Broadly speaking, transport infrastructure impacts on social and economic development are commonly examined by using two approaches (Mazlumol-Hosseini 1991). The first method observes the impacts taking place during a certain time period, and covers a sufficiently long period after project implementation to be able to assess impacts. Initial socio-economic variables should be known and defined in order to make comparisons with the post-implementation situation. The influences of the project should, ideally, be isolated from other factors affecting the study area simultaneously.

The second method studies several areas with sharp differences in the level of transportation system development. By establishing correspondence between the system's level and the level of development of socio-economic conditions, the degree of association of transportation with socio-economic development is determined. Time or other factors are not considered.

The complicated causal relationship

Most socio-economic impact analyses are focused on the relationship between a certain measure as an explanatory variable and economic development as the goal variable (Nijkamp & Blaas 1994). In order to achieve desired effect, a causal relationship must exist between the variables that are directly affected by a measure and the independent variable you want to govern. But to establish a causal relationship in social science is problematic, as we are not allowed to perform controlled experiments. *"The stubborn refusal of other things to remain the same that complicates the imputation of causality to this exogenous factor"*. (Wilson 1966:169). While a relationship between road investment and indirect impacts can be shown, it is not possible to prove the causal direction.

To establish a causal relationship in an observed course of events from empirical data we must i) prove a covariance between the dependent and independent variables, ii) identify which variables are dependent and which are independent (causal direction), and iii) show that the relationship between the studied variables is not related to an underlying variable.

Furthermore, when studying the relationship between a measure and economic development, Rydén (1976) and Nijkamp and Blaas (1994) identify other circumstances that make it difficult to meet methodological criteria:

- As economic development is affected by several conditions, methods including other non-measure explanatory variables have strong methodological advantages.
- Due to indirect effects and the existence of explanatory variables for the dependent goal variable, conclusions of effects of a measure are often ambiguous.
- Did impacts precede the project or not? Actors often know in advance which projects are to be implemented. Responses may occur before project completion.
- Why would impacts not materialize without the investment?

The relationship between direct and indirect socio-economic development impacts

Reduced transport costs and travel time are direct impacts of transport infrastructure investments. A decline in unit cost of each type of traffic is multiplied by the volume of that traffic and represents the saving for the existing traffic, excluding generated and diverted traffic. As goods transport is essential in production, reduced transport costs can release resources for investments in other production inputs. The value and volume of producer surplus are important as they demonstrate the impact of the project on incomes and expenditures in the zone of influence. This, in turn, affects the import and export volumes of goods and services in and out of the zone. An increase in income will directly affect household expenditures on transport services. Expenditures also affect transport demand indirectly as expenditures on goods and services affect transport demand. The impacts stemming from the direct impacts are referred to as indirect impacts (see below).

5.4 Methodological approach and choice of analysis method

A comparative time-series approach on a disaggregated spatial level

The choice of method should consider which methods provide us with data of most relevance to our problem and to answer our research questions. Nijkamp and Blaas (1994) discuss a controlled experimentation method, the double difference technique. This method is seldom used due to the problem of finding identical classes of actors with the same characteristics where the differences can be ascribed to the specific measure under study. The method strives at collecting information about two classes of actors where one has and one has not (policy-on and policy-off respectively) been exposed to a measure.

The policy on and policy off situation can be captured by this technique. It can be used to compare places within the same region by applying the level of accessibility to a measure (improved road). While a road investment affects an area's level of accessibility, relative levels may show huge variations. Places with low and high accessibility, located within the same influence area, can be compared. From this we can study impacts on places not directly served by the policy measure but still located within the influence area (control site – policy off) with places directly affected by the measure (project site – policy on).

The empirical method that forms the basis for the analysis of causal relations in this study includes time-series observations of actors. By basing the analysis on time-series data, a before-after comparison is used to compare the policy on and off project situation, i.e. a double difference technique. An analysis measuring impacts after project implementation includes data on the occurrence of past exogenous changes and the endogenous changes brought about by the project. Problems with this approach are the drop off of informants and their forgetfulness of past experiences, and respondents' rationales.

Disaggregate data have several advantages. The flexibility of such data affords us to devise aggregation schemes. As no level of aggregation is suitable for answering all questions, the finer the level of data details, the more responsive aggregation schemes can tackle questions. In sum, different methodological practices, such as a before–after implementation measure, double-difference technique, time-series, disaggregated data, and the inclusion of other non-measure explanatory variables are used in this work.

Multi-criteria impact assessment analysis

To measure and analyse impacts from road investment is difficult as it includes indirect impacts that occur later after project implementation (Adler 1987). It makes it difficult to trace their origin as they are stimulated by and often require investments in other sectors.

At the end of the 1970s, non-economic considerations were considered in addition to the traditional investment appraisal method, the cost-benefit analysis (CBA) (Edmonds & Relf 1987). In a CBA, the welfare benefits are cost and time reductions, and increased safety. Nowadays, CBAs are believed to be too narrow (de Silva & Tatam 1996, Nakamura 2000, Grant-Muller *et al.* 2001, ADB 2001a, SOU 2003).[25] Appraisals have been extended to include indirect impacts, such as the environment and economic development. A multi-criteria [impact assessment] analysis (MCA) typifies this approach, where indirect socio-economic development impacts are inlcluded. MCA is often seen as competing with CBA, but the two approaches can complement each other (Vickerman 2000, SOU 2003). MCA is possible to use in assessment of concrete projects (SOU 2003:230).

What should be included in a MCA and how should data be measured? These problems have led to precautions being taken before including a MCA, especially in societies with well-functioning markets where the CBA is seen to capture all economic impacts (SIKA 2002b). The qualification of using a MCA is that in markets with poor competition, the effects may be large. Improved infrastructure may open up for increased competition and thereby increased efficiency in the society at large. MCA impacts are expressed in several dimensions: money, quantity, qualitative assessment and/or rating. Environmental impacts (e.g. carbone dioxide emissions) are excluded due to measurement problems. The operationalization of the direct and indirect impacts included is shown in table 5.6.

[25] In a CBA, spatial redistribution is non-economic and irrelevant, and has traditionally been neglected by transport economics (Button 1993). It is also hard to identify impacts that can be included and monetized (Grant-Mullet *et al.* 2001). Further, economic analysis excludes equity issues, despite a growing awareness of a poverty reduction aspect when analysing the justification for public sector investments (ADB 2001b; 2003, Njenga 2003).

By including indirect impacts there is a risk of double counting according to those stressing that only the direct impacts (time and cost savings) are true measurements of an investment. A direct impact of a road project is reduced travel times. The secondary impact is improved accessibility to work, schools etc. The tertiary impact is the economic activity that the project has promoted. All secondary and most tertiary impacts are manifestations of the primary impact. Those tertiary impacts that are not directly related to primary impacts may be related to a multiplier effect. A similar investment elsewhere could have had a similar multiplier effect. For example, a construction project outside the influence area may attract migrant workers. Thus, other conditions and measures influencing a study area must be included in the analysis.

A final problem is related to time-span. How long after the implementation of a project can impacts be related to the project itself. This must also be treated with caution by including other conditions and measures that affect the study area. However, this does not disqualify the geographer's task, of explaining spatial problems and their implications, and the evaluation of implications of geographic distribution.

5.5 Selection of data collection methods used

Different methods reveal different data and aspects of a problem. Instead of a single collection method, several data collection methods, a multiple method (Philip 1998), have been used here to address questions from several perspectives. The strength is that if the different methods point in the same direction, the results indicate higher reliability.

In this study, questionnaires, a manual traffic counting survey, network accessibility inventories, key informants and official documents were used as data collection methods (table 5.4). The methods were used to answer the research question outlined in secion 1.4.

The *first research question*, dealt with in chapter 6 and 7, is based on questionnaires performed with household respondents, household firms and transport operators, and key informant interviews.

The *second research question*, dealt with in chapter 8, is based on key informant interviews, questionnaires performed with household firms and transport operators, and traffic counting surveys.

The *third research question*, dealt with in chapter 9, is based on questionnaires performed with household respondents, but also key informant interviews.

The *fourth research question*, dealt with in chapter 10, is based on questionnaires performed with household respondents, household firms and transport operators.

As the study is concerned with the distributional outcomes of socio-economic development impacts stemming from an improved road accessibility situation, the accessibility situation and the other conditions within the study area, before and after the

improvement had to be established. This is done in chapter 3 and 4. Chapter 3 is based on official documents related to the Famy-Infanta road project in a historical perspective. Chapter 4, mainly dealing with the conditions within the study area, both before and after the project was implemented, is based on network accessibility inventories, official documents, questionnaires performed with household respondents and passenger transport operators, and key informant interviews. Chapter 4 is also based on secondary material.

Table 5.4: Data collection methods, actors included and number of respondents in 1999, 2001 and 2005, distributed by study villages.

	Infanta villages				Nakar villages			
1999	Infanta town	Dina-hican	Ban-ugao	Lual	Pobla-cion	Catab-lingan	Pesa	Tot.
A) QUESTIONNAIRES								
• Household respondents (i)	92	67	55	40	40	60	34	388
• Household firms (incl. firms that own vehicle) (ii)	31	18	9	2	–	–	–	60
• Transport operators, goods (iii) & passengers	19	1	1	1	–	–	–	22
(i-iii) share of tot. households 1990 (%)	19	20	30	25	25	24	29	
B) MANUAL TRAFFIC COUNTING SURVEY C) INTRA- AND INTERMUNICIPAL AND PROVINCIAL NETWORK ACCESSIBILITY INVENTORY D) OFFICIAL DOCUMENT ASSESSMENTS								
E) KEY INFORMANTS	9	1	1	1	1	1	1	15
2001								
A) QUESTIONNAIRES								
• Household respondents	83	64	44	37	36	58	32	354
• Household firms (incl. firms that own vehicle)	27	17	7	2	–	–	–	53
• Transport operators, goods & passengers	13	5	1	–	1	–	–	20
B) INTRA- AND INTERMUNICIPAL AND PROVINCIAL NETWORK ACCESSIBILITY INVENTORY C) OFFICIAL DOCUMENT ASSESSMENTS								
D) KEY INFORMANTS	21	4	1	1	4	1	1	33
2005								
A) KEY INFORMANTS	4	4	–	–	–	1	–	9
B) OFFICIAL DOCUMENT ASSESSMENTS								
Total number of informants	299	181	119	84	82	121	68	954

Note: Key informants from elsewhere totalled one in 2001and eight in 2005.

Accordingly, different methods were used to answer the research questions. Below a presentation of respective data collection method is made.

Questionnaires

A total of 954 questionnaires and interviews were conducted with household respondents, household firms, goods and passenger transport operators, and key informants between March-December 1999, August-November 2001, and May 2005 (table 5.4). The time period for the household respondents span from 1990 to 2001 (the questions in the first questionnaire to 1999 and the questions in the second questionnaire to 2001) in all villages. Except for the household firms in Dinahican and the key informants, where the time span was extended to 2005 in some cases, the time span among the household firms and passenger and goods transport operators was from 1990 to 2001.

Structured questionnaires with a combination of closed and semi-closed answers were the main data collection method. Qualitative questions followed quantitative ones. For example, trip frequency data was followed up with a question concerning the respondent's level of satisfaction concerning his/her trip frequency. Depending on the response, this was followed up by asking what caused the respondent to travel more or less often. While leading questions should be avoided, it is not always possible. Such questions should be put forward in the most neutral way possible and the responses should be treated with caution. In this study, some results are based on rather leading questions.

Different questionnaires were outlined for households, household firms, and transport operators (appendix 2a-e). Owing to delimitations, not all questions put to the respondents through the questionnaires are dealt with in this work. Key informant interviews were designed to collect information from sectors and activities, not available elsewhere.

With the exception of some key informants, questionnaires were performed face to face, when the author, the interpreter, and the respondent met in the latter's house. The village captains did not participate and did not influence the choice of respondents. Thereby, one possible personal bias was avoided. From earlier work in Infanta I had noted that women were good informants on household members' activities. Accordingly, females make up, on average, 63 % of the household respondents.

A questionnaire with household respondents could go on for anything between 15 minutes to one and a half hour. In an income poor household with two members where no one had travelled outside the study area the questionnaire was performed very quickly. On the contrary, in a household with many members, several income sources and many travelling outside the study area to different destinations the questionnaires was time consuming.

Less than 10 % of the household respondents that participated in 1999 were not willing to participate in 2001. Drop of was less among the household firms. Another problem is forgetfulness of past experiences and data reliability. With this in mind, some questions were not based on time-series, and some time-series related questions were based on averages and the respondents' estimates.

The concordance of the respondent answers pointing in the same directions where it should, and show differences where it should, indicates high reliability. As respondents are spread over two municipalities and among seven villages, and that no respondent knew about my visit in advance, their opportunities to influence each other or prepare themselves, was non-existent. Also, owing to the poor economic situation among a majority of the households where many live on, or under, a poverty margin, to remember money outlays and incomes, down to the peso, is essential.

Further, many informants (tricycle-association chairmen, transport operators, household firms etc.) keep their own records. Given the importance to control resources, it is important to know production and service output. Take the fishing sector in Dinahican as an example. While there are no official records on fish landings, records are kept in the village captain's head. It lies in his interest to know the volume of fish landings. The

captain also has the authority to license fishing vessels. Further, being the husband to a former major fish-dealer, his historical perspective is considerable. Finally, the village captain (or his assistant) spends, more or less, 24 hours a day at the fishing port. Few fishing vessels land captures in and around Dinahican without the captain's knowledge.

Household income follows, as far as possible, the National Statistics Office's (1997a) definition: *primary income and receipts from other sources received by all family members during a calendar year as participants in any economic activity or as recipients of transfers, pensions, grants, etc.*[26] Non-agricultural income follows the definition of Leones and Feldman (1998:789): *any source of income not generated through agricultural activities (farming, fishing, forestry).* Off-farm income refers to any source of agricultural income that is earned away from the family farm, such as agricultural wage labour.

Collection of income data are prone to imputation, recall bias, seasonality etc. It may be affected by under or over-reporting and the reluctance to reveal true income due to fear of taxation. Likewise, non-cash incomes are not given a monetary value. Household respondents were asked about incomes and their perception of poverty on two occasions. Still, incomes can be withheld. To circumvent this, welfare information, e.g. access to household appliances, was collected. If the welfare level did not match income data, other withheld incomes usually appeared. Another way was to ask the amount of money the household needed to cover basic needs. When expenses did not match income data, other incomes often appeared. Income data was also collected from village captains.

Remittances, usually excluded in impact studies, despite empirical findings where its effect on village level income distribution and as an income source in general has been tremendous (Leones & Feldman 1998, Battistella 1999), refers to: *regular cash payment received from household or non-household members working outside the municipality.* These members, mainly overseas workers, are the most common source of remittance for Filipino. Remittances are included here. Non-cash incomes and returns from savings are excluded. Incomes from rice farming are gross-measured, based on selling prices for un-milled rice (averages of good/bad harvests) to the national food authority. Total harvest is included for landowners, while 60 % for tenants (share tenants and leaseholders).

Household income also defines official poverty.[27] Families whose incomes fall below the poverty threshold (those living on less than a minimum of income, including food and non-food expenses) are poor, as well as those who cannot afford in a sustained manner to provide their minimum basic needs of survival, security, and enabling (NSCB 2000b:5).[28]

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[26] The main household income and expenditure studies in the Philippines are the Family Income and Expenditure Surveys (FIES). FIES estimates and data from the national accounts show huge disparities (Booth 1997). When growth is rapid incomes and expenditures are often understated. Another problem is disparity. Incomes are usually lower than expenditures for all except the top income class, mainly due to understatement of income (Rao in Booth 1997).

[27] As income statistics do not adequately show the poverty profiles, NSCB use, for example, the Department of Social Welfare and Development 33 indicators.

[28] Poverty estimates in the Philippines are sensitive to small variations in the poverty line. As many earn an income close to the line, shifting the measure little will include and exclude many (WB 1996). Surveys studying household perception showed about 60 % regarded themselves as poor (WB 2001b:viii). This is the poverty threshold level that households regard as 'minimum acceptable income'. It confirmed that self-rated poverty is not about absolute poverty. It reflects rising household expectations in response to rising incomes and/or greater exposure to how other people live.

Manual traffic counting survey

Information on traffic data is essential for effective appraisals of rural transport infrastructure, particularly when this includes an upgrading to a higher than least-cost basic access (gravel) standard or for investments motivated by economic objectives (WB 2001a:65). The Famy-Infanta road project fell within this category.

In order to identify traffic volume, a manual traffic counting survey was conducted in 1999. The 1999 survey was compared with surveys performed by the DPWH (table 5.5). A manual traffic survey should include seven days and last twelve daylight hours (WB 2001a). Remaining hours are multiplied by 1.33 to get average annual daily traffic flow.

In the 1999 survey, motor vehicles (excluding hand-tractors, motorcycles) entering and leaving the border to the study area (between Infanta-Real) were counted during seven days (October 10th to 16th) from 6 a.m. to 6 p.m. DPWHs surveys included two days. The border is located two and eight kilometres from Real urban centre and Infanta town proper respectively. Vehicle classification and passenger capacities are shown in table 5.5.[29]

Table 5.5: Vehicle classification and passenger capacities, based on traffic counting surveys.

DPWH		Author	
Vehicle	Passenger capacity	Vehicle	Passenger capacity
Car, taxi, owner-type jeep	4–5	Car, owner-type jeep	4–5
Pick-up, van	3–8	Pick-up, van	3–8
Jeepney	17–25	Jeepney (passenger and goods)	17–25
Mini-bus	10–12	Mini-bus	10–12
Ordinary bus	60–66	Ordinary bus	60–66
Truck (2 & 3-axle)	–	Truck	–
Tricycle	6–7	Tricycle	6–7

Source: DPWH 1989, 1996, DPWH/ADB 1998, Author 1999.

Since weather may influence traffic flows, two surveys should, ultimately, be conducted. The 1999 survey was conducted before the rainy season. Therefore, rain did not affect traffic. The 1999 survey did not make a distinction between truck axles. DPWH surveys made no distinction between jeepneys, while the 1999 survey did.

While traffic surveys give no information on distributive impacts among actors they do indicate how the transport system operates in a time-perspective in terms of vehicle and transport flows. It also indicates the level of economic activities and transport demand on an aggregated level, and whether passenger or goods traffic dominates.

[29] A tricycle is a 125cc motorcycle with an added frame and a sidecar. Tricycles are used for short journeys between the village and Poblacion or the main road. A jeepney is based on a standard jeep, but is equipped with an extended rear chassis. Gross weights are around 3 tons. Railings and small cargo bars are attached to carry more freight and passengers. Jeepneys are mainly used on longer journeys, from the Poblacion to the provincial centre. Ordinary buses and minibuses operate on long main routes. Given ordinary buses' and jeepneys' capacity and higher costs makes it necessary for them to run on routes where demand is high. The tricycle has a lower capital cost, a smaller capacity and greater service flexibility, and can operate on low demand and on poor quality routes. Trucks operate on any distance.

Intra- and intermunicipal and provincial network accessibility inventory
There is a need to use an operational and measurable index of accessibility in space when analysing the impact of transportation on the economic performance of different regions (Martellato & Nijkamp 1998:17). Thus, following the assessment in chapter 2 accessibility levels are measured at different geographical scales, from village to study area via the municipal (see table 4.3).

From a village, household and firm perspective, the level of accessibility between the village and the major urban center in the study area, Infanta town, and to the road connecting the local and the regional networks are central. In a municipal perspective, the level of inter-accessibility between the municipal and the regional networks is central. In a study area perspective, the level of accessibility relative to other areas is also central.

A thorough inventory of the inter- and intraregional and municipal network accessibility was conducted in a pre- and post-road project fashion. On the municipal level, a network inventory provided data on the supply side, including observations and interviews in the field, map analysis and records from operating and administrative entities of the road transport system, including the number of links, costs (money, time), seasonal passability, service frequency, vehicle types and capacity, major network nodes etc. Also, other infrastructures supporting the road transport system were identified. Put together, this shows different levels of accessibility.

Road project data include documents from the government department responsible for the implementation, the Department of Public Work and Highways, and the financing body, the ADB. From a historical perspective, the documents concerning the road have, primarily been produced by the National Economic Development Authority. Despite that the data is of a descriptive nature, it provides necessary information highlighting where the transportation system failed before the project. Data from households, household firms and transport operators concerning network related issues complement this.

Key informants
To use key informants has been criticised on the grounds of bias. This can be neutralised by not giving an informant the notion of being indispensable. Key informants were chosen in order to get data showing changes in economic activities in the municipalities in general and for certain sectors or economic groups. Choice of economic sector and group were led by, in the case of economic sectors, the sectors identified to be of greatest importance to the local economies. The informants identified as having best knowledge about respective sector were chosen.

Several community residents, leaders, and employees at various local government departments and authorities served as key informants (see appendix 3). They provided valuable information about the organization and production systems, the problems faced by various sectors, and other topics relevant to the study.

Operationalization of impacts, collection methods and interested parties included

In table 5.6 the direct and indirect socio-economic development impacts, the methods used to collect data on these impacts, and the interested parties who are affected by the impacts are presented. The direct and indirect impacts are an operationalization of the *four research questions* put forward in section 1.4.

Table 5.6: Direct and indirect socio-economic development impacts, collection methods and interested party.

Direct impacts	Collection methods	House-holds	Household firms	Transport operators	Local Gov.
1. Travel time reduction	Quest. I–III, Doc. I	x	x	x	
2. Variable vehicle operating costs	Quest. III, Doc. I		x	x	
3. Vehicle load capacity	Quest. III, Doc. I		x	x	
4. Safety and comfort	Quest. I & III	x		x	
5. Reliability, passability	Quest. I–III		x	x	
Indirect impacts					
1. New business establishment	Quest. I–III, Doc. II, KI		x	x	x
2. Land use and value	Quest. II, Doc. II, KI		x		x
3. Employment and occupation	Quest. I–III, KI	x	x	x	x
4. Transport services & demand	Quest. I–III, KI, MTCS	x	x	x	
5. Production/productivity	Quest. II–III, Doc. II, KI	x	x	x	
6. Investment/production inputs	Quest. I–III, KI	x	x	x	
7. Competition & competitiveness	Quest. II–III, KI		x	x	
8. Access to/purchase of goods & services	Quest. I–II, KI	x			
9. Incomes and revenues	Quest. I–III, Doc. I, KI	x	x	x	x

Note: Quest.: Questionnaire. Quest. I = Households. Quest. II = Firms. Quest. III = Transport operators.
Doc.: Document. Doc. I = National and provincial levels. Doc. II = Local level.
KI: Key Informant. MTCS: Manual Traffic Counting Survey.

The 1st, 2nd, 3rd and 5th direct impacts and the 1st, 3rd to the 7th and 9th indirect impacts are an operationalization of the *first research question* that is applied on the households, the household firms and transport operators.

The 1st, 2nd, 3rd and 5th direct impacts and all the indirect impacts are an operationalization of the *second research question* that is applied on the households, the household firms and the transport operators.

The 3rd, 8th and 9th indirect impacts are an operationalization of the *third research question* that is applied on the households.

The 1st, 4th and 5th direct impacts, and the 4th indirect impact is an operationalization of the *fourth research question* that is also applied on the households.

Variable vehicle operating costs (VVOC) are wages, fuel and oil consumption, maintenance, tyre wear and tear, vehicle depreciation etc. VVOC ranges between 70-90 % in the motor-carrier industry (Coyle *et al.* 2000:108), the remaining is fixed costs. Socio-economic development impacts can be classified as direct effects on business growth for firms directly affected by changes in operating costs and markets, indirect effects on business growth for suppliers to the directly affected firms, induced effects on economic growth for firms affected by the spending of additional worker income, and additional

induced effects on economic growth from shifts in population, workforce, labour costs, prices. The sum of all effects is the total effect on economic growth (Weisbrod 2000).

5.6 A note on fieldwork, authorization, interpreter, and respondents

When I arrived in the study area I had nothing except letters of introduction from my university and the provincial government in Lucena City. The mayors in Infanta and Nakar authorized and helped me with the staff and data needed at local level. Authorization was renewed in 2001 and 2005. Before starting research, government employees thought it was advisable to introduce me to a representative of the Catholic Church. Not until later did I understand the value of his approval. Living with a local family and being a subject of curiosity in the area resulted in the fact that my purpose and whereabouts spread very fast. After village selection, contact was made with village captains, who approved of the research.

You often feel lost when performing fieldwork. This may perhaps be more pronounced when it takes place in an unfamiliar setting. I only started to feel comfortable on my third visit to the study area. Initially, it is very difficult to know your way around, what department, bureau, division etc. that has the information and data you seek. Further, is the data available on the local, provincial, regional, or national level? Finally, whom should you get in touch with? If this is not known and help is difficult to come by, researchers to the Philippines should be prepared for many time-consuming bus and jeepney trips. I have spent a lot of time on buses and jeepneys.

While I had a problem to locate the right department at the right administrative level, I found out early that the person to get in contact with was the private secretary. But first a formal visit must be done to the secretary's boss who authorises your access to the data and staff. Once authorized, the sky is the limit. I have often got a feeling that the staff 'give away' far too much of their time. The volume of documents and data is enormous but often incomplete. Often only data for the last few years is available at the local level. If longer time-series is needed, it requires time consuming trips to the same department, bureau, agency on provincial, regional, and national level, or to all of them. If the data is still missing, you go back to the local level to another department. Suddenly the data appear. The concluding remark is, at least in the Philippines, not to give up. The data is there. It is only a matter of having enough time and patience to find the right person.

Through a request to the local government in Infanta I got in contact with a local interpreter. The same interpreter was used in 1999, 2001 and 2005. As we were almost never refused entry to a household, I understood that the interpreter had qualities, such as a polite manner resulting in mutual respect, no matter what household. Another quality was patience. An interview situation is unusual and sometimes awkward. Questions have seldom been thought about and to express oneself can be frustrating when words do not come easily. The interpreter made respondents feel at ease by discussing something else and then returning to the question.

Questionnaires could not have been conducted with a non-local. Respondents wanted to check the interpreter's background. People familiar with the Philippine society know the importance of belonging to a respectable family. The interpreter belongs to such a family. Respondents were also allowed to ask questions about myself. Of most concern was why I had chosen the Philippines, their municipality, their village, and their household? They found the latter difficult to comprehend.

It should be remembered that many of the people included in this study are income poor. As such they are accustomed to an environment where authorities have never listened to or shown any interest in their opinions. Accordingly, the dedication and the effort they put into the questionnaires to get everything right (down to the centavo in money matters) was impressive, but most of all, touching. I only hope I have reproduced their opinions in an acceptable manner to them. When realising I had no connections to the local or national government, a relaxed atmosphere was established. The relaxed atmoshpere strengthened in 2001 and 2005.

The disadvantages of using an interpreter are many. Respondents' answers are interpreted by the interpreter and then interpreted once again by the researcher. Can the interpreter be trusted? As researchers we cannot (why should we?) expect the interpreter to have the same interest, but it can be limited by initiating him/her into the rationale of the study. This leads to another question. Does the interpreter understand the questions? Discussions between researcher and interpreter indicate whether the latter understands questions and central concepts. Can the interpreter withhold information or misinterpret respondents? The latter can be corrected when answers are 'too wrong'. There is also a risk answers are summarised and biased. Respondents may respond in a manipulative way or in a way (s)he think will favour his/her situation. A way to circumvent this is to downgrade the importance of the measure and ask questions that have little in relation to the measure.

Chapter 6

Change in local context: the fishing sector, from self-sufficiency to market orientation

6.1 Introduction

In this chapter, the *first research question* is partly dealt with, namely what changes have taken place within the local fishing sector's production and distribution system after the completion of the Famy-Infanta road project. It also includes a historical background where interacting conditions and measures are explained and analysed concerning the way in which they have shaped and changed the fisheries production systems in the major fishing village, Dinahican in Infanta, and the much smaller, Catablingan in Nakar. This includes the role of transport infrastructure, technological leaps, entrepreneurs, access to capital, relocated knowledge and skills, and external supply and demand. It is to contextualise the process by locating it within the cultural, social, and economic relations through which it takes on meaning and direction. The chapter is based on key informants' (KI) and household respondents' (HRs), and the author's interpretations.

6.2 Entrepreneurs, technological leaps, infrastructures, relocated knowledge and skills, capital, and supply and demand

Initial pros and cons – complementarity and transferability

Given the problems faced by the fishing sector, the potential of the study area as an outtake depot became important in the 1980s. The study area had two advantages:

- it was located relatively close to Manila, and
- it was located adjacent to the Pacific Ocean's abundant fish resources.

But the study area also had disadvantages:

- the only accessible road was a gravel road in very poor condition resulting in high costs, delayed deliveries and low vehicle load capacity, and
- fishing in the Pacific was restricted and difficult, demanding big fishing vessels and advanced skills and equipments.

Fish for household consumption and barter

The older population in Dinahican remembers that before the 1960s fishing was for household consumption and barter. Few were fulltime fishers. Most households supported themselves as self-sufficient rice and copra farmers, supplying their protein intake from small-scale fishing, seldom capturing more than a couple of kilos. When they did, they bartered it for other goods within the village or at the public market in Infanta town. It followed the market situation in rural Philippines in general (Veloro 1994).

While it was very difficult to hire a vehicle to transport fish, captures were not large enough to make exports to outside markets economically viable anyhow. Another obstacle was the lack of ice. Fish requires ice to stay fresh if transported longer distances.

> *"Before ice was available fish could be stored a maximum of six hours in wood boxes covered with banana leaves that had the best cooling effect. Six hours were not enough to reach big fish markets outside Dinahican."* (KI10, Dinahican 2005).

This was the situation in Dinahican before fish became a commercial product. Fish was rarely delivered outside Infanta, only occasionally shipped to Atimonan in the south (see map 4). Owing to a small population, and the fact that fishing was only for household consumption and barter, the fish supply was abundant.

> *"It may sound very primitive and simple, but there was no need to use advanced equipment to feed the population as the shoreline was full of fish. The water boiled with fish"*. (KI10, Dinahican 2005).

Also, owing to a cash-strapped economy, fish-vendors at the local market in Infanta town could not extend capital to fishers to purchase more advanced equipment. This also followed a pattern found throughout the Philippines (Veloro 1994).

Ice paved the way for a potentially wider market area

At the end of the 1950s the situation changed. At that time ice was delivered to Real, located 22 kilometres from Dinahican, from Sta. Cruz in Laguna province (see map 4). It expanded the potential market area, as fish could be transported further away without being spoiled. Still, ice supply remained unreliable due to poor road condition. Also, the difficulty of hiring a vehicle, high vehicle costs, and too simple equipment remained. While each factor constituted a problem in itself, the major problem was to match vehicle hire, ice supply, and fish landing at the same time:

- if fish and ice were available but no vehicle, the fish was spoiled,
- if fish and vehicle were available but no ice, deliveries could not take place as delivery time exceeded the freshness of the fish,
- if ice and vehicle were available but no catch owing to uncertain fish captures, deliveries could not take place, and,
- if ice, vehicle, and fish were on hand deliveries were still often spoiled due to delays owing to poor road conditions, especially during the monsoon period.

New actors enter the fishing sector

In 1963 a young woman named Ludy entered the fishing sector. She was later to become the No. 1 fish-dealer in Dinahican and Infanta (KI11, Dinahican 1999; 2001; 2005). A fisher from Real who owned two vessels had seen Ludy's skills at the port in Dinahican where she controlled on- and off-loading of cargoe boats servicing Polillo Island. The Real fisher invited her to become his partner, a partnership that would last until 1980 when he moved to Aparri in Northern Luzon. He would be responsible for the fishing operation,

while Ludy would handle the hiring of vehicles and drivers, buy ice, marketing, and, perhaps of most importance, attach as many fishers to her as possible (a very common system in the Philippines – Krinks 2002).

Until 1968, their business improved but given the fish production potential, not good enough. With few vehicles available in Infanta, competition was stiff and vehicle hiring rates high. Also, taking delays and uncertain selling prices into consideration, profit was insecure. Accordingly, the incentive to increase fish production was limited. The ice supply problem had been eliminated further as the ice-plant owner from Sta. Cruz opened up a small plant in Real in the early 1960s.

Having a talent for business but no experience in fishing (her father being a farmer, only fishing for household consumption), Ludy observed other dealers and considered how she could improve. Knowledge about the market and marketing was limited. Now, one incident happened to be very important. An aunt in Lucena City advised Ludy to deliver fish to Divisoria market in Manila and always deliver to the same broker, thereby establishing trust and a *suki* relationship. Deliveries to Divisoria lasted less than a year due to a problem receiving prompt payment from the brokers.

The aunt then advised her to deliver to Roxas Boulevard in Manila. Here Ludy established contact with a broker who later became her *suki*. This was a breakthrough for her in particular, but also for the fishing sector in Dinahican in general. Between 1963-1968 the broker lent Ludy his jeepney with the agreement that Ludy was to deliver fish under the principle: ***as much, as often, and as fast as possible 'only' to him***. With this arrangement, a second transport-related problem, the first one being ice, was partly eliminated, that of acquiring a vehicle.

In 1968 the broker lent capital to the then 26 years old Ludy to purchase her first jeepney. Now the introduction of capitalist relations into this former self-sufficiency fishing village was a fact. The jeepney cost 15,000 pesos and it was repaid by deducting money from delivered fish. This occasion was a second breakthrough. Now Ludy's position as the No. 1 local fish-dealer was unchallenged for several decades.

> *"The best thing I ever did was to get in contact with a broker in Manila, deliver to him and build up confidence. Eventually he extended capital to me to purchase my first jeepney, the first in Dinahican with the intention to deliver fish. The advance I was given ahead of others, almost 10 years, cemented my position as the No. 1 fish-dealer".* (KI11, Dinahican 2005).

Once Ludy had established herself as the No. 1 fish-dealer she expanded her business by getting more fishers to deliver their catch to her. During this time she extended her business to include a general store (sari sari store). Thereby fishers could be paid both in cash and groceries. Fish were delivered to Roxas Boulevard until the early 1970s when deliveries shifted to Malabon, the major fish market in the country together with Navotas, both located in Manila. Since this time, fish export is mainly destined for Malabon.

Given the poor fishing skills and equipment, production could only increase if the fishers fished more often, if the number of fishers increased, or if present and additional fishers fished more often. Another limit was transport. There was only one jeepney in Dinahican. The fish landings must be coordinated with this vehicle. Also, this vehicle could only load 20 to 30 fish-boxes. This obstacle was partly offset by another jeepney operating from Infanta town. The other operator, Toda, delivered any kind of goods with a smaller jeepney that she had purchased around the same time as Ludy. But Toda never threatened Ludy's position, as she could not attach local fishers. Once Ludy's jeepney was loaded, Toda's was hired to deliver the remaining boxes. Toda also helped to solve the ice-problem further. She opened up the first ice retail outlet, a Real plant outlet, in Infanta town in the late 1960s (KI11, Dinahican 2005).

With capital generated through fish export and financial help from her sisters, Ludy purchased two additional jeepneys in the early 1970s. But others wanted a share of the market. In the mid 1970s two families, also raising capital from companions that would become the 2nd and 3rd major fish-dealing families, purchased jeepneys. As the three families owned all five jeepneys and had access to capital they controlled the market. However, Ludy remained the major dealer, or as she put it herself:

> *"When Elsa and Naning, the 2nd and 3rd major fish-dealers, became fish dealers they never threatened my position. The fish they traded in Manila was bought from me!"*. (KI11, Dinahican 2005).

Due to fish being perishable and difficult to preserve, dealers were concerned with immediate returns. Therefore, Elsa's and Naning's fish were first sold to the local market in Infanta town (KI10, Dinahican 2001). The remainder was delivered to Malabon in Toda's jeepney.

Until the late 1960s, fish export was very low. Between 1962-1963 export to Divisoria reached around 12 fish-boxes per week (50 kilo/box) during the good fishing season. The problem was to receive payment. The reluctance to deliver was solved when deliveries to Roxas Boulevard started. At that time, exports reached 60 to 80 boxes/week during the good season. The increase was also due to more fishers, more full-time fishers, improved transport capacity, and a more reliable ice supply.

In the early 1970s, an ice plant with a limited production capacity was established in Dinahican. Now fish boxes did not have to be brought to Real, where they were off-loaded, filled with ice, and then on-loaded once again. Fish could be stored longer and wait for additional landings to make a delivery economically viable.

While the production situation improved, vessels from other locations were reluctant to land their captures in Dinahican. Due to Dinahican's peripheral location owing to its poor transport conditions, non-Dinahican vessels, mainly from Polillo islands, delivered their captures to Real, Atimonan, and Baler instead. Real is closer to Manila and Baler in Aurora province is located further away from Manila than Dinahican but the condition of

the road to Manila was better. Real is also located adjacent to Lamon Bay, the traditional major fishing ground in the study area (see map 3-4).

Greener pastures – the arrival of immigrants

Dinahican started to receive immigrants from the Visayas, Mindanao Island, and the Bicol pensinsula (see map 1-2) during the late 1970s. Migrants had, following a common pattern among small-scale fishers in the country (see Ushijima 1994, Seki 2004), been forced away from their homes due to fish depletion, shortage of arable land, and few other job-opportunities. Later on, the first migrants invited relatives, thereby initiating chain migration. Migrants from Mindanao also mention the armed conflict between the Muslim guerrilla and the army as a reason to migrate.

> *"As fishing cannot feed your family and there are few other opportunities, the man tries to find new fishing grounds. When he does not return after several months, the family is thrown between hope and despair. Either he has found a new site and tries to establish himself in the community or he has died in a boat accident. It is a great relief when news reach them to join up at their new home"*. (KI12, Dinahican 2005).[30]

As a migrant you leave socio-economic networks behind and must start anew in a new environment. It may be suspected that the migrants were received with hostility, as they competed over resources with the local fishers. This was not the case. The locals, especially the big dealer families, welcomed them as an additional production potential as they delivered more fish. The migrants also felt welcome as they were 'taken care of' by the dealers who extended capital and groceries in return for captures. Due to competition in their home provinces, few migrants had enjoyed this security before arriving in Dinahican.

Relocated skills and knowledge

What are the advantages of receiving migrants? Before the migrants arrived local fishers were not able to, or needed to, venture outside the municipal waters. Fishing was restricted to the coastline.

> *"When we arrived in Dinahican we could not believe our eyes. Fishing equipment and skills were primitive and vessels could not go far out in the Pacific, they were too small. Instead they went up and down the coastline"*. (HR No. 57, Dinahican 2001).

From the 1960s until the 1980s local fishers used small fine-meshed nets that they, due to plentiful resources, only had to throw out around 15 meters from the shoreline. They also used hand-lines made from rope. Offshore fishing was dangerous as a majority of the average 15 typhoons that hit the country yearly directly affect the study area (Krinks 2002:19). Vessels, skills, and equipments were insufficient to muster the Pacific waters.

The migrants were also welcomed due to their ability to build big vessels, operate advanced techniques and equipment. Both deep-sea fishing and fishing with big nets were

[30] Fishers practise short-term migration to other locations when the fishing season in their home areas is bad (Kawada 1994). This practice allows fishers to observe the conditions at other places while staying there temporarily. If living conditions are perceived as better there compared to where they came from, they may choose permanent migration.

introduced by the migrants from the Visayas. They could also master rough seas and find fish in offshore waters. The latter is referred to as a skipper effect. It is believed that a boat captain (skipper), significantly affects catch as his ability to find and catch fish is very good (Veloro 1994). Others simply mean that success is due to vessel size and equipment, willingness (and ability) to take calculated risks, and hard work. Vessels catching most fish are simply those fishing most regularly. Mindanaoans brought advanced hand-line fishing with nylon, able to fish high-grade fishes, for example tuna fish. This technique had been available earlier south in Mauban (see map 4) where transport conditions allowed deliveries to Malabon, Manila.

Despite relocated skills and knowledge, the problem to tap offshore fish resources remained. Investors were not willing to extent capital to invest in inputs enhancing production due to the poor transport conditions. It was simply not possible to deliver fish to brokers in Manila in a suitable manner. Instead a situation where a huge production potential was available but not utilised prevailed.

An oligopoly production system

Few vehicles aiming at delivering fish to Manila were added to the five owned by the three major fish dealing families between 1975-1994. The production system where fishers delivered their catch to the three families prevailed. Hence, due to, amongst others, an oligopoly system and poor transport conditions, competition was low. The latter most certainly enabled and reinforced the former. But small-scale marketing of fish to the local market in Infanta town and neighbouring villages took place. Following the marketing pattern in the Philippines (see Ushijima 1994), fish was, and still is, distributed in tricycles to local buyers at the local market.

The system where native fishers dealt with the same local dealer/suki due to long socio-economic ties was persistent in Dinahican. The local dealers controlled access to capital through their brokers/suki in Manila. Sellers/producers usually deal with the same buyer/trader out of habit, obligations, and long relationships, even when offered higher selling prices elsewhere. Also, dealers stuck with the same transport operator. The influx of immigrants conflicted with the suki-system. The migrants were more flexible in their choice of dealers and/or transport operators.

The Famy-Infanta road project – the end of the oligopoly production system

The Pacific, that had been avoided as a commercial fishing site due to its rough sea, long delivery times, and high transport costs to Manila compared to other fishing sites, was identified as a resource potential during the 1980s. But accessibility to the east coast was very low (see map 4). In order to get access to and tap resources from the Pacific, transport infrastructure must be provided.

> *"There is no doubt the road project aimed at supplying Manila with fish. But it does not mean that we at the local level have not benefited, on the contrary. It only means the intention with the project was not rural development"*. (KI10, Dinahican 2005).

The road project reduced transport costs and delays, enabled larger load capacity, and expanded the market area. Reduced delays improved punctuality. As such, the road project was an incentive to increase production. According to respondents (HR 6 & 11, Dinahican 2001), if brokers in Manila are assured that huge volumes of fish will be delivered quickly on a frequent basis throughout the year, they will extend capital. Except from Ludy and to some extent the other two major fish dealing families, few fishers could assure that before 1995. The road project made way for investments. The interaction between road investment, capital, relocated knowledge and skills, and conditions related to external supply and demand, paved the way for expanded fish production. Since then, fishing operations operate under a more commercialised production system with greater market orientation.

It was not until the mid 1990s that the production system changed dramatically, when capital needed to invest in big vessels was extended (KI10-13, Dinahican 2001; 2005). Big vessels that were able to manouvre big nets, 500 meters in length (at a depth of 115 meters below the surface), could venture far out in the Pacific. The net is kept in place on the seafloor at a 1,000 meters depth by sinkers and by buoys at the surface. With stationary nets, the fishers can investigate their nets more often. This method requires huge capital and is oriented towards large volumes. Together with an efficient fish-attracting device, 'habong', it revolutionized the fishing. The habong are leaves from the buri tree. The leaves give shelter to small fishes that attract large predators. It greatly reduced the time spent in searching and fishing for commercial volumes. The habong, or payao as it is named elsewhere in the Philippines, has been singled out as the most important factor triggering the phenomenal development of the tuna fishing industry.

Medium vessels used smaller nets that are 300 meters in length (three metres depth) and hand-lines both before and after 1995. The handline had one to 30 hooks depending on which fish was being targeted. Many hand-line fishers fish up to 145 kilometres off the coast in a northeast direction. Hgh-grade fishes, blue-fin tuna and blue marlin, are fished at 120 to 240 metres depth, while other species are fished down to 100 meters. Small vessels practiced hand-line fishing both before and after 1995, and long-line fishing if attached with a 16 horsepower engine, but they cannot venture far out in the Pacific.

Other conditions and measures coinciding with the road project

Fish demand is mainly determined by the situation in Manila, but also, increasingly, by international demand. The demand for fish in Manila and for export is central to the commercial fishing industry in the Philippines. It is the engine driving the economy in rural fishing communities with few or no other resources available. Increased demand and higher selling prices induce involvement in fishing. Large alterations in prices in Malabon affect the fishing sector across the country.

Wholesale prices for the most commonly caught fishes in Dinahican increased between 161-200 % from 1990 to 2004 (BAS). Except for a few years, prices increased less than the inflation rate (IMF 2003; 2005a,b). From a fisherman's perspective, the period from 1990 to 1994/1995 was quite good. Following the rather poor price development vis á vis inflation, fishers must increase captures in order to maintain or increase their incomes.

Until August 2001, when the new fish port in Dinahican became effective, the old landing point and post-harvest facilities were insufficient. The installation of the telephone system in the study area in 1994 helped fishers and dealers to get market price information and bargaining power over the big dealers, and to get access to brokers in, foremost, Manila. According to respondents, the fishing was modestly affected by the Asian crisis.

The bank sector reforms in the Philippines benefited the fishing sector. Rural banks with more liberal lending policies and lower interest rates appeared in the study area. Also, contrary to the logging period, where operations were controlled by outsiders and capital streamed out, the fishing sector is (still) controlled by locals who re-invest profits into the local economy. Also, the societal transformation has taken place without support from the local government. Dinahican has even voiced its wish, given its contribution to the local economy in terms of tax revenues, to establish a municipality of its own.

6.3 Contemporary Dinahican

Dinahican is located 9 to 12 kilometres southeast of Infanta town and is only accessible by land through the national road coming from Infanta town. Thus the village has a local accessibility situation comparable to Infanta's interregional accessibility, where Infanta is only accessible by the Famy-Infanta road. The road is six meter wide, surfaced with gravel, and passable throughout the year with all types of vehicles except during extreme weather conditions. Speed is below optimal capacity due to poor road surface conditions. Dust and mud are other inconveniences, penetrating vehicles.[31]

Owing to huge in-migration and high fertility rates, the population has boomed. In 1990 the population was 2,500. It increased to 3,500 and 6,000 in 1995 and 2000 respectively, and to around 8,000 in 2005 (NSO 2002, KI10, Dinahican 2005). Dinahican is, by far, the most populous village in Infanta, making up seven and twelve percent of Infanta population in 1990 and 2000 respectively.

No village in the study area has received so many migrants, or so recently. In-migration started in a small scale during the late 1970s and escalated during the 1980s. Contrary to the study area in general, Dinahican's immigrants come from far away places. Almost half of all household respondents in Dinahican are born outside the study area. Half came from the Visayas, one third from Luzon Island, and the remaining came from Mindanao Island. Ten percent arrived during the 1970s, almost 50 % during the 1980s, and 43 % between 1990-1992. Making up a huge share of the population, the migrants are an economic force.

The settlement pattern in Dinahican is mainly based on origin and time of arrival. A huge majority of all households are located along the national road, the village centre, and the Visayan village. The latter adjoins the village centre. There are also clustered neighbourhoods and scattered houses along the coast. Visayas mainly reside in the

[31] Villanueva (1959) noted similar problems. Studying economic and social impacts from 'barrio' road construction connecting highways in the Philippines respondents answered: "flooding of the road during the wet season", "muddy when it rains", and "dusty during the dry season".

Visayan village, while Mindanaoans are mixed with Visayans, but usually live further away from the village centre. Native Dinahican's mainly live in the village centre or along the national road. Households along the road, the village centre and the Visayan village have best access to the national road, while households along the coast have low access.

Nowadays, economic activities in Dinahican are almost exclusively related to fishing. Being close to fish resources is the main reason why people engage in fishing.

> *"Except for fishing there are no other options in Dinahican. You buy a small boat, equipment, and you are into business. If you do not catch enough fish to sell, at least your family can eat"*. (HR No. 44, Dinahican 1999).

Most people are engaged in fishing as fishers, dealers/vendors, vessel and vehicle owners, haulers, drivers, ice plant labourers, vessel builders etc. An overwhelming share are municipal fishers, either owning a small motorised or non-motorised vessel or no vessel at all. Many of them also work as fishers on medium or big vessels and/or casual as labourers. A majority of the fishermen are poor in economic and material terms, possessing very few resources.

A second small group owns medium sized vessels. This group also practise fish dealing from time to time. A final and an even smaller group are the small-scale commercial fishers. They usually own motor vehicles and/or are frequent fish dealers. Through access to resources and a potential to employ and invest in new production enhancing inputs, e.g. vessels and equipment, this group is a driving force in the local economy. The remaining households are mainly non-agriculture self-employed, employed in the public sector, or work as migrant workers.

6.4 Catablingan – fish for household consumption and barter, no change in sight

Fishing in Catablingan, Nakar, resembles the traditional techniques and trade patterns found in Dinahican before the 1960s. Simple hand- and long-lines and small nets, even mosquito nets, are used along the coastline. Except for a few vessels equipped with a 16 horsepower engine, the majority are manually operated. Fishers without a vessel, or occational fishers, hire vessels and pay the owner in catch.[32] Few fishers venture beyond the 15 kilometres municipal water demarcation line.

Contrary to their counterparts in Dinahican, fishers in Catablingan uses one fishing technique.[33] There is no fish port in Catablingan or in the southern part of Nakar and no port construction is planned (KI14, Catablingan 2005). An alternative for the fishers in Catablingan would be to deliver to the fish port in Dinahican, but given their low captures it is not economically viable.

[32] Vessel leasers give 33 to 50 % of the harvest to the vessel owner (KI10–12, Dinahican 2005).
[33] There were 80 (mainly) small vessels in Catablingan, Pamplona and Banglao. After the typhoon in late November, 2004, this was reduced to 30.

A small-scale fisher in Catablingan fishes around two times/week and catches 15 to 20 kilos if using nets and 5 to 7 kilos if using hand-line (KI15, Pamplona 2005). The catch is consumed by the household and, if it is big enough, sold within the village or neighbouring villages. It is usually the wife who sells fish, marketing it by walking from door to door. Fish has not been delivered to Infanta or further away to Manila, neither before nor after the road project or after the completion of the bridge across the river Agos in late 2002.

According to the village captains and fishers in Catablingan and Dinahican, there are certain reasons why fish production and trade in Catablingan has not gone through any major changes. Catablingan, and Nakar in general, are disadvantaged due to:

- physical geographical features, and
- low accessibility, both in an infrastructure and fishing ground sense.

None of the respondents hesitate when asked why no significant fish production has taken place in Catablingan. The disadvantageous location is most important:

> *"Even with sufficient transport infrastructure, as of now with a bridge across the river Agos, nothing has happened in fisheries. As the coast in Nakar does not offer shelter for fishing vessels or a fishing port there will be no investment".*
> (KI14, Catablingan 2005).

Contrary to the coastline in Dinahican, Catablingan's offers no protection for vessels or a port from typhoons. The risk that vessels will be damaged exceeds the economic benefits. When asking the village captain why vessels do not use the rather large river further south as shelter, he replies that it is too narrow for big vessels. Asking a fisher migrant in Dinahican why so few migrants settled in Nakar, the reply was simply its disadvantaged physical geographical feature:

> *"It does not matter if there is an abundant fish resource at hand. If you cannot fish with large vessels and advanced equipment you can only practise fishing along the shoreline. The conditions where a port and vessels can be sheltered must be present".*
> (KI12, Dinahican 2005).

The village captain in Catablingan also stresses that even if the location of Catablingan had been similar to that in Dinahican, no change would have taken place. No port would have been constructed. The Catablingan inter- and intramunicipal network accessibility was *Below Basic Accessibility* before and after the road project. As such, its accessibility worsened relatively to that of Dinahican. This was the situation until the end of 2002 when the bridge across the river Agos was constructed, thereby upgrading Catablingan's intervillage accessibility to *Basic Accessibility* level. Finally, Catablingan is located far away from Lamon Bay, the major fishing area for municipal fishers, located just south of Dinahcian (KI13, Dinahican 2005). It demonstrates the importance of physical geographical features and accessibility.

6.5 Analysis

This chapter has partly dealt with the study's *first research question*, namely what changes have taken place within the local fishing sector's production and distribution system after the completion of the Famy-Infanta road project.

Dinahican fishing community was of little interest as a supplier of fish to markets outside the study area as long as supply was available closer to the major urban markets. While complementarity existed, the pre-project situation characterised by very high transferability costs made this difficult as transport costs were unrealistically high. The study area was not able to compete with other intervening production sites. These sites delivered fresh fish faster and cheaper to Manila in large volumes and on a frequent basis throughout the year. The post-road project situation, characterised by higher accessibility, changed the situation of the study area as a supplier, mostly due to overfishing in other areas, but also in a situation where these areas had not been overfished.

Despite being located along the same coast, the fishing sectors in Dinahican and Catablingan have both been restricted but for different reasons. In Dinahican, the restrictions were initially related to ice, vehicles, and transport conditions, and later to fishing methods and equipment, transport conditions, and lack of capital. Catablingan's restriction was, and still is, related to physical geographical features and accessibility. Dinahican's level of accessibility outperformed that of Catablingan even before the road project. The gap widened afterwards as Catablingan is disconnected from the national road network. Further, while Dinahican's port and vessels are sheltered, the straight coastline in Catablingan cannot give such shelter. Neither abundant fish resources nor a road investment will affect production, as there will be no investment in production factors. Having said that, this conclusion is not applicable to all kinds of goods.

Thus, a favourable physical geographical feature is of central importance if resources are abundant and supported by, amongst others, an adequate transport infrastructure. It may have a considerable impact on trade, production, and marketing system. In this case, transport infrastructure functions as a releaser and an enabler, and something that speed up a societal transformation process either not yet in motion or in motion, but at a much slower pace.

In the Dinahican case, the physical and cultural barriers restricting fishing sector development were eliminated one by one. The monetization and marketing history of Dinahican's fishing sector is a combination of technological leaps, relocated knowledge and skills, entrepreneurship, and external demand and supply. The development of the fishing sector owes its development to five certain factors:

- the introduction of ice in the early 1960s,
- the introduction of locally owned vehicles in the late 1960s,
- the influx of immigrants bringing skills and knowledge in the 1980s,
- the general overfishing in Philippine waters, especially since the 1980s, and
- the Famy-Infanta road project between 1993-1995.

The latter enabled:

- faster, cheaper, and more reliable deliveries of larger volumes of fish throughout the year, and
- the extension of capital from brokers in Manila and local capital invested elsewhere before.

As capital was provided it enabled the most recent technical advancements affecting fish production in Dinahican since the mid 1990s, namely the introduction of:

- anchored buoys, making big net fishing possible,
- big vessels, able to handle big nets and master rough seas in offshore Pacific, and
- light trucks with additional load capacity compared to jeepneys.

Notwithstanding the importance of the road project, to stress that it was the sole cause of the societal transformation is to neglect the wider context wherein such processes take place. The process was largely influenced by other conditions and measures. Demand for fresh fish outside the study area is 'the engine' in the economy. As the traditional fishing waters were facing depletion, the government was forced to allocate other fishing grounds not yet overfished. The Pacific Ocean was one. However, as accessibility by land between the west coast, where the major markets are located, and the east coast, where the Pacific is located, was *Below Basic Accessibility*, investments in adequate road infrastructure and port facilities were necessary in order to connect production and consumption sites. Without this the situation would be different. Through interaction with other conditions and measures this created synergy effects that determined the strength and pace of the transformation.

How the societal transformation dealt with above has materialised itself in various socio-economic outcomes, spanning from production to incomes, via investment in production factors and job-opportunities etc. is dealt with in chapter 7.

Chapter 7

Change in accessibility – production and distribution consequences for the fishing sector on village level

7.1 Introduction

In this chapter, the study's *first research question* is dealt with, namely what changes have taken place within the local fishing sector's production and distribution system after the completion of the Famy-Infanta road project. The direct and indirect socio-economic development impacts in Dinahican and Catablingan fishing sectors after 1995 are measured, evaluated, and analysed in this chapter. Direct impacts include changes in variable vehicle operating costs, travel time, delays and vehicle load capacity. Indirect impacts include changes in fishing vessels and road motor vehicles, fish production and exports, production milieu, delivery destinations, incomes, employment, competition and fishing conditions. The chapter is based on primary data. In Dinahican, household firms (HFs) practising small-scale commercial fishing are included. The HFs are medium and big fish-dealers by local standards, they own almost all jeepneys, close to two thirds of all light trucks, and about one third and one fourth of all big and medium vessels respectively. Dinahican household respondents (HRs) are partly included. There are only small-scale municipal fishers in Catablingan. Finally, while not explicitly included in the text, HFs and goods transport operators (GTOs) in Infanta town and Banugao are referred to in notes.

7.2 Direct impacts of the Famy–Infanta road project

Variable vehicle operating costs

Reduced variable vehicle operating costs, including reduced travel time and delays, and higher load capacity are the major direct impacts of road improvement (table 7.1). It is important to know the extension of these reductions as they influence production, especially if impacts are considerable.

Table 7.1: Variable vehicle operating cost (VVOC) changes among Dinahican household firms since the Famy-Infanta road project.

Variable	Change
Fuel consumption reduction (litres) – jeepney	35% decrease (average)
Overall maintenance cost reduction (pesos)	44% decrease (average)
Replacement of tyres (two tyres each time)	From every 1 to 1½ months to every 2 to 3 months

Source: HF, Dinahican 1999.

According to the HFs, the VVOC decreased considerably after the road project. Fuel consumption was reduced 20 to 50 %. Since 1995 light trucks have the same, or less, fuel consumption as jeepneys. Maintenance costs were reduced by 30 to 50 %. Tyre expenses increased after the Asian crisis, but an improved road surface and straightened curves made tyres last longer, despite the longer running time during the same period. There was only a negligable change in oil consumption, as it was based on distance.

Travel time and delays

Good transport conditions facilitate reliable and fast deliveries. Depending on consumption and the time duration of the market, different goods' demand will be affected depending on delivery speed. The period of consumption for fresh fish is short and fish market operations are on a day-to-day basis. Late arrivals are punished economically as customers avoid unfresh fish. Delays hampered the fishing sector before the road project.

> *"Delays and low speed, unfresh fish and low selling prices. No delays and high speed, fresh fish and high selling prices"*. (HR No. 70, Dinahican 2001).

> *"Of the improvement over the last 10 years, 70 % owes to the road project. Now we can deliver fast to Manila and receive high selling price as our fish is fresh. Up north in Nakar and Aurora there is plenty of fish, but due to slow deliveries their fish smell when they arrive in Manila"*. (KI13, Dinahican 2005).

Travel time back and forth to Manila decreased on average from 12 á 16 hours to 7 á 10 hours (HF, Dinahican 1999). This change enabled a later departure and more time to fill up vehicles. Further, delays almost disappeared. Thereby reliability and flexibility improved. All vehicle types became passable throughout the year. On average, almost half of all deliveries were delayed before 1995, especially during the rainy season (see appendix 5 for details).[34] Delays, spanning from a few hours to several days, resulted in a much lower selling price at the market (from 20 to 55 %, see appendix 5), additional costs for driver and hauler expenses, and difficulties to plan ahead. The absence of telephones complicated the marketing further. Finally, ice-consumption was cut by 20 % (KI16, Dinahican 2001). Since 1995, delays did not derive from poor road conditions along the Famy-Infanta road, but from traffic congestion in and around Manila. Small dealers delivering to Infanta town still struggled with high transport costs.

Vehicle load capacity

A vehicle owner tries to load as much fish as possible to maximize profit.

> *"The name of the game is volume. It was a tremendous improvement when the Famy-Infanta road was asphalted. Before we could not fill up a jeepney. Now we fill up a light truck with higher load capacity."* (HF No. 26, Dinahican 2001).

Low carrying capacity before the implementation of the road project resulted in vehicle load capacities below legal limits, especially during bad weather conditions. Instead fish must be sold at the local market at a lower price. After the implementation, the vehicles could load legal maximum capacity throughout the year. A light truck loaded 69 boxes, 29 (1½ ton) more than a jeepney.[35] In this sense the road project was a releaser and enabler.[36] Vehicle ownership became more profitable.

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[34] Reductions in VVOCs and delayed deliveries among HFs in Infanta town and Banugao, and GTOs in Infanta town followed those in Dinahican. Furniture makers lost customers due to inability to deliver to stores on set delivery times.

[35] Why then was fish not delivered in larger trucks? HFs meant that catch required to make it economically viable could not be guaranteed. Poor storing facility was another counter argument.

[36] HFs in Infanta town and Banugao, and GTOs in Infanta town also increased their vehicle load capacities.

7.3 Household firms perception about production milieu

Who has benefited from the road project and who was intended to benefit from the road project? The village captain (KI10, Dinahican, 2005) stresses that the road project was implemented to provide consumers in Manila with fresh fish. But while local development was not a priority, the project did not restrict it, on the contrary. As the HFs are of major importance to the local economy as employers and producers, it is important to know how they perceived their situation before and after the road project (table 7.2).

Table 7.2: Fish production restrictions 1990-1994 and 1995-2001, distributed by Dinahican household firms.

Restriction 1990–1994 – 1st choice	No. of HF	Restriction 1995–2001 – 1st choice	No. of HF
Poor road condition*	9	Competition	5
Difficult to get bank loan/high interests	3	No own vessel	3
No own motor vehicle	1	Labour and spare part costs	3
Competition	1	No own motor vehicle	1
Poor fishing methods/equipment	1	Transport costs (vehicle owners)	1
Fishing vessels not big enough	1	Fishing vessels not big enough	1
Low demand	1	Difficult to get bank loan/high interests	1
Total	17	Weather conditions	1
		Total	16

* Speed, delays, load capacity, VVOCs. Note: For restrictions based on three choices, see appendix 6.
Source: HF, Dinahican 2001.

Poor road condition was the main factor restricting production before 1995. Others were the lack of big vessels, lack of vehicles, low access to capital, and poor fishing methods and equipment. After 1995, competition was the main restriction. Those without a vessel or vehicle found it a problem. The road condition was not a restricting factor any longer.[37]

Let us turn to transport related restrictions. It is often stressed that transport costs are of the greatest importance, while reliability and flexibility grow in importance, especially for high-value and perishable goods. The HFs confirmed this. For 13 of 18 HFs, the ability to deliver faster, whenever, and with larger volumes were the most important transport-related impacts. It was in accordance with firm preferentials in developed countries with advanced transport networks. Being a perishable good, fish selling prices are extremely sensitive to delays.[38] Of second importance was reduced VVOCs or vehicle renting cost. Access to more customers and markets was least important. Production restrictions shifted from transport related ones toward restrictions associated with a market system.

7.4 Upgrading of fishing vessel and road motor vehicle fleets

Fishing vessel ownership, sizes and load capacity

Vessel ownership among fishers is comparable to land ownership among farmers. To purchase a big vessel is expensive. In 2000, a fully equipped big vessel cost two million pesos. It took two months and required six to eight carpenters to build. Vessel sizes ranged from between small manual and big. The latter fell between 3.1-15 gross tons, but the

[37] Production restrictions amongst HFs and GTOs in Infanta town and Banugao followed those in Dinahican.
[38] Effects of delays were sector specific. Furniture makers in Banugao stressed they were not effected by delays to the same extent. Customers could wait for delivery and furniture could be stored.

average was eight (KI10, Dinahican 2001). Medium vessels load up to 1,000 kilos. Table 7.3 show changes in vessel ownership.

Table 7.3: Number of fishing vessels owned by Dinahican household firms 1990–2001, distributed by size.

Year	Small	Medium	Big	Total vessels	HF with no vessel
1990–1992	3	2	2	7	13
1993	2	3	2	7	13
1994	6	3	2	11	11
1995	3	4	4	11	11
1996–1997	4	4	5–6	13–14	9
1998–1999	3	4–5	6–7	13–15	9
2000–2001	3–4	7	9–11	19–22	7–8

Source: HF, Dinahican 2001.

While an increase in the number of vessels started already during the road construction in 1994, especially the frequency of big vessels increased since 1995. Big vessels increased fourfold from 1994 to 2000, medium more than doubled, while the small vessels reduced to almost half of that in 1994. One fisher (HF No. 5, Dinahican 2001) invested in a feeder vessel that fished in the Pacific and 'fed' medium vessels with captures. The HFs not owning a vessel declined during the period.

The increase in vessel ownership amongst the HFs followed the general pattern in Dinahican. Before 1995 there were two big and around 40 medium vessels in the fishing fleet (HR No. 6, 28, Dinahican 1999; 2001). This increased to between 35-38 big and around 60 medium vessels in 2001 (KI10, Dinahican 2001). The number of big vessels remained the same in 2005 as few could shoulder costs. Medium and small vessels exceeded 200. The increase in local vessels was due to the population increase, few alternative income sources, and fishing still being a secure income (Ibid 2005).

Partnership was a common labour relation, when investing in vessels. Brothers or friends, mainly Visayans, saved money or acquired capital from brokers (HR No. 48, Dinahican 2001). Starting with a medium vessel they later upgraded. Such cooperation was associated with less risks and expenses. Of the HFs, 70 % borrowed money from brokers outside Infanta in 2001 (another 10 % from banks, 10 % from moneylenders, and 10 % not borrowing at all). The conditions of the fishing fleet in Catablingan were different. The number of vessels in Catablingan remained stable at around 20 small non-motorised (mostly) vessels between 1990-2005 (KI14, Catablingan 2005). A straight coastline unable to give shelter to a port and big vessels as well as low accessibility by land, were the main reasons why the number of vessels and/or vessel sizes did not increase.

Road motor vehicle ownership and sizes

The three major fish-dealing families owned the first five jeepneys and the first light truck in Dinahican. Among the other vehicle owners a huge majority wanted to own a vehicle before the road project, but they could not shoulder costs or were deterred from it.[39] Profits were low due to high VVOCs, delays, and low load capacity (HF No. 5, Dinahican 2001). The road project solved this problem. The brokers' confidence increased and capital was

[39] Lack of money was the major reason for all HFs in Banugao not owning a vehicle before the project.

extended, which allowed these small entrepreneurs to purchase vehicles (table 7.4), as a steady supply of fish could be assured (HF No. 21, Dinahican 2001).

Table 7.4: Number of motor vehicles owned by Dinahican household firms 1990–2001, distributed by vehicle type.

Year	Jeepney	Light truck	Total motor vehicles
1990–1992	5	1	6
1993–1994	4–5	1–2	5–7
1995–1997	6–10	4–6	10–16
1998–1999	9	8–9	17–18
2000–2001	7–8	9–10	17

Source: HF, Dinahican 1999; 2001.

The purchasing of motor vehicles started almost parallel with that of vessels and increased almost 150 % from 1994 to 2001. Light trucks increased fourfold. Jeepneys increased by only 40 %, peaked in 1997 and then started to decline due to lower load capacity and higher VVOCs than trucks. In 2005, there were more than 20 trucks and 11 jeepneys owned by Dinahicans' (HR 6 & 58, Dinahican 2001, KI10, Dinahican 2005).[40]

Not until 2003 did a Catablingan household own a four-wheeled vehicle. The major reasons were the lack of a bridge across the river Agos, low intramunicipal accessibility, and very low economic activity in Nakar in general. After the completion of the bridge in 2002, a change took place. In 2005 there were five owners, two jeepneys (purchased 2004), one light truck (purchased 2004), and two passenger vans (purchased 2005) (KI14, Catablingan 2005). The river Agos no longer restricted intermunicipal movements.

Investment in production factors among household respondents

Table 7.3 and 7.4 showed how HFs had invested in production factors. As the less affluent Dinahican households also have increased their incomes (see chapter 9), a huge majority being fishers, it is interesting to see if they invested as well (table 7.5).

Table 7.5: Number of fishing vessels owned by Dinahican household respondents 1990–2001, distributed by vessel size.

Year	Small non-motorised	Small motorised	Medium	Total vessels
1990–1994	5–6	4–5	1–3	10–14
1995–1996	6–7	7	5–8	18–22
1997–1999	8–10	11–13	8	27–31
2000–2001	10–12	11	8–9	29–32

Source: HR, Dinahican 1999; 2001.

The total number of vessels increased considerably after the road project. A majority of those investing in medium vessels were 'natives' and to a lesser extent Visayan migrants. Migrants from Mindanao mainly owned small non-motorized vessels or no vessels at all. Many purchased small vessels from others who had upgraded to larger vessels or worked as full-time fishers on big vessels. No household could afford to invest in a big vessel.

[40] The number of road motor vehicles also increased amongst HFs and GTOs in Infanta town and Banugao.

The huge investments among HFs and HRs in fishing vessels and motor vehicles with larger load capacity after the road project resulted in higher production and trade capacity in the Dinahican fishing sector. The situation in Catablingan remained unchanged.

7.5 Fish landed at Dinahican fishing port

Higher fish production capacity, brought about by additional and larger fishing vessels, should manifest itself in increased fish landing, given that fish resources are available. The year 1995 could be regarded as the start of a new phase of the Dinahican fleet. After 1995, 35 big vessels practiced commercial fishing in the Pacific and three in Lamon Bay. A vessel stayed at sea six days during good weather conditions and ten days during bad conditions before 1995, while two and six days respectively after. Table 7.6 shows average fish volumes landed by big Dinahican vessels. Small and medium vessels are excluded due to the lack of reliable data.

Table 7.6: Estimated average volumes of fish landed by big Dinahican vessels at Dinahican fish port 1990–2004, distributed by year and season (metric tons).

Year	January – February		March – August		September – December	
	Good weather	Bad weather	Good weather	Bad weather	Good weather	Bad weather
1990–1993	1–3	0–1	4–6	1–2	1–2	0–0.5
1994–1996	1–3	0–1	5–7	1–2	1–2	0–0.5
1997–1999	4-5	0–1	10–12	1–2	2–4	0–1
2000–2001	4–5	0–1	10–15	3–5	2–4	0–1
2004	+30–40 %	+ 30–40 %	+ 30–40 %	+ 30–40 %	+ 30–40 %	+30–40 %

Note: Between 1990-1993 vessels from locations outside Dinahican also included.
Source: KI10, Dinahican 2001; 2005.

Fish volumes landed at Dinahican fishing port exploded after 1997. Only three to four vessels, including non-Dinahican vessels until 1993, delivered every four or fifth day until 1996. After 1997, four to six vessels (excluding non-Dinahican vessels) delivered 3 to 4 times/week. Taking landings in March as an example, monthly landings up until 1993 totaled 24 to 42 metric tons (calculating with 7 landings), while 35 to 49 metric tons between 1994-1996 (7 landings), and 225 metric tons (15 landings) in 2001. While landing frequency and the number of vessels was not known in 2004, assuming the same frequency and number of vessels as in 2001, landings totaled 195 to 315 metric tons, almost a sevenfold increase compared with landings before the road project.

As big vessels master rough weathers better, fish landing during bad months increased. But fishing was still limited from late September through to January due to typhoons. To compensate for the low catch, around ten vessels ventured around Luzon Island north tip and continued to the South China Sea where they fished tuna during this period (see map 1) (KI12, Dinahican 2005). From there, captures were delivered to Manila and Cavite.

The increase in landing was confirmed by the HFs. Out of 19 HFs, 16 had increased their landings after the completion of the road project. Among those increasing, four increased 30 to 60 %, six 50 to 150 %, and six 150 to 300 %. One former major fish-dealer had decreased volumes, while another that invested in a light truck and big vessel increased.

The large increase in landings by big vessels was, according to the village captain (KI10, Dinahican 2005), a combination of big vessels, and new methods and equipment. It resulted in a larger and faster catch per effort, more frequent fishing throughout the year, and the catch of high-grade fish. With anchored nets, fishers could investigate and empty the nets more often, between 3 to 4 times per week in 2005, up from 1 to 2 times per week before. Stationary nets improved efficiency and saved costs, time and money.

Also, more non-Dinahican vessels land their catch in Dinahican. In 2005, around 10 dealers from Polillo Island delivered to Dinahican where they resold to bigger dealers. Accordingly, many vessels relocated their landings to the fishing port in Dinahican. The improved road accessibility certainly contributed to this.

There was no official data on fish landings in Catablingan. According to the village captain (KI14, Catablingan 2005), the catch per vessel has decreased. From between 0-30 kilos/vessel during the good season (June-August) and between 0-20 kilos/vessel during the bad season (waves broke the vessels) in 1995, to between 0-20 and between 0-10 kilos/vessel during the good and bad season respectively in 2005. The main reasons for this were the influx of Catablingan fishers and intrusion of vessels from Dinahican.

7.6 Fish deliveries

Vehicle owner deliveries

The increase in landing has resulted in additional and larger fish deliveries per trip to fish markets outside the study area. Table 7.7 shows HFs deliveries between 1990-2001, excluding deliveries when they rent their vehicles to others.

Table 7.7: Estimated average fish delivery frequencies 1990–2001, distributed by Dinahican household firms (No.).

Delivery frequency	1990–1991	1992–1993	1994	1995	1996	1997	1998	1999–2001
Almost daily	2	3	4	4	6	6	6	5
20/month	–	–	–	–	–	1	–	–
12–15/month	3	3	3	3	2	–	–	1
6–10/month	2	2	2	3	4	6	5	6
4–6/month	4	4	6	8	8	8	8	7
2/month – <2/month	2	2	2	–	–	–	–	–

Note: In 1997 one HR included. Variations between fishing season are adjusted for. Almost daily is equivalent to 6/week. Total average monthly deliveries based on each respondent average deliveries.
Source: HF, Dinahican 1999; 2001.

Average delivery frequency has exploded. From 1994 to 2001 total yearly deliveries increased between 504-576. Deliveries peaked in 1997, between 936-1,032 higher than in 1994, and then declined due to competition from new dealers (HF No. 1, 62, Dinahican 2001). The decline was compensated by larger volumes per delivery and the renting out of vehicles to others. But not all increased deliveries:

> *"Despite an improved transport situation, we as the former major fish dealers decreased our deliveries due to competition. Market shares transferred to new actors"*. (HF No. 11, Dinahican 2001).

Deliveries continued to increase between 2001-2005.[41] During the good fishing season in 2005, between 70-84 light trucks and jeepneys delivered fish outside the study area per week (KI10, Dinahican 2005), or 280 to 336 deliveries per month. It was a substantial increase from 2001, but also compared to the 1997 post-project high. It should be noted that increased deliveries immediately after the road project were less related to increased catches, but instead to declined post-harvest losses previously caused by delays.

Vehicles for hire for fish delivery

The vehicle owners also facilitated renting services and could increase incomes three times (HR No. 27, Dinahican 2001). While it was very difficult to rent a vehicle before 1995, it was easy after (HR No. 67, 68, Dinahican 2001).[42] A combination of bigger captures and more people being able to participate in dealing, influenced by the road project (HF No. 13, Dinahican 2001), generated a demand for vehicles (table 7.8).

Table 7.8: Dinahican household firms' estimated monthly renting out of vehicles for fish delivery, 1990–2001.

Year	Total no. of monthly renting out	No. of HF renting out vehicle	No. of HF never renting out vehicle
1990–1994	24–27	6–7	2–3
1995–1996	84–89	9–10	5
1997	104–112	15	6
1998–1999	80–88	14–16	6–8
2000	62–66	14	7
2001	45–51	14	7

Note: In 2001 operators charged 130 to 140 pesos/fish-box, up from 100 to 110 between 1990–1994 (HR No. 28, 58, 70, Dinahican 2001).
Source: HF, Dinahican 1999; 2001.

While yearly renting out averaged between 288-324 until 1994, it increased to around 1,000 in 1995, peaked to 1,344 in 1997 and then declined to between 540-612 in 2001 mainly due to competition. Also, more dealers only delivered their own catch as it was, contrary to before 1995, profitable to deliver less fish. Finally, vehicle owners wanted to reduce maintenance costs and vehicle depreciation, and to reach markets quickly with fresh fish. Thus, scale economies were not a priority, mainly owing to fish's perishable nature. While farmers could store produce, fishers must sell as quickly as possible.

Another outcome after 1997 was that a majority, 60 %, of the small dealers, previously delivering fish with tricycles to Infanta town, also delivered to markets outside the study area. Of the huge increase in landings since 1997 almost all was destined for outside markets where selling prices and demand were higher. Through easy access to vehicles and lower transport costs in relative terms, engagement in fish dealing after the road project became easier. This was disadvantegous for the local consumers, as they could not compete with customers in the cities.

[41] Volume and deliveries by HFs and GTOs in Infanta town and Banugao also increased.
[42] A majority of the HFs in Infanta town and Banugao shared this opinion.

7.7 Delivery destinations

Following the reduction in transport costs, the market area wherein fish could be delivered expanded (table 7.9). While Malabon in Manila is the most important market, Lucena City and other destinations, excluding Infanta town, narrowed the gap after 1996.[43] Before 1995, around half of the medium vessel owners delivered to Manila, while the remaining sold to Infanta town. After 1995, almost all of them deliver to Manila or Lucena City. All big vessel owners deliver to Manila and often to other destinations. The former major dealer families reduced their number of delivery destinations (HF No. 6, Dinahican 1999).

Table 7.9: Medium and big fishing vessels delivery destinations 1990–2001, distributed by Dinahican household firms (No.).

Year	Manila (Malabon)	Lucena City	Other destinations
1990–1993	11–12	4	2
1994–1995	17	4	1
1996–1998	18–19	7–11	3–5
1999–2001	16	13	5

Source: HF, Dinahican 1999.

As most dealers were tied to a broker they were 'expected' to deliver to them. Therefore deliveries to Lucena City and other destinations started later because of the time it took to build relationships with new brokers. Dealers with several brokers could deliver to the market where they received the highest selling price (after 1994 telephones were used to get market price information). Lucena City and other destinations may continue to grow in importance due to less congestion and similar selling prices as in Manila. Ironically, since the construction of the bridge across the river Agos, Dinahican dealers delivered fish to Catablingan. It is likely the fish had been caught in Catablingan municipal waters by intruding Dinahican vessels.

7.8 Income sources and work opportunities

As noted earlier, it was easier to engage in fish dealing outside the study area after the road project as the number of vehicles facilitating delivery services increased. Also, it was much easier to get access to capital in order to invest in production. Table 7.10 shows the HFs changes in income sources.

Table 7.10: Income sources 1990–2001, distributed by Dinahican household firms (average yearly number).

Income source	1990–1994	1995–2001
Fisherman	4.0	3.0
Fish-dealer	12.5	16.0
Small vessel	3.0	3.0
Medium vessel	2.5	5.0
Big vessel	2.0	5.0
Jeepney – delivering fish	3.0	7.5
Light truck – delivering fish	1.0	7.0

Note: Based on an average of 18 households 1990–1994 and 20 households 1995–2001.
Source: HF, Dinahican 2001.

[43] While Manila dominated as delivery destination amongst HFs and GTOs in Infanta town and Banugao, both before and after the completion of the road project, its dominance declined.

The major change in the period following the road improvement was that a larger number of HFs was engaged as dealers and vessel and vehicle owners at the same time. In 2001, eight HFs were fish-dealers, big vessel owners, and vehicle owners at the same time, up from one before 1993 and three in 1994. It showed that the previous concentration of economic power had been distributed among more actors after the road project.

As major employers, the HFs have knowledge about the community's job situation. A very positive development had emerged according to the HFs. Almost 90 % stated that employment had increased since 1995, especially as hired fishers, drivers, vessel builders, haulers, and other fisheries-related services. The ease of renting a vehicle enabled the emergence of small dealers. It was also a common opinion that farmers had benefited less.

A medium and big vessel employed on average 15 and 30 fishers respectively. Given the increase in vessels among the HFs between 1994-2001, an additional 330 jobs (60 by medium vessels, 270 by big vessels) had been created by the HFs alone. Taking the total increase in big vessels in Dinahican, around 1,000 additional jobs had been created.[44] The expanding fishing sector also created demand for other services, and attracted people from outside Dinahican. *"My husband heard about Dinahican through friends. Therefore we moved from Manila in 1995 and opened up a tailor shop. We expanded fast and decided to open up another shop in Infanta town".* (HR No. 102, Dinahican 1999). Tricycle operation was another example of how a growing fishing sector created work in other sectors (see chapter 8).

The village captain (KI10, Dinahican, 2001) confirmed this. The unemployment rate among adult men was almost non-existent and underemployment was very low. Those underemployed were mainly migrants and sons. Around half of the women were employed or self-employed. Women's underemployment rate was not known. The village captain in Catablingan (KI14, Catablingan 2005) had the opinion that the major difference in his village was that Dinahican's had regular work and many have access to vessels.

Intravillage distribution in Dinahican

This section presents and analyses the distributional outcomes of job opportunities (table 7.11) among households located in places with different intravillage accessibility. Dinahican has huge intravillage disparities. Four locations: the Village center, Along national road, Visayan village, and Beyond Visayan village, were identified. The Village centre and Along national road had the highest accessibility, followed by Visayan village, and finally Beyond Visayan village which had very low accessibility.

Accessibility also corresponded to respondent origin. Households in the Village centre and Along national road mainly originated from Dinahican. People in Visayan village and Beyond Visayan village were mainly immigrants, in the former mainly from the Visayas. In Beyond Visayan village, migrants also came from Mindanao Island. Hence location and level of accessibility followed, to a large extent, the household members origin.

[44] HFs in Infanta town and Banugao also increased their number of employees.

Table 7.11: Dinahican household respondents' perceptions of job opportunities and households with a family member who got employed since 1995, distributed by intravillage location (%).

Job opportunities	Total	Village centre	Along national rd.	Visayan village	Beyond Visayan village
Difficult*	25	–	18	–	50
Same as before	7	–	–	–	17
Easy**	68	100	82	100	33
Household member who got work since 1995	71.5	75	59	73	58

* Includes hard, harder, and much harder. ** Includes easy, little bit easier, easier, and much easier.
Source: HR, Dinahican 2001.

Intravillage outcomes showed huge disparities. Only 32 % of the households in Beyond Visayan village found it somewhat easier to some extent to find work after 1995, while 100 % of the households in the Village centre and the Visayan village found it so. One explanation of why Visayans found it easier to find work than to households Along National road was due to Dinahican's orientation towards the fishing sector. Many people in Visayan village were sought after as fishers etc. The households Along national road mainly earned their incomes from non-fishing sector employments and occupations.

The share of household members who became employed 1995 was very high, but disparities were huge, spanning between 58-75 %. Households with high participation rate in fishing related activities (Village centre, Visayan village) had the highest shares. Accordingly, a lower share of the households Along the national road got work. While a huge majority of the households in Beyond Visayan village were fishers, their socio-economic networks were poor, access to resources limited, and due to low accessibility they were partly isolated from the center of activities. Despite this disadvantaged situation a majority had a family member who became employed after 1995.

7.9 Fishing sector-related incomes

Given the increase in fish landing and employment in Dinahican it is possible to assume that it has had a very positive effect on the household firms incomes (table 7.12), and also on other groups in Dinahican (see chapter 9).

Table 7.12: Average monthly gross incomes 1990–2005 among fishing related groups in Dinahican (pesos).

Year	Employed fisher – small &medium vessel	Employed fisher – big vessel	Owner – medium vessel	Owner – big vessel, medium & big fish-dealer, vehicle owner
1990–1994	3,000–8,000	n.a.	20,000	36,000
1995–2001	6,000–10,000	12,200–21,300	30,000–40,000	100,000
2005	n.d.	n.d.	42,000–44,000	150,000–160,000
Year	Casual labour (20 days/month)	Jeepney driver (delivering fish)	Hauler (delivering fish)	
1990–1994	2,500	500/trip	300–400/trip	
1995–2001	4,600–5,000	700–1,000/trip	500–600/trip	

Source: KI10, Dinahican 2001; 2005, HR No. 6 & 42, Dinahican 2001.

All fishing sector related groups increased their incomes considerably after the road project. Big vessel owners increased their incomes fourfold, while the remaining groups doubled or almost doubled them. Also, a new group, employed fishers on big vessels was

created. It gave steady incomes to former small-scale fishers. While big vessel owners continued to increase their incomes remarkably after 2001, mainly due to a greater number of nets and the ability to investigate nets more frequently, medium vessel owners' incomes started to phase out. A reason for this development could be initial overfishing.

From a distributive perspective, the changes were quite positive. However, in terms of real money the higher income groups increased much more relative to other groups.[45] This pattern was not exclusive for Dinahican, but followed a general pattern in all villages (see chapter 9). So, disparities widened. This was also the perception of others:

> *"All have benefited but disparities have widened. Around 30 % of those engaged in fishing benefited very much. But choosing between this situation and the situation before the road project, almost everyone would chose the present situation. Had it not been for the project we had been much worse off".* (KI10, Dinahican 2005).

> *"It is obvious that more families build their own houses and own fishing vessels".* (HR No. 28, Dinahican1999).

The HFs confirmed the findings in table 7.12. Out of 17 HFs, 13 increased their incomes substantially after 1995, three had the same income, and one decreased.[46] Between 1999-2001, incomes continued to increase among ten and four had the same income. Three had lower incomes, as the profit margins were lower due to competition.

The incomes increased considerably among all fishing sector-related groups after the road improvement. As fish production increased more fish was sold. Increased competition among dealers led to higher selling prices for fishers. Due to improved transport conditions, post-harvest losses were reduced and the selling prices at fish markets were higher as the fish delivered was fresh. Reduced transport costs and delivery times also allowed bargaining for purchasers and fishers. Finally, a general increase in fish prices, domestic and international, especially since the mid 1990s, and more efficient fishing raised the incomes in Dinahican (KI17, Infanta town 2001, HR No. 8, Dinahican 2001).

7.10 Competition in the fishing sector

The situation before the upgrading of the road project

Before the road project, Dinahican's low accessibility resulted in, or rather reinforced an uncompetitive production system. The absence of a telephone system added to this. Until the mid 1990s, three local families controlled the fishing sector (HF No. 5, 28, Dinahican 1999; 2001). These families, who got access to radio communication withheld information from the fishers and controlled prices. Each family had a large number of fishers delivering their catch to them. Slowly, an in-migration of skilled fishers started.[47]

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[45] Salaries are also paid in catch. Sharing systems among the crew usually include deduction of all operating costs before the residual is divided. The vessel owner receives 25 % and the crew the remainder (HR No. 38, Dinahican 2001). The system is common in the Philippines (Krinks 2002).

[46] Six out of eight HFs in Banugao increased their incomes substantially after the road project was completed.

[47] Competition also became harsher amongst HFs in Banugao and Infanta town.

> *"We did not, or did not want to, foresee the influx of local fish-dealers. When our vehicles became too old and we had not invested in big vessels or vehicles our status as major dealers was lost. Since then only one is still a major dealer, while mine and the other family perished due to a competitive situation we could no longer control or face".* (HF No. 41, Dinahican 2001).

The citation above gives a picture of the situation before 1995. When asking the former major dealers what their situation would be without the project they respond: *"Higher profit"*, and *"I had no problem with the road before the project"*. (HF No. 6 & 41, Dinahican 1999). But the huge majority was restricted. On the same questions the other HFs answered: *"Economic progress would have been slower"*. (HF No. 21 & 38, Dinahican 1999), *"More delays and higher maintenance costs"*. (HF No. 20 & 28, Dinahican 1999), *"Not possible to deliver fish whenever"*. (HF No. 5 & 16, Dinahican 1999), and *"High-tech fishing would not be possible"*. (HF No. 11, Dinahican 1999).

A fishing epoch comes to an end – old actors leave and new enter

In November 2004, the No. 1 fish-dealing family pulled out of the fishing sector, most likely forever, when they sold their last big fishing vessel. An era, stretching over 41 years between 1963-2004, had ended. While not asking about the reasons for pulling out, as a strain of sadness but also bitterness came into Ludy's voice, one can still speculate. Had competition become too fierce? Was she perhaps simply tired and did not have the strength to carry on? Or had none of her children or grandchildren the interest or skill to take over what their mother and grandmother had build up? Perhaps a combination was most likely. Put in a family perspective this must have been devastating, while seen from a transformation perspective, only another phase in a continuing process.

The fishing oligopoly ended when brokers started to extend capital. Before 1995, there were no medium fish dealers in Dinahican. In 2001, there were at least six big and seven medium Dinahican dealers (HR No. 28, Dinahican 2001). There was no definite number of small dealers as their operations were irregular.

When asking the HFs about the competition situation in the fishing sector after the completion of the road project there is a mutual agreement (70 %) that the competition situation was reinforced after the road project. Competition was strong before but it became fiercer after. As to competition origin, a large majority, 62 %, stressed competition initially came from within Dinahican and later from elsewhere (see appendix 7).

Since 1997, competition was reinforced through improved equipment and external demand (HR No. 11, Dinahican 2001). Those stressing that there was no competition were the source of competition themselves. Today no dealer has the ability to satisfy the demand for fish inside or outside Infanta alone (HR No. 6, 8, 29, 58, 62, Dinahican 2001). The actors who controlled the sector have lost it.

Who then has benefited? Competition between dealers benefited fishers and vessel owners (HR No. 28, 58, Dinahican 2001). It was a common opinion that dealers from outside drove up prices. Others (HR No. 8, 29, 70, Dinahican 2001) meant that additional vessels

and fish supply benefited everyone as no one could handle these volumes alone. Seen from a distributive perspective this was positive.

While no formal freight rate system existed, the *suki* system was still partly followed. The system expected that customers did not jump between operators to receive lowest rates.

> *"Even if I dumped freight rates fishermen still waited for their regular transport operators, even if the operator was in Manila and they would save time and money delivering with me"*. (HF No. 21, Dinahican 2001).[48]

Before the advent of the road project no operator outside Infanta was engaged in fish trade. The old system came under pressure when new operators from outside and within Dinahican entered the market, especially after 1997, and lowered rates.

> *"When transport operators from outside entered and lowered costs we understood we must follow in order to stay in business"*. (HF No. 5, Dinahican 2001).

Until 1999, the new operators had a problem establishing themselves.[49] As migrants could chose any operator natives were stuck in obligations and friendship relations, the system started to wither. As local operators were forced to lower freight rates, smaller dealers not owning their own vehicles benefited (HR No. 70, Dinahican 2001). Today many small and medium vessel owners sell their catch directly to the new dealers. In 2005, around five to six light trucks from Manila, Lucena City, and Sta. Cruz arrived in Dinahican 3-4 days per week during the good season to purchase fish (KI10, Dinahican 2005).

The competition was strengthened in 2001 when the new fishing port was completed. Of 20 permanent fish stalls at the new port 15 were from Dinahican. The remaining was from Manila, Lucena City, and Atimonan.

> *"If competition becomes fiercer we may experience a future scenario where few very big vessels and dealers, all from outside Dinahican, control the fishing sector"*. (HR No. 58, Dinahican 2001).

Contrary to the situation before 1995 this competition was anticipated by the locals, and they were, therefore, better prepared. Earlier no one, or few, expected outsiders to find their way to Dinahican.

As the road project reduced interaction costs to outside markets and given the study area's potential as a fish supplier, the fishing sector in Dinahican shifted from one controlled by few protected actors to a competitive one. The competition came both from within and outside. The *suki* system, a system nurtured by low competition, lost much of its influence, mainly to the former major fish-dealers' detriment. Given the increased status of the fishing community and the construction of the new fish port competition became even harsher. Contrary to the previous situation, the new competition was anticipated.

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[48] Total HFs was 19 in Dinahican. No. 21 meant this person happened to be the 21st person interviewed.

[49] Operators from outside only delivered to Malabon while local operators delivered anywhere and allow customers to take detours. A detour can go via a city to make purchases or visit family members.

7.11 The fishing conditions and the future sustainability of the fishing sector

The village captain did not want to acknowledge the problem with overfishing. Instead the Pacific was referred to as not being possible to over-fish. A huge majority, 70 %, of the HFs responded in 1999 that fish supply had continued to increase, mainly as a result from the vessels ability to venture further out in the Pacific and fishing with big nets. Many net fishers shared the rights to investigate and empty their nets with others by charging fees. Some expressed that shoreline fishing is almost impossible. Here supply decrease yearly.

Turning to medium vessels practicing hand-line fishing, one KI (No.13, Dinahican 2005), owning three such vessels, had an average catch per vessel above 1,000 kilos until 2000. Since then the catch had been reduced to 400 kilos. However, all three vessels were still operating, indicating that the catch was still enough to make profit and that profits must have been huge up until 2000.

There was a greater consensus concerning the conditions in municipal waters. The village captain in Catablingan (KI14, Catablingan 2005) stressed that overfishing was due to intruding vessels from Dinahican and more fisher in Catablingan. Overfishing was also due to net sizes. Net fishers catching a specific fish only keep this fish and threw away the remaining small fish. The reasons for overfishing in municipal waters in Dinahican were, together with more advanced equipment, the same. Some respondents in Dinahican also mentioned destructive dynamite fishing (KI13, Dinahican 2005). When this method is practised, overfishing is usually approaching or is present. Conflicts over access to fishing areas and what type of gear should be used are present in Dinahican.

7.12 Analysis

In this chapter, the *first reaseach question* has been dealt with, namely what changes have taken place within the local fishing sector's production and distribution system after the completion of the Famy-Infanta road project.

The main findings were that fish production and export to the major urban markets outside the study area increased substantially after the completion of the road project in the major fishing community, Dinahican in Infanta. Manila is still the major export market, but other markets share has increased.

After the road project, investors' interest in providing capital to invest in production inputs increased as the former major restriction to fish production, poor transport conditions to markets outside the study area, disappeared. Due to this improvement, post-harvest losses were reduced and the selling prices at fish markets were higher as the fish delivered was fresh. As production increased, a great number of people were engaged as fishers and fish dealers, more people owned vessels and vehicles, and were engaged in other fishing activities. Export of fish to markets outside the study area increased a lot, while the selling of fish at the local market declined. As selling prices at larger fish markets are higher, this trend will most likely prevail. The road project influenced this development.

Increased competition among dealers and transport operators generated reduced transport costs and led to higher selling prices for fishermen. Reduced transport costs and delivery times also allowed bargaining for purchasers and fishers, further benefiting fishers. Through this, incomes increased considerably among all fishing sector related occupations and employements. However, in real money terms incomes increased much more among the higher income groups. Further, a general increase in international fish prices, especially since the mid 1990s, raised the incomes. Finally, increased incomes were also related to more fish sold and more efficient fishing and longer fishing periods.

Once the country's west coast (Manila with its huge market, export ports) and east coast (Pacific with its abundant fish resources) were interlinked with an adequate road, the complementarity that existed between the capitol city and the study area came into full bloom. This was especially so as other areas' (intervening opportunities) competitiveness and production potential diminished by overfishing, while the study area's transferability costs were lowered due to an improvement in regional accessibility.

While the road project was not the sole determinant of the societal transformation in Dinahican (see chapter 6), it enabled trade and released a previously latent production potential. Thereby, together with other measures, the road project speeded up the transformation process. Production factor investment became interesting after the road project, as the improved road enabled and fulfilled the major brokers' wish, namely: *fast and reliable deliveries of huge volumes of fish as often as possible throughout the year*. Few could assure this before the road project.

The fishing sector in Dinahican has transformed from an oligopoly system with few actors controlling production, to one characterised by competition. Contemporary Dinahican holds no gratitude to the actors who influenced the transformation of the fishing sector into its present state. Perhaps they should not as they prospered on small-scale fishers for decades. As of today, actors operate in an environment where competition becomes fiercer every year, both on land and in the waters. From examples in peripheral fishing communities elsewhere (see Skaptadóttir *et al.* 2001), close reciprocal and associational relations have lost in importance. Instead, stricter market type relations have become more dominant.

To be successful one must be flexible and constantly upgrade vessels, vehicles, and fishing methods and equipment. Actors must adapt fast and have access to capital. Those not able to face competition or that hold on to old practices too long, especially small dealers and vessel owners not able to acquire needed capital, may be marginalized and left behind. Despite this, the sector has attracted more actors than it has lost.

Dinahican has, as did the forest sector before, experienced a resource boom created by an increase in prices and quantity exported, improved transport and landing conditions. This has attracted both labour and capital to the community. Still, there is no sign of a value-added industrial location, where some of the profits have been invested. Instead, more and more people put vessels in the water. Signs of overfishing are present in the municipal waters. For local authorities, over fishing is a sensitive issue. The fishing sector employs many, especially poor people, and they contribute greatly to the local economy.

Whether this development will continue is, to a large extent, determined by the usage of resources in the near future. We are perhaps not witnessing a welfare improvement, but an unsustainable struggle over resources where the extraction of future economic growth takes place. Dinahican's population boom and the introduction of more advanced fishing methods and equipments have put pressure on the common pool resource. As long as fish resources are abundant and regulations are not enforced, the extraction will, most likely, continue.

Had the impacts emerged without the road project? It can be questioned whether a fish port had been built, an ice plant had been established, or capital had been extended. However, changes would have emerged in due time. Overfishing in the coastal waters would have forced fishers into the Pacific sooner or later.

This development did not take place in the much smaller fishing community, Catablingan in Nakar. In fact, fish production decreased after the road project. Poor accessibility by land and an unfavouralble physical geographical feature unable to provide shelter for big fishing vessels and a fishing port were the main reasons for this. Following the findings in chapter 6, the Catablingan fishing sector has, at worst, started to deteriorate due to overfishing. Overfishing is, amongst other things, related to additional fishers in Catablingan and intruding vessels from elsewhere. Unfavourable physical feature and low accessibility contributed to the self-sufficiency character of Catablingan fishing sector. It is unlikely that any kind of development in the fishing sector, resembling the one in Dinahican, will take place in the future.

Finally, except for some sector specific conditions, outcomes among the household firms and goods transport operators in Infanta town and Banugao followed, to a large extent, those in Dinahican.

Chapter 8

The effect of improved accessibility on other sectors

8.1 Introduction

In this chapter, the study's *second research question* is dealt with, namely what changes and outcomes have been identified in other sectors in terms of production and distribution after the implementation of the Famy-Infanta road project. The chapter mainly include sectors in Infanta. Sectors and economic activities included are i) the banking sector ii) land-use and values, iii) the marketing of farm goods and farm-inputs, iv) copra and rice production, v) the passenger and goods transport sector, and vi) the fuel market. Following this, section 8.8 shows how the outcomes have affected the development of new firms and local government revenues. The chapter is based on data from household respondents (HRs), household firms (HFs), key informants (KI), and goods and passenger transport operators (GTOs and PTOs).

8.2 The banking sector

Before 1996 there was only one bank in Infanta. It was a locally owned rural bank, established in 1972. According to the bank manager, historically there had been a reluctance to invest in the local economy (KI28, Infanta town 1999). Instead there had been a net outflow of capital. As lumber export dominated until the 1980s and consignments were given to firms from outside, they did not reinvest in the local economy. The remaining capital was scarce and interest rates were high.

Following the road project five new banks, all branches with main offices elsewhere, were established in Infanta town (none in Nakar). This put the former monopoly bank under pressure as the new banks interest rates were considerably lower (see appendix 8).

That the new banks are not locally owned worry some firms (HF No. 122, Infanta 1999), as profits may flow out of Infanta, leaving little capital in the local economy and drive up interest rates. Contrary to the situation before the road project, at present, the fishing, furniture, and farm sectors are locally controlled and export incomes are reinvested in the local economy. All the bank managers stress that investments in the study area increased after the road project, both from outside and from local reinvested capital and have contributed to a surge in new firms (see below in section 8.8).

With lower interest rates and Infanta being promoted as a growth area, it may be assumed that lending was easier. Two bank managers confirmed that their lending policies included a broader group of households after the road project. Two banks said there was no change in lending policy, but they did not indicate whether it was easy or difficult before. As late as 2001 could no bank transfer money, and thus simplify the sending of money, the speeding up of business transactions etc.

8.3 Land transactions and land values

Transport facilities affect land values, often referred to as non-user benefits as those benefiting not necessarily use the facilities. Investors with information about the road project and the potential of the study area, invested in land before the project started. Once the project was in progress, competition began and prices reached levels incomprehensible to many locals. Bank managers in Infanta confirm an increase in investment after the start of the project. Table 8.1 shows the changes in the number of land sales, transaction costs and land prices by different land classifications in Infanta.

Table 8.1: Land sales, transaction costs, and square meter prices, distributed by land classification in Infanta, 1990–2001 (No. & pesos).

	No. of	Purchasing price (000' pesos)				Square meter prices by land classification (pesos)			
Year	land sales	<50	50–200	>200	No data	Commercial	Coastal	Industrial	Rice & Coconut
1990-91	n.d.	n.d.	n.d.	n.d.	–	500	50	100	10 & 10
1992	53	37	11	0	5	1,000	75	200	10 & 10
1993	166	122	36	3	5	1,500	75	275	10 & 10
1994	142	131	11	0	0	2,000	150	350	15 & 10
1995	140	120	14	2	4	2,500	250	500	15 & 15
1996	228	192	28	8	0	2,500	250	500	15 & 20
1997	149	110	26	13	0	3,000	250	500	15–50 & 25–75
1998	251	139	83	7	22	3,500–5,000	300	500	20–100 & 25–100
1999	237	109	66	6	58	4,000–10,000	300	500	25–100 & 50–100
2000	221	104	69	17	67	5,000–10,000	300	500	30–100 & 50–100
2001	257	159	92	6	0	5,000–10,000	350	650	35–100 & 50–100
2005*	43	25	11	3	4	n.d.	n.d.	n.d.	n.d.

* May 9th. Note: Data between 2002–2004 destroyed by typhoon.
Source: Author's compilation of KI27 information, Infanta town 1999; 2005, KI28–33, Infanta town 2001.

Following the completion of the road project, the number of land sales increased considerably after 1996 and has, since then, continued to be high. Transaction costs have also increased considerably after 1994. Prices are due to increased land value after the road project, production capacity, and accessibility to Infanta town. Increases in coconut and rice lands are also related there being to more people engaged in farming. It is in itself partly a result of increased population and economic viability since the road project.

Land sales in the coastal area and the emergence of a tourist industry

In the years preceding the project, speculators from Manila, and Laguna and Rizal provinces purchased land in the coastal area in Infanta. For example, many Dinahican's never expected an implementation of the road project, despite 50 years of promises.

The local people had little knowledge about land values, so prices were low (1 US$/square metre), and running a risk was cheap (KI34, Infanta 1999). With little or no knowledge about the project and going through life without cash, and never expecting sand on a beach to be valuable, many sold their land. Today, many regret this as prices have skyrocketed. In 1998 it was difficult to find sellers and people from outside owned about 70 % of all beach area land (ibid, Infanta 1999).

The intention of the land speculation was to establish beach resorts. With improved accessibility, residents from Manila could leave Saturday morning, reach Infanta before noon and return back on Sunday. This was not possible before 1995. In 2001, there were 25 beach resorts in Infanta, up from one in 1995. In Real, also located along the road, there are 25 resorts. In Nakar no resort has been established despite a long coastline, cheap land for sale, and a nicer beach. Nakar's low accessibility, being disconnected from the national network certainly contributes to this.

Commercial lands

A distinction between prices used by government for taxation purpose and the price set between sellers and purchaser should be made (KI35, Infanta 1999). According to the Land Registration Authority, at least 50 % shall be added to the official price (KI27, Infanta 1999). The price given by local and provincial authorities, banks, and local inhabitants do not correlate.

> *"If 10,000 pesos is registered on the Land Registration transaction form, the real price is closer to 100,000. Since the buyer must pay a 7 % tax on the purchase value, the price is set low"*. (KI36, Infanta town 1999).

Square meter price for commercial lots in Infanta town and adjoining villages were 270 and 240 pesos respectively between 1997-1998, up from 135 and 120 pesos respectively between 1994-1996 (KI35, Infanta 1999). When I studied prices among commercial and residential owners with business on their premises in Infanta town, increases were different (Olsson 1999). Among 23 respondents who owned their localities, 13 indicated an increase between 300-350 % after 1994. Those indicating 50 to 100 % increase, numbering six, had unattractive locations, while those indicating extremely high increases should be treated with caution.

Improved accessibility since the road project affected the use of land. Land previously lying almost idle, with low production and low value shifted into more productive uses. As a result, land values increased considerably. Values increased most among land with the highest accessibility and land being most attractive to people from outside. Commercial landowners saw the highest increase in value per unit, followed by industrial and coastal landowners, and finally agricultural land.

8.4 Marketing of agricultural goods and farm-inputs – implications on production

Rice-trading

As access to food in Manila was a motive to go ahead with the road project, it is important to see what have been the developments of the market for agricultural goods and farm-inputs since the road project. Considering that rice production in the study area exceeds self-sufficiency level and that the country has been a net rice importer almost constantly since 1988, it is likely to assume that traders from outside have been present ever since.

"Private rice traders from outside the study area were present before the road project, but the number increased, especially 1996/1997. Private dealers now also purchase vegetables and coconuts". (KI22, Infanta town 2001).

Due to the poor transport conditions on the old road, the profit margins were very low and the rice trade was mainly in the hands of the locals. While there were no data on the number of traders from outside the study area, the number of certified rice-retailers in Infanta increased from 50 to 65 between 1990-1994, from 70 to 100 between 1995-1999 and finally to 140 in 2000 (see appendix 9) (KI23, Infanta town 2001). This development was influenced by increased rice production, which dependen of the road project, and the economic viability of trade due to improved accessibility. Since the transport system for farmers begins at the field, any reduction in transport costs was a benefit.

"Most farmers have benefited from the road project because of lower transport costs delivering palay [unmiller rice] *to rice-mills. It is also easier to get farm inputs delivered"*. (HR No. 1, Banugao 2001).

"It cost 150 pesos/trip with tricycle to the rice-mill before the road project, while only 50 after." (HR No. 46, Banugao 2001).

Rice traders from outside entered the villages after the road project, purchased rice at higher prices compared to NFA and Infanta retailers, and then returned to urban markets in Laguna and Rizal provinces. As a result, more Infanta farmers sold to these dealers (table 8.2). The situation remained unchanged in Nakar as low accessibility functioned as a deterrent to traders. The households in Nakar still sold their produce to former dealers.

Table 8.2: Purchasers of rice and copra 1990–2001, distributed by villages (No.).

	1990–1994					1995–2001				
	Infanta villages			Nakar villages		Infanta villages			Nakar villages	
Purchaser	Infanta town	Banu-gao	Lual	Catab-lingan	Pesa	Infant a town	Banu-gao	Lual	Catab-lingan	Pesa
Rice dealer	5	2	5	2	–	8	2	12	2	–
– Infanta	–	*2*	*4*	*2*	–	–	*2*	*4*	*2*	–
– Outside	–	–	*1*	–	–	–	–	*8*	–	–
Rice-mills	2	2	4	2	–	2	2	2	2	–
NFA	7	–	4	1	–	6	–	1	1	–
Copra dealer	–	–	–	7	6	–	–	–	7	6
– Infanta	–	–	–	*5*	*6*	–	–	–	*4*	*6*
– Nakar	–	–	–	*2*	–	–	–	–	*3*	–
Total	14	4	13	12	6	16	4	15	12	6

Source: HR, 2001.

Improved accessibility also enabled rice imports. Thereby, rice bought from local farmers by Infanta retailers decreased after 1996, from an average of 70,000 kilos/year until 1996 to 55,000 kilos/year thereafter (see appendix 10) (KI22, Infanta town 2001). Cheaper high quality rice was imported after the road project (from Bulacan, a major rice production province, see map 2), while rice-mill owners and farmers sold local rice to dealers from outside. Thus, cheaper (but expensive in comparison) quality rice was imported and low quality rice was exported. It can be related to purchasing power. As incomes increased

people bought food with higher quality. The situation in Nakar did not change until the bridge across Agos was completed in 2002 (KI14, Catablingan 2005).[50]

Oligopoly control of agricultural farm-input markets

It is commonly stressed that farm input prices should decrease as transport conditions improve. In rural areas, the processing and marketing of agricultural goods are often characterised by oligopoly, with high input prices and low selling prices for producers. For example, in Infanta there were three fertilizer suppliers before 1995, and eight afterwards (KI24, Infanta town 2001). Given the high usage of fertilizers in Infanta (above national average), agri-supply must have been a lucrative business.

After the road project, fertilizer costs have increased less relative to that of the selling price of unmilled rice. Between 1990-1994 and 1994-1999 the selling price of one kilo unmilled A-grade rice to NFA increased 20 and 66 % respectively (for details, see appendix 11). The price of a 50 kilo bag fertilizer (prices followed national retail prices, FPA 2002) increased 8 and 11 % respectively (KI23, Infanta town 2001, FPAP 2002). The calculus showed that the road project benefited the rice-farmers.

Other calculations can be made. The selling price of unmilled A-grade rice increased from 5 to 6 pesos between 1990-1994 and to 10 in 1999, while purchasing a 50 kilo of fertilizer increased from 261 to 281 pesos between 1990-1994 and to 313 in 1999. Thus a farmer must produce only 8 extra kilos of rice to cover fertilizer costs. Given higher selling prices, reduced transport costs, and increased production, farmer net profit was, excluding other production costs (e.g. high increase in farm-worker salaries), higher after the road project.

Increased competition between agri-suppliers partly explained the usage of inputs and increased productivity. But while demand, transport costs, and competition affected prices, the price was mainly determined by the value of the peso against the U.S. $ (KI24 Infanta town 2001, HF No. 55, Infanta town 2001). Increased demand was due to more people engaged in farming, more cultivated land, and soil exhaustion (Ibid 2001).

Competition among livestock suppliers also became fiercer as new actors entered the market. As a result, profit was reduced by half (KI25, Infanta town 2001). Sales were also less. One supplier sold 1,000 sacks/month before the road project, while only 400 after. Less transport costs partly compensate for the loss of income. Before the road project, suppliers had to pick up goods very often due to the small trucks limited load capacity. After 1995, distributors from Lucena City deliver in big trucks whenever. However, farmers in the study area are still disadvantaged compared to farmers west of the Sierra Madre as the relatively long distances to markets generate higher marketing costs.

Measures affecting farming had implications on all villages, but mainly major rice villages (e.g. Lual, Banugao). It was more profitable to engage in rice farming in Infanta as

[50] According to the village captain in Catablingan (KI14, 2005), there was an influx of dealers after the bridge across the river Agos was built in 2002. Today dealers charge haul costs and selling prices are higher. Earlier farmers transported produce across the river and from thereon traders shouldered costs.

transport costs were lower, input prices increased less than selling price, an influx of dealers, and better initial conditions (soil, irrigation, landownership). According to the village captain in Lual (KI26, 1999), the increase was, mainly, related to the dealers offering higher prices and the lower transport costs, especially if other conditions were fulfilled. These conditions were, to a large extent, not fulfilled in Nakar that still struggled with high input and transport costs, and an absence of traders due to low accessibility.

Rice production

While no production data for palay (unmilled rice) was available before 1995, officials stressed that production was lower compared to in 1995 (KI1, Infanta 2001). At the same time, between 1995-2001, the cultivated rice area increased slightly in Infanta, while total production increased considerable (table 8.3).[51]

Table 8.3: Palay production in Infanta, 1995–2001.

Year	Total production one harvest (million tons)	Area planted (ha.)	Average yield (metric ton/ha.)
1995	4.75	1,529	3.1
1998	4.63	1,206	4.5
1999	5.12	1,405	3.6
2000–2001	6.98–7.11	1,552	4.5–4.6

Source: KI1, Infanta 2001.

In 1995, average yields in Infanta were about 10 % higher than the national average and almost 50 % higher after the road project (NSCB 2000a). The production was affected by weather, access to markets, credits, the area under cultivation, ownership, but in particular it was dependant upon inputs. The usage of irrigation, fertilizer, and hand-tractors had improved in Infanta (KI1 Infanta 1999, Olsson 1999).[52] Except from poor irrigation, there was no data in Nakar.

8.5 The copra industry

While the copra industry is declining in the study area, it was still very important, especially in Nakar. In Catablingan, 24 households out of 60 were engaged in copra 2001, down from 29 in 1996/1997. In Pesa, 13 out of 34 households were engaged in 2001, down from 15 in 1997.

Unprocessed copra has always been traded in the study area. Before privately owned trucks appeared in the 1960s, copra was shipped to refineries in southern Quezon province. Since the 1960s, the trade followed an oligopoly system where four families, three from Infanta town and one from Dinahican, controlled the trade and divided the production areas between themselves. Two families were established in the 1960s, one in the 1970s, and one in the early 1980s. The first dealer started when Chinese copra brokers in Manila financed his, himself of Chinese descent, truck.

[51] The increase occurred despite few incentives among tenants to increase production.

[52] Average fertilizer usage increased from 225 kilos per hectare between 1992-1994, to 300 kilos per hectare in 1998. Hand-tractor usage increased from 65 % in 1992 to 85 % in 1995, and 93 % in 1998. The farmers in Lual, Infanta, increased inputs considerable after 1994 (Olsson 1999).

> "*One family alone did not have the capacity to handle the copra trade. Instead cultivators were divided between us. Everyone had their share and there was no need to compete."* (HF. No. 24, Former Major Copra Dealer, Infanta town 2001).

Information about selling prices before the road project was scarce and cultivators were dependent on traders. The situation changed after the project. The access to the telephone in 1994 made information more accessible to cultivators and improved accessibility enabled new actors to enter the market. Two former dealers withdrew after 1996. The remaining dealers competed with new actors from Nakar and Polillo Island.

Competition was reinforced in 1998 when a ferry able to accommodate trucks started to operate from Polillo to Dinahican. Two major dealers were not able or foresighted enough to upgrade their vehicles. While they continued to use trucks with a load capacity of 5 to 8 tons, others used trucks with 10 tons legal load capacity. To overload was common practice:

> "*Profit per kilo copra delivered has always been stable around 50 centavos. The more you overload, the better it is. It does not matter if you wear down the truck because it is second hand anyway. I delivered 400 sacks weighing 75 kilos each per trip (30 tons). By the time the vehicle is junk you have made a fortune. Even more so before the road project when competition was almost not existent. Today it is different".* (HF No. 42, Former major copra dealer, Infanta town 2001).

The incomes of the major copra dealers have most likely been among the highest in the study area. While all dealers agree that overloading is a must, not all agree this was possible before 1995. The biggest dealer stresses that it was impossible to load legal maximum due to poor road condition (HF No. 121, Major copra dealer, Infanta town 2001). Except for one dealer all others delivered to destinations in Quezon province after 1995. Truck-bans and traffic congestion deter from delivering to Manila nowadays.

Owing to unstable prices, low productivity, and a marketing system that is unfair to producers, the road project did not generate economic growth among copra-farmers. While the competition among traders increased, profit is still based on the volume delivered. Through the road projects the traders benefited from lower transport costs.

8.6 The passenger and goods transport markets

Direct impacts of the road project

Road investments contribute to economic efficiency and productive capacity through reduced transport expenses, flexibility and reliability, and a competitive transport market. This section deals with changed variable vehicle operating costs (VVOC) and travel times (table 8.4) among public passenger transport operators (PTO) since the road project.

Table 8.4: VVOC and travel time impacts after the Famy-Infanta road project 1990–2001, distributed by passenger transport operators operating to/from Infanta town.

	Ordinary bus (OB)		Minibus	Jeepney (J)		
Impacts	OB1–2 Manila	OB3 Lucena C.	MB1–2 Manila	J4 Manila	J1,3 Real	J2–3 Siniloan
Average travel time (hours/one way)						
1990–1994	6:30–7	6:45	n.s.	n.d.	1–1:10	4:30– 5
1995–2001	3:45	3:35	3	n.a.	0:20–0:25	1:30–2
Travel time reduction						
minutes	165–195	190	n.a.	n.a.	40–45	180
percent	42–46	47	n.a.	n.a.	64–66	66–60
Reduction in litres of fuel (%)	13–19	n.d.	n.a.	50	17–34	33– n.d.
Oil change (months)						
1990–1994	1	n.d.	n.s.	1	1½–3	1½
1995–1999	20 days	n.d.	n.a.	1	3	3
Tyre change – months (2 tires/time)						
1990–1994	1–2	n.d.	n.s.	4	1–2	1½
1995–1999	2	n.d.	6	5	2–4	2–2½
Total maintenance cost reduction (%)	35–50	n.d.	n.d.*	n.d.	20–50	50–80

* MB2 stressed operating costs reduced 100 per trip from 1994 to 1995.
Source: Author's elaboration of PTO information, Infanta town 1999; 2001.

VVOCs and travel times (during good weather conditions) reduced considerable after the road project. Travel speed almost doubled and lay within estimated traffic speeds on other major Philippine roads (NEDA 1998). Thereby the study area's level of accessibility improved compared to other areas with similar pre-project accessibility condition i.e. *Below Basic Accessibility*. Ordinary bus travel time one way to Manila and Lucena City decreased around three hours, jeepney to Siniloan two hours, and jeepney to Real 45 minutes. Travel time to destinations closest to Infanta decreased most in percent as the mountain ridge made up a larger share of the total distance.

Reduced fuel consumption resulted mainly from less running time and accelerations. Ordinary buses saved 10 to 15 litres/one way to Manila, jeepneys to Siniloan saved 5 to 10, and minibuses to Manila saved almost 15 litres compared to jeepneys before 1995. Despite an increase in running time, tyres lasted longer due to straightened curves and driving habits. Oil change was almost the same due to increased running time. Maintenance savings were very high, but spare part costs increased after 1998 partly due to the Asian crisis and vehicle deterioration (PTO: MB 1-2, Infanta town 2001). However, mechanics stressed that less maintenance was required nowadays.

Traffic flows and vehicle composition in and out of Infanta between 1988-1999

While it is not possible to establish a direct causal relationship between reduced VVOCs, travel times, and increased traffic flows, it is hard to disqualify altogether. The average annual daily traffic (AADT) in and out of Infanta along the Famy-Infanta road increased from 326 in 1988 to 892 in 1996, to 990 in 1998, and 1,163 in 1999 (DPWH /ADB 1998, Author's MTCS 1999). It was equivalent to a 257 % increase between 1988-1999.

As the 1980s was a period of economic recession and very low vehicle registration in the Philippines (LTO, various years), the 1988 AADT data should be viewed in this light.

After 1992, the Philippine economy grew but there were no data during the years from 1988 to 1995. However, considering VVOC and travel time reductions, and that impacts in this chapter show breaks in between 1994/1995 and later, it may be assumed that the growth in traffic between 1988-1996 most likely appeared then. Expected AADT for the road in 2003 was 804 (DPWH 1989). It was exceeded as early as 1996. That AADT continued to increase, especially between 1998-1999 and despite the Asian crisis, indicates increased economic activity in the study area.

Vehicle composition

As traffic in and out of Infanta increased substantially after 1995, it is important to analyse what type of traffic has increased and their respective changes (table 8.5).

Table 8.5: Vehicle composition and share of traffic in and out of Infanta, 1988–1999 (No. & %).

	1988		1996		1998		1999	
Mode	No.	Share %	No.	Share %	No.	Share %	No.	Share %
Bus	10	3	38	4	30	3	43	4
Truck	58	18	119	13	152	15	147	13
Car, jeep	1	–	167	19	255	26	238	20
Pick-up, van	62	19	152	17	263	27	302	26
Jeepney	195	60	412	46	290	29	433	37
Total	326	100	892	100	990	100	1,163	100

Source: DPWH/ADB 1998, Author 1999.

All vehicle types increased in total numbers between 1988-1999. Cars, jeeps, pick-ups, and vans increased their shares most. Increased incomes, trade, and/or money previously available but not used to purchase vehicles due to high operating costs, partly explained this. Jeepneys' share declined 20 to 30 % after 1988. The passenger and goods jeepneys were replaced by buses and trucks with higher passenger and load capacity. It indicated increased volumes after the road project. Although, neither volume nor value may be higher, it may have been a result from more frequent deliveries. Passenger traffic increased faster than goods traffic, following a common pattern where the former usually exceeds the latter initially (Lebo & Schelling 2001).

Changes in the number of public passenger transport operators

Reduced VVOCs and travel times, a latent transport demand, and low private vehicle ownership created opportunities for additional operators to enter the transport market after 1995. Accordingly, the number of intra- and interregional PTOs increased from nine to eleven after the road project (see table 5.3). No operator operated from Nakar. Poor intermunicipal accessiblity due to no bridge connection across the river Agos most likely explained this. Other changes were:

- the number of PTOs servicing Manila and Sinilaoan increased from three to four and from two to three respectively,
- the operator servicing Sta. Cruz extended its service to Lucena City, and
- the introduction of fast air-conditioned minibuses with direct services to Manila.

Both the number of PTOs and the destinations served by public PTOs from Infanta town increased after the completion of the road project. Likewise, following an increase in household incomes, demand for faster and more convenient services gave opportunities for minibuses to enter the passenger market.

Scheduled passenger services, service hours and passenger capacity

Public transportation has existed in Infanta since the 1930s, but the number of departures and destinations were insufficient. Departures were unreliable, waiting times extremely long, and vehicles overcrowded. The situation resulted from the low economic viability of providing services due to high vehicle operating costs and low demand. The situation lasted until the road project was implemented and costs were reduced. As a result, the pressure on operators to improve and provide better services (table 8.6) increased.

Table 8.6: Average daily public passenger transport departures from Infanta town 1990–1999, distributed by mode and destination.

Year	Ordinary bus Manila	Ordinary bus Lucena City	Jeepney Manila	Minibus Manila	Jeepney Siniloan	Jeepney Real	Total
1990–1992	10–14	n.s.	15	n.s.	35–40	10	80–85
1993–1994	11	2	15	n.s.	35–40	10	72–82
1995	11	2	15	9	58–63	24	119–124
1996	12	2	n.s.	31	58–63	52	155–159
1997–1998	18–26	2–4	n.s.	25–30	66–69	52	160–179
1999	24	6	n.s.	23–28	74–78	52	181–186

Source: PTO: OB1–2, J1–4, MB1–2, Infanta town 1999.

While unscheduled departures remained stable between 1990-1994, they increased a lot after 1994 among all means and destinations, especially among those servicing Manila. For example, daily departures to Manila increased from 26 in 1994 to around 50 in 1999. Operators have also scheduled timetables (improves punctuality) and extended service hours after 1995. Jeepneys' final departure to Siniloan was extended from between 2-3 p.m. to between 5-6 p.m. All buses service Manila around the clock.

Owing to low passenger capacity, jeepneys to Manila must depart full of people to be economically viable. Therefore, to operate more often and after schedules became a detriment for these jeepneys after 1995. Competition from faster and comfortable services, especially minibuses, became too harsh. Before 1995, minibuses could not operate due to low passenger capacity and a high initial investment cost. After the road project, minibuses were economically viable due to lesser operation costs and shorter travel time. Many former jeepney owners and drivers own and drive minibuses after 1995.

As the number of departures increased and all operators passed through Real to their final destination it was difficult for Real jeepneys to attract passengers. Also, before 1995 inhabitants in Real were dependant on Infanta for services (PTO: J1, Infanta town 2001). Today, more shops are available in Real. The influx of private tricycles and tricycles for hire added to this. Finally, the improved road conditions and the high demand allowed vehicles with higher capacity. Two ordinary bus operators increased their passenger

capacities from 45 to 60, minibuses from 10 to 12, and one jeepney operator transferred to vehicles with between 18-25 passengers, up from 18 to 20 before the road project.

Vehicle units and occupancy rates

The pressure to provide good services among operators since the road was upgraded may have resulted in too many departures. There were indications of a saturated market:

> *"Since 1999, few buy minibuses with the intention of transporting passengers. People that buy a minibus today are affluent and use it only for family purposes".* (HR No. 37, Lual 2001).

Operating after set timetables and more frequently, using units with a higher passenger capacity may result in, at least, two outcomes: The number of vehicle units increases and occupancy rates, given passenger number is not increasing, decrease.

Following the increase in daily departures from Infanta town, the total number of vehicle units increased from 261 in 1994 to 481 in 1999. The number of units increased for all means and to all destinations (see appendix 12). While this was positive for passengers, it strained the economy of the operators, especially jeepneys and minibuses, as association membership could not be legally prevented. Instead, a system where a set number of units per day operate was practiced. The occupancy rate decreased for all jeepney operators after 1995, and for one ordinary and one minibus operator after 1997. One ordinary bus operator increased its occupancy rate and one minibus operator remained stable.

Passenger fares and goods haul rates – the implied differences in accessibility

Inter- and intraregional transport market

Passenger fares and hauling rates among operators in the study area followed the general pattern in the country were official rates where not followed (PTO: OB2, Infanta town 2001). The market and customers' ability to pay determined fares and rates.

Competition between passenger operators after the road project was completed benefited the riding public. Except from one ordinary bus operator, all operators increased fares less between 1995-1999 than between 1990-1994 (see appendix 13). While the official rate at 0.9 pesos/kilometre in 2001 translated into 126 pesos to Manila one way, ordinary buses and minibuses charged 100 pesos. Fares to Siniloan and Real were also lower. The operator servicing Lucena increased fares after the road project because of a monopoly situation, but still charged below the official rates. One ordinary bus operator servicing Manila increased the fare in 2000 because the other operator went bankrupt due to a combination of competition, a deteriorating vehicle fleet, and trade union problems.

PTOs also hauled goods. Before the road project it cost 1,200 to 1,500 pesos/trip to rent a jeepney, while 800 pesos/trip afterwards due to competition from private vehicles and goods transport operators (PTO: J2-3, Infanta town 1999; 2001). Another jeepney

operator, hauling fruits and vegetables, almost stopped this after 1995 and one ordinary bus operator lost 70 % of its goods hauling (PTO: OB1, Infanta town 1999).[53]

The competition among PTOs, expressed in improved services benefited the riding public after the road project. People could participate in activities outside the study area cheaper, faster, more reliable and comfortable, at extended service hours, and with greater choice of modes. It also resulted in lower freight rates. The latter was only applicable to Infanta as the absence of a bridge across the river of Agos prevented land transport to Nakar.

Inter- and intramunicipal transport market

Goods transported from the villages are mainly farm produce, while goods transported into the villages are mainly groceries, gas, kerosene, flour, construction materials etc. Personal trips were seldom separated from goods transport, but occured simultaneously, resulting in that passenger fares must be added.

Travelling back and forth to Infanta town from Infanta villages included 2 separate trips, while 4 from two villages and 6 from one village in Nakar (see figure 4.1). Differences in modal and nodal splits to reach Infanta town had severe impacts on passenger and goods costs and help us to answer questions of cost reductions in present production and future production due to improved transport conditions. Table 8.7 shows the implications from these differences.

Table 8.7: Total transport costs for one passenger and one sack of rice between villages and Infanta town , 1990–2001 (pesos/one way).

Villages	Distance (km.)	Mode	1990	1994	1995	1999	2001	Rank 1990	Rank 2001
Infanta									
Lual	2.5	Tricycle	8	8	8	10	13	1	1
Banugao	5	Tricycle	9	9	16	18	18	2	2
Dinahican	12	Tricycle	24	24	24	24	30	4	3
Nakar									
Poblacion	4	Tricycle + boat	17–27	18–28	20–30	24–34	26–36	3	4
Catablingan	6	Tricycle + boat	23–33	24–34	26–36	32–42	34–45	5	6
Pesa	12	Tricycle + boat	n.a.	n.a.	28–30*	33–35	35–37	6	5

Source: Author's analysis of PTO: TC1–6 information, 2001.

As Nakar level of accessibility worsened relative to Infanta after the road project, the transport costs between municipalities widened in favour of Infanta residents. Transport costs increased less after the road project among Infanta villages. While it was, on average, 4 pesos more expensive to transport a passenger and a sack of rice from Catablingan compared to from Dinahican in 1990, it increased to 7 in 1995, and 13 in 1999, before declining in 2001. It occured despite Catablingan is located 6 kilometers closer to Infanta town. The Magsaysay association, servicing Pesa, Nakar, was the contrary before the road project. Without a tricycle service and few operating jeepneys it resulted in a monopoly situation where fares doubled between 1990-1994.

[53] HFs and GTOs in Infanta town and Banugao confirmed the reductions, or rather, less increase, in goods haul rates in the period following the road project compared to the period before.

Further, passenger fares to Catablingan doubled between 1995-1999 and rice haul rates increased 40 %. In comparison, passenger fares and rice, copra, fish, and gas tank haul rates did not increase in Dinahican between 1995-1999. No other association managed this (for other villages and goods, see appendix 25). A reason for this was competition due to expansive economic activities since 1995. The increase in 2001 was due to fuel price hike.

Due to low accessibility, people in Nakar had higher interaction and production costs, and thereby lower competitiveness compared to their counterparts in Infanta. Low demand added to this. Had costs on feeder roads, transporting goods from the fields to the main road been included Nakar's situation had been further disadvantaged. Construction firm's confirmed that transport costs made up a large share of project cost in Nakar as construction materials had to be shipped across the river Agos (HF No. 88, Infanta town 1999). Physical barriers and modal and nodal splits had implications on transport costs. Distance was secondary. Transport costs per kilometre were also higher for the villages in Nakar, the exception was Pesa due to its long distance to Infanta town (see appendix 14).

As a result from a much higher improvement in accessibility in Infanta and its villages (and accompanying competition) compared to Nakar, passenger fares and goods haul rates (and cost per kilometre) between the villages and Infanta town increased less among Infanta villages in the period following the completion of the road project. Owing to continued low intermunicipal accessibility, being substantially below basic accessibility, both time and money expenses were higher among Nakar villages despite their closer or same distance to Infanta town compared to Infanta villages. Nakar household production costs and thereby competitiveness worsened in comparison to Infanta household's.

Inter- and intra-regional passenger transport operator incomes

Following the increase in interregional passengers and assuming that all passenger travel to the final destination, total average monthly gross income from passenger fares increased among the PTOs after the road project. Monthly gross incomes in 1999 amounted to 5.5 million pesos, up from 3.7 million pesos in 1994 (see appendix 15). In reality, incomes were higher as reduced VVOCs and travel time increased the profit per unit. But it did not apply to all operators. Due to competition, incomes decreased for some operators. Also, net income was lower when taking inflation into consideration.

8.7 The fuel market

Traffic growth since the road project was completed resulted in an expanded fuel market (table 8.8). There were three official petrol stations in Infanta in 1990, five in 1993, six in 1995, and seven in 1998. Two were located in Dinahican, two within Infanta town, and three just outside Infanta town along the national road. There were two stations in Real. There was no station in Nakar. Accordingly, fuel prices were 50 % higher as fuel must be transported across the river of Agos (HR No. 27, Catablingan 2001).

Table 8.8: Monthly average volumes of fuel sold in Infanta and Real, 1990–2001 (m^3).

Year	Infanta	Real	Total average
1990–1992	140–180	52–70	201–241
1993–1994	205	52–70	266
1995–1997	297–325	52–70	358–386
1998–1999	330–335	128–165	474–484
2000–2001	267–282	133–165	424

Source: HF No. 33, 71, 77, 83, 108, Infanta 1999; 2001 and KI20–21, Real Poblacion 2001.

While fuel volumes increased at a low pace until 1994, after that they increased considerably, in accordance with the growth in traffic. It coincided with, amongst others, the huge influx of fishing vessels and vehicles. Had the station that refused to participate been included, fuel volumes would have been much higher. The station was the major outlet for the fishing sector. The increase also occurred despite the Asian crisis. Passenger demand also remained strong during the crisis and contributed to the increase.

The responses of station owners to competition were mixed. Early established stations were most affected. Those established after the road project had the opinion that the market could carry more stations. Since 1998, three stations controlled the market, due to certain reasons. One station in Infanta had the major passenger operator as a customer. The bus station and the garage were located on land owned by the station owner. Another station was the outlet for the fishing sector. The third station was the outlet to the fishing sector in Real and had a good location. The station was spacious and convenient for big trucks. Space was, according to the owners, an important comparative advantage.

Due to competition from outside sales were below actual volumes. As it is common that a driver receives a fixed amount from the vehicle owner for fuel expenses, drivers filled their vehicles in Manila where fuel prices were cheaper. The driver kept the difference. The emergence of beach resorts in the study area was influenced by the road project. It compensated somewhat as tourists filled up their vehicles before returning home. The log-ban was a severe setback as lumber deliveries made up a large share of all truck movements out of the study area until the late 1980s. The fact that other sectors have compensated for this loss indicated that the transfer from an economy quite dependant on lumber to a more diversified economy with increasing incomes had been successful.

8.8 Local business establishments and local government revenues

A growing economy is partly a result of new business establishments. Table 8.9 shows official business permits issued in respective municipality between 1990-2001.

Table 8.9: Total number of issued local business permits in Infanta and Nakar, 1990–2001.

Year	Infanta	Nakar
1990–1991	331–368	n.d. (destroyed)
1992–1994	272–318	n.d. – 125 (in 1994)
1995–1996	440–450	159–145
1997	527	154
1998–199	438–524	193–192
2000–2001	485–455	207–241

Source: KI39–40, Infanta and Nakar 2001.

Following the road project, official permit issuments surged in Infanta after 1994, while this happened to a much lesser extent and later in Nakar. Before turning to each respective sector it is important to make some clarifications with regard to table 8.9:

- Issued permits in Nakar were around 100/year during the whole period (KI40, Nakar 2001). The remaining businesses operate during the municipal fiesta.
- Sari stores (general stores) are included in Nakar where they make up approximately 90 % of all business permits, while such stores are excluded in Infanta. Several hundred sari sari stores would be added each year in Infanta if they had been included.
- Businesses operating without a permit are excluded. This is very common in the Philippines. Officials admit that more establishments exist than are registered in order to evade taxes (Hollnsteiner 1963, WB 1976, KI44, Infanta town 2001).
- Petty traders within the study area and ambulant peddlers and distributors from outside operating without a permit, especially since 1995, are excluded. These actors' operations in Infanta outperform those in Nakar by far.

Taking the above mentioned into consideration, the establishment of new firms in Infanta came out very strong in Infanta, while it was much less impressive in Nakar. This development was influenced by the road project.

Manufacturing

According to the latest detailed data available, in 1998, there were 72 registered establishments classified as manufacturing activities in Infanta. These included 15 bakeries, four hollow blocks manufacturers, 30 furniture shops and 23 rice mills. There are others which are not registered due to being small-scale (boat building) or being illegal (furniture making). Manufacture in Nakar is almost non-existent. Small-scale processing of fliches, charcoal, boat building, and furniture making are present, but not officially documented. There are also 16 rice-mills.

Service and trade

Few service outlets were lacking in Infanta in 2005. The situation in Nakar was characterised by the opposite and inhabitants were dependent upon Infanta. In 2001 there were 194 trading and commercial firms, 102 offering personal and community services, more than 20 beach resorts, and 11 banks and financial institutions in Infanta. Wholesale and retail activities were copra and fish dealers, dry goods stores, pharmacies, gasoline dealers, general merchandisers, sari sari stores, and hardware, auto and electronics suppliers. Others were beauty and funeral parlours, dress and tailoring shops, video rentals, medical clinics, schools, restaurants, recreation halls, manpower services. In Nakar, services spanned from sari sari stores (90 %) to shipping, solicitation, building, serenade, and recreation permits during fiestas.

Local government revenues reflect the economic growth of an administrative area. While population and business growth affect revenues, these may be influenced by improved

and/or additional road capacity. Table 8.10 shows total local government revenues in Infanta and Nakar between 1990-2001.

Table 8.10: Total local government revenues 1990–2001, distributed by municipalities and by source (million pesos).

	Infanta			Nakar	
Year	Total	Local	National	Local	National
1990–1991	3.49 – 4.47	1.79 – 1.80	1.70 – 2.67	0.65 – 0.33	n.d.
1992–1993	6.30 – 9.56	1.66 – 1.80	4.64 – 7.76	0.36 – 0.49	n.d.
1994	13.18	2.47	10.71	0.39	n.d.
1995–1996	14.74 – 19.47	2.75 – 3.60	11.99 – 15.87	0.58 – n.d.	n.d.
1997–1998	25.06 – 33.08	4.99 – 11.30	20.07 – 21.78	0.52 – 0.40	n.d.
1999–2000	42.07 – 49.86	14.63 – 20.03	27.44 – 29.56	0.80 – n.d.	n.d.
2001	43.39	10.07 (Sept. 30th)	33.32	0.65	n.d.

Source: KI37–38, Infanta and Nakar 2001; 2005.

Local sources' share of total local government revenues increased considerably in Infanta after the road project. Following a modest increase between 1995-1997, revenues skyrocketed in 1998, despite the Asian crisis (revenues reached 57 millions in 2004). Revenues were, in ranked order, receipts from economic enterprises, loans (credit worthiness), and business taxes. Revenues from real property tax and fees also increased considerably as a result of a surge in land sales and land-values after 1995. Local revenues remained low and stable in Nakar, indicating poor economic growth.

Following the increase in business establishments since the completion of the road project, the local economy, measured by local government revenues, increased considerable in Infanta, while it remained low and unchanged in Nakar. Nakar worsened relative level of accessibility versus Infanta after 1995 contributed to this, especially as its physical resources are similar to Infanta. Low accessibility continued to restrict exploitation of resources in Nakar, while it enabled and released latent production potentials in Infanta.

8.9 Analysis

This chapter has dealt with the study's *second research question*, namely what changes and outcomes have been identified in other production sectors in terms of production and distribution after the implementation of the Famy-Infanta road project.

The findings in this chapter were many. First of all, as the road project brought down transport costs, new capital poured into Infanta, and the increase in land sales and land values released new capital able to invest in production. Lower transport costs also resulted in reduced production and marketing costs, it stimulated competition, more fallow land was put into productive usage, and it enabled the influx of new actors. Large amounts of capital were invested in Infanta after the completion of the road project (but also just before). Through this, several banks opened up branches in Infanta town. It became easier to participate in trade and production, as the new bank-lending policies included a larger group of people, and interest rates went down due to increased competition.

Accordingly, the number of business establishements and local government revenues increased a lot in Infanta, while it remained low and stable in Nakar. Through reduced transport and agricultural in-put costs, the production and export of rice, the major crop and the most important economic activity in terms of livelihood (measured by the number of households), increased substantially. It benefited rice farmers as well as traders. This development did not take place in Nakar or in copra production.

As economic activities increased in scope, so did the demand for transport services and fuel. As it became economically viable to provide transport services, both the number of operators and destinations served by interregional public and private operators from Infanta town increased. It also resulted in larger vehicles, better services and lower goods haul rates and passenger fares. Both the transport operators and the riding public benefited substantially as transport costs and travel time reduced. This stimulated the participation in activities outside the study area.

Total average annual daily traffic in and out of Infanta skyrocketed. Traffic increased among all modes handling passengers and goods, but in particular among cars, jeeps, pick-ups and vans. The increase coincided with and was an outcome of the socio-economic development that took place within the study area. Likewise, following an increase in household incomes, ordinary buses and jeepneys had to give way to minibuses offering faster and more convenient services. Traffic in and out of Infanta increased among all modes handling passengers and goods, but in particular cars, jeeps, pick-ups and vans.

The new situation mainly favoured the villages in Infanta that enjoyed a much higher improvement in accessibility than those in Nakar. Infanta producers' competitiveness improved towards regions outside the study area, while Nakar producers' competitiveness worsened in comparison to Infanta. In sum, a latent production potential previously not fulfilled due to high production and marketing costs were released and enabled through the road project.

In Infanta, very high interaction costs in all economic sectors and activities restricted the potential market and production in the study area before the road project. Competition was low. As the level of accessibility improved after the road project, it became economically viable for more actors to compete for market shares. As a consequence, the monopoly or oligopoly status within respective sector and economic activity was broken up. Also, improved access to information reinforced competition and put further pressure on former oligopolies. This new situation benefited the public, both customers and small-scale producers. Since then, customers' and small-scale producers' situations are more advantageous as costs are lower and service has improved. But the new situation also benefited former actors who were able to catch up with the new situation as they had to become more productive.

After the road project Infanta is an attractive place to locate firms and services and start production. Overall, the situation after the road project benefited the population in general as more people were employed and generated incomes, prices went down, services improved, and the local government revenue base increased. The oligopolistic production

systems, previously charging high costs, and with poor services could not face the competiton once the improved accessibility situation enabled and made it possible for additional actors to enter the market.

As such the road project was an input into production and raised the productivity of production factors. The adaptation of new technology led to even higher production capacity. In this sense there was a relationship between improved transport infrastructure and local growth and socio-economic development.

While there was an increased concentration of economic activities towards Infanta, the situation in Nakar remained almost unchanged. Thus, the distribution of socio-economic development between the two study municipalities widened after the completion of the Famy-Infanta road project.

Chapter 9

Welfare impacts distributed by municipalities, villages and households

9.1 Introduction

In this chapter, the study's *third research question* is dealt with, namely in what ways the households' welfare has changed after the implementation of the road project. The distribution of welfare impacts on municipal, village, and household levels are presented, evaluated, and analysed. The chapter is mainly based on data collected from household respondents (HRs). Before turning to impacts in sections 9.3 to 9.6, section 9.2 presents and evaluates household living conditions, their access to resources, and their perceptions of living conditions. Impacts include changes in employment, occupation, incomes, and the availability of and purchasing of goods and services within and outside the study area.

9.2 Households' living conditions

Perception about living conditions

Several conditions differed among the villages and households (see table 5.1), and thereby their ability to influence their situation. Thus, it is possible to assume that living conditions between and within municipalities and villages differs. This is presented in here. In order to better understand living conditions HRs were asked i) if they considered themselves much below, below average, average, or above average compared to other households in their village in terms of income, and ii) how much capital each household member need per month to cover basic needs (see table 9.1).

Table 9.1: Household respondents' perceptions of household living conditions compared to the village average and capital per head needed to cover basic needs in 1999, distributed by study area, municipalities, and villages (No. & pesos).

				Infanta villages				Nakar villages		
Perception	Study area	Infanta	Nakar	Infanta town	Dina-hican	Banu-gao	Lual	Pobla-cion	Catab-lingan	Pesa
Much below	123	54	69	13	18	14	9	14	41	14
Below average	20	17	3	5	5	3	4	1	2	–
Average	174	130	44	57	28	22	23	16	12	16
Above average	12	6	6	2	1	2	1	5	1	–
Per person (pesos/month)										
Average	1,975	1,989	1,950	2,539	1,786	1,630	1,496	2,888	1,693	1,380
Below average %	58.4	53.4	67.5	61	63	61	57	67	55	52

Source: HR, 1999.

A larger share of the HRs in Nakar, especially in Catablingan, considers themselves much poorer than households in Infanta, and especially Infanta town. That a large share of the HRs in Nakar's urban center, Poblacion, considers themselves poor is partly related to higher expectations. Also, Poblacion is quite heterogeneous, containing a rather large group of less affluent households.

People basically see capital needed per person and not being considered poor very much as the same thing. The highest averages are in respective municipality urban centre. The subsistence inicome level in the rural villages is much the same, the difference being only 406 pesos between the third, Dinahican, and lowest, Pesa. The number of households below average is high in all villages. Due to a very high poverty level in Pesa, few households are below average as the village average is low. The higher capital needed among Nakar villages is due to larger households, exclusion of Infanta household firms, and higher prices due to low accessibility.

Material assets and access to other resources

In practice, all kinds of transport planning or investments have different effects upon various societal groups and sectors. One way to analyse effects from road investments is to see how different groups' possession of resources differ both before and after an investment. Households' access to various material assets and resources gives a clearer picture about their living condition and welfare. This is shown in table 9.2.

Table 9.2: Households' material possessions and access to resources 1990–2001 and 2001, distributed by study area, municipalities and villages (%, elsewhere noted).

Material possessions and resources		Study area	Inf.	Nak.	Infanta villages				Nakar villages		
					IT	Din.	Ban.	Lual	Pob.	Cat.	Pesa
Electricity	1990	59	72	40	98	46	65	79	63	45	13
	1994	67	77	53	98	50	72	88	72	45	43
	2001	90	95	83	100	83	100	97	97	77	74
Television	1990	38	52	20	82	40	37	51	48	8	3
	1994	44	59	24	85	40	45	67	58	10	3
	2001	71	86	50	96	71	88	89	86	38	27
Radio	1990	38	53	18	86	31	34	62	36	8	10
	1994	42	56	24	82	36	37	70	44	9	20
	2001	78	86	67	87	83	80	95	84	61	57
Refrigerator	1990	20	25	15	61	9	13	16	33	8	3
	1994	24	27	20	72	13	22	27	44	10	6
	2001	48	50	45	90	52	58	54	75	34	27
Electricity bill – average (peso/month)		487	586	355	964	566	388	426	591	264	209
– below average (%)		53	51	55	55	51	51	47	44	61	60
– 20% highest share		43	40	46	40	43	40	39	43	46	47
– 20% lowest share		5	4	6	6	3	5	4	6	5	6
– 40% lowest share		16	16	16	19	15	16	13	19	13	15
Own house – yes		90	88	93	85	94	92	81	88	98	93
Own lot – yes		70	66	75	83	44	68	70	80	78	66
Telephone – Cannot afford		62	53	75	17	62	71	57	44	90	90
– Can afford but do not have		24	24	25	14	32	29	19	51	10	10
– Can maybe afford		2	3	–	–	6	–	5	–	–	–
– Got telephone		12	22	–	68	–	–	19	5	–	–
Toilet facility – Inside house		52	58	44	90	45	54	43	74	31	27
Water source – Deep-well		11	15	5	2	13	5	42	3	12	–
– Manual pump		44	44	44	9	57	85	25	80	51	–
– Spring		20	1	46	–	–	–	–	3	35	100
– Pressurised tank		6	6	5	2	6	10	5	14	2	–
– Buy drinking water		3	6	–	–	24	–	–	–	–	–
– Municipal system		16	28	–	87	–	–	28	–	–	–
Fuel – Gas		44	58	25.5	84.5	43.5	29	75.5	52.5	20.5	3.5
– Gas(sometimes wood/charcoal)		18	21	14	10.5	20.5	34	18.5	17.5	10.5	10
– Wood		17	10.5	25.5	1.5	20.5	17	2.5	2.5	38	36.5

– Wood (sometimes charcoal/gas)	9	6.5	14	–	11	14.5	–	7.5	10.5	23.5
– Charcoal	4	1.5	7	–	4	2.5	–	9.5	1.5	10
– Gas/wood/charcoal	5	2	9.5	4	–	2.5	2.5	9.5	8.5	10
Medical treatment – Hospital	34	47.5	16	62.5	49	30	48.5	22	26.5	–
– Hospital/herbalist	41.5	36.5	48	27	37.5	41	40.5	46	42.5	55
– Herbalist	14.5	7.5	23.5	–	5.5	16	8	16	19.5	36
– Health centre	6.5	1.5	11.5	–	–	11	–	14	12	9
– Private clinic	3	5	1	7.5	7.5	2	2.5	2	–	–
Newspaper – Never	25.5	25.5	25.5	22.5	34.5	12	32.5	2.5	24.5	50
– 1-6/year	12.5	6	21	–	13.5	7.5	2.5	8.5	24.5	30
– 1-3/month	31	29.5	33.5	21.5	21	46.5	29.5	55.5	31.5	14
– 1-2/week	16	16	16	6.5	19	14.5	24.5	27.5	14	6
– 2-3/week	2.5	4	1	6.5	4	5	–	–	3.5	–
– Almost daily/daily	11.5	19	2.5	42.5	7.5	14.5	11	5.5	1.5	–
Children college education										
– Level or graduate	49	57	38	87	36	52.5	54	74	22	18.5
Lending money – Bank	29.5	41	15	56.5	18	39	50	30.5	11	4
– Cooperative	9	9.5	8	10.5	–	14.5	14	20.5	3	–
– Money-lender	10.5	15.5	4	10.5	32	14.5	5.5	2.5	10	–
– Neighbour	33.5	18.5	53	8	28	19.5	19.5	34	61	64
– None	15	15	15	14.5	22	12	11	–	13.5	32
Eating fish – Daily	33	51	9	64	22	52	66	27	–	–
– Almost daily	47.5	41.5	55	27	75	31	34	73	91	–
– 2-3/week	3.5	6.5	–	9	3	14	–	–	–	–
– 1-2/week	15.5	–	36	–	–	–	–	–	9	100
– Almost never	0.5	0.5	–	–	–	3	–	–	–	–
Eating meat – Daily/almost daily	5.5	10	–	22	8.5	3	5.5	–	–	–
– 2-3/week	32	43.5	16.5	46	36	37	55.5	50	–	–
– 1-2/week	28.5	25.5	32	24.5	16.5	39.5	22	22	75	–
– 2-3/month	9.5	45	16.5	1.5	11	3	2.5	–	–	50
– 1/month	17.5	9	29.5	2.5	16.5	11.5	5.5	21	16	50
– Almost never to never	6	7	5	2.5	11	5.5	8.5	7	9	–

Inf.:Infanta, Nak.:Nakar, IT:Infanta town, Din.:Dinahican, Ban.:Banugao, Pob.:Poblacion, Cat.:Catablingan.
Note: Except for electricity, television, refrigerator and radio, all figures are for 2001.
Source: HR, 2001.

In general, living conditions in the study area improved after the road project, but differences between municipalities and villages were large. While table 9.2 only showed access to some capital goods in a time-perspective, taking section 9.5 (incomes) into consideration, it is likely other variables shifted in a positive direction. Taking table 9.2 as a measure, living conditions and welfare improved much more in Infanta than in Nakar.

The best living conditions were (in ranked order), found to a high extent in Infanta town, followed by Poblacion, Lual, Banugao, Dinahican, Catablingan, and finally, Pesa. The gap between Infanta town and the others was large. The gap between the two villages with the lowest living conditions and accessibility, Catablingan and Pesa, and the others was also large. Living conditions follow respective municipality level of accessibility, where Infanta's interregional accessibility went from *Below* to *Above Basic Accessibility*, while Nakar still had *Substantially Below Basic Accessibility*. Living conditions and economic welfare among villages followed also largely the level of intervillage accessibility.

Land ownership, capital savings, and remittance incomes

Savings, land ownership, and remittance incomes (table 9.3) influence material possessions and access to other resources. These directly affect living standard. For example, farm size, ownership, and tenancy system influence food self-sufficiency, the opportunity to sell produce, and borrow money from banks.

Table 9.3: Percent of households that own land, have capital savings, and receive remittance incomes in 2001, distributed by study area, municipalities and villages.

				Infanta villages				Nakar villages		
	Study area	Infanta	Nakar	Infanta town	Dinahican	Banugao	Lual	Pobl-acion	Catab-lingan	Pesa
Land ownership*	39	43	32	52	49***	31	30	10	43	41
Capital saving	37	48	19	62	32	39	48	36	7	20
Remittances**	36	38	30	46	17	39	50	31	31	28

* Rice and/or copra. ** Only money, excluding gifts. *** Fishing vessel owner.
Source: HR, 2001.

Land ownership was higher in Infanta. There are other farming-related differences (see appendix 16).[54] Average farm size, access to irrigation, fertilizer application, and ability to sell the produce were higher among Infanta farmers. Further, only 3 % of the landowners in Infanta tilled their land (they generate higher incomes elsewhere), while 62 % in Nakar. Also 71 % of the wives in Nakar against 51 % in Infanta worked on the farm. There were also similarities. Households not able to produce enough rice for their own family consumption were around 16 % in both municipalities, but differences between villages were huge, from 7 % in Infanta town to 35 % in Pesa.

Households with savings and remittances from overseas workers are less dependent on agricultural production, fluctuating selling prices of agricultural goods, and the purchasing prices of farm inputs. Capital savings and remittance incomes were much higher (the former partly a result of the latter) among Infanta villages, in particular in Infanta town, but also in Lual.[55] Despite being the urban center, Poblacion savings and remittances were, except for in Dinahican, lower lower than in all Infanta villages. Savings were, by far, lowest in the villages with the lowest accessibility, Pesa and Catablingan in Nakar.

Affluent vs. poor household characteristics

Characteristic for the living conditions of an 'affluent' household would be that they had access to electricity, television, radio, gas, and a refrigerator as early as 1990. Further, the electricity bill, as well as the education level of the parents and children (either college level or graduate), is high. Likewise, household member got access to information through television and frequent newspaper reading. Food is cooked on a gas stove and running water is available. All household members eat, at least, three meals per day and, for its nutritional intake, fish and/or meat are eaten on a daily basis.

[54] Of farming households, 92 % own their land in Infanta town, 80 % in Dinahican, 64 % in Banugao, and 40 % in Lual. Of the farmers in Poblacion 34 % own their land, 39 % in Catablingan, and 55 % in Pesa.
[55] The amount of remittances is dependant on the type of work, country working in, and commitment.

When someone is sick an appointment with a doctor at a clinic in Manila is booked. As soon as it was possible to install a private telephone line in 1996 the family did so in order to keep in contact with children studying in Manila, family members or relatives working elsewhere, and for performing duties that previously required time-consuming physical movements, either within or outside the study area. The family owns its house (a concrete house) and the lot it stands on. Toilet and other sanitary facilities inside the house are taken for granted. Finally, due to their access to resources (e.g. land ownership) if there is something that requires high capital investment, lending from banks is not a problem.

There are reverse conditions among poor households. With few resources at their disposal, household members work as hired farm workers and fishers, and/or casual labourer with insecure employment and low salaries. Opportunities to shift to more advanced employment and higher incomes are often out of reach. As a consequence, they are poor and their children will, most likely, also remain poor once they reach adulthood as, among others, their parents are unable to shoulder costs for education. Their energy consumption is high, given that they, especially the women, spend many hours taking care of the household, children, and fetching water and firewood (affluent households have a maid). Additional to this, and also due to low incomes, food intake is low and their children are malnourished, permanently or from time to time.

A low food intake, a high energy outtake through hard physical labour, and poor housing conditions mean that these people are prone to sickness. Once sick many remain sick as hospital fees, for example in Manila where the required medical treatment can be attained, cannot be met. Finally, at the end of the day leisure time is minimal. More affluent household's are accustomed to occasional leisure trips, have watched TV and listened to the radio for a long time, and perhaps also started to curse its poor quality and the risk of too much time spent on watching TV. Poorer households would, most certainly, not mind a little bit of entertainment now and then.

Households had different conditions before the road project, and thereby their ability to respond to [accessibility] changes also differed. The substantially improved interregional road network accessibility, reaching *Above Basic Accessibility* after the road improvement, contributed to Infanta's improved opportunities to make use of their resources. Improved intervillage accessibility contributed further. In comparison, Nakar's interregional and intramunicipal accessibility was still *Substantially Below Basic Accessibility* after the road project due to the lack of a bridge connection across the river Agos. It resulted in few opportunities for Nakar households to make use of their resources.

9.3 Job opportunities

Availability of jobs

The rising number of newly established businesses in Infanta after 1995 affects job-opportunities. Likewise, the area wherein people can apply for work has widened. To see whether opportunities have benefited the study households, the HRs were asked about job-opportunities both before and after the road project (table 9.4).

Table 9.4: Job opportunities within respective municipality after 1995 compared to before 1995 according to household respondents, distributed by municipalities and villages (No. & %).

	Infanta		Nakar		Infanta villages				Nakar villages		
					IT	Din.	Ban.	Lual	Pob.	Cat.	Pesa
Job opportunities	No.	%	No.	%	No.	No.	No.	No.	No.	No.	No.
Within Infanta											
Improved*	129	67	41	36	50	30	22	27	11	22	8
Same as before 1995	16	8	–	–	7	3	–	6	–	–	–
Difficult**	48	25	73	64	22	11	15	–	22	28	23
Total	193	100	114	100	79	44	37	33	33	50	31
Within Nakar											
Improved*			12	9.5	–	–	–	–	–	6	6
Difficult**			115	90.5	–	–	–	–	35	52	28
Total			127	100	–	–	–	–	35	58	34

Note: IT: Infanta town, Din.: Dinahican, Ban.: Banugao, Pob.: Poblacion, Cat.: Catablingan.
* Includes easy, little bit easier, easier, and much easier. ** Includes hard, harder, and much harder.
Source: HR, 2001.

A huge majority of the Infanta households but only 8 % of those in Nakar found it easy to some extent to find work after 1995 in their respective municipality. Also, only around one fourth of Nakar households (higher in Poblacion with best access to Infanta) found it easy to some extent to find work within Infanta. Intermunicipal related transport problems (uncertainties, costs, time) and poor socio-economic networks discouraged and prevented people in Nakar from applying and seeking work in Infanta.

Notwithstanding the positive development described above, improved work opportunities do not necessarily result in employment. There are several restrictions. Competition among job seekers and a growing labour pool is one. Many jobs are low paid unskilled jobs, mostly aiming at youngsters and/or singles. Finally, given the relatively high education level among many villages, especially in Infanta, most jobs do not match the applicants level of education.

As it is common in the Philippines to have a family member or relative working abroad, table 9.5 shows the scope and time period of overseas workers in the study area.

Table 9.5: Number of households with an overseas worker and the time-period for working abroad, distributed by study area, municipalities and villages (No. & %).

Household with overseas worker*	Study area		Infanta		Nakar		Infanta villages				Nakar villages		
							IT	Din	Ban	Lual	Pob	Cat	Pesa
	No.	%	No.	%	No.	%	No.	No.	No.	No.	No.	No.	No.
Yes	224	68.0	161	79.0	63	51.0	67	31	33	30	26	25	12
No	104	32.0	43	21.0	61	49.0	9	20	8	6	10	33	18
Total	328	100	204	100	124	100	76	51	41	36	36	58	30
Time-period													
Before 1990	71	30.0	57	33.0	14	21.5	28	13	10	6	10	4	–
1990–2001	168	70.0	117	67.0	51	78.5	43	17	26	31	18	22	11
1990–1994	*58*	*34.5*	*42*	*36.0*	*16*	*31.0*	*16*	*7*	*11*	*8*	*7*	*9*	–
1995–2001	*110*	*65.5*	*75*	*64.0*	*35*	*69.0*	*27*	*10*	*15*	*23*	*11*	*13*	*11*
Total	239	100	174	100	65	100	71	30	36	37	28	26	11

Note: IT: Infanta town, Din: Dinahican, Ban: Banugao, Pob: Poblacion, Cat: Catablingan.
* Household member and/or relative. Note: For overseas worker destinations, see appendix 17.
Source: HR, 2001.

A large majority of the households in the study area (68 %) have had a household member and/or relative working abroad, especially in Infanta (79 %). During the 1990s, a large majority of all overseas workers (65 % in the study area) in all villages worked abroad during the second half of the 1990s. While improved accessibility made work applications easier, the applications were mainly influenced by poor or deteriorating living conditions and/or few job-opportunities. This was especially the case in Nakar, in particular in Pesa, where the incidence of overseas workers during the second half of the 1990s was highest.

Except for household data, police clearance applications give a clearer picture of labour out-migration (table 9.6). Philippine citizens must apply for a police clearance to apply for employment outside one's own municipality.

Table 9.6: Total number applying for police clearances in Infanta and Nakar, 1990–2001.

Year	Infanta	Nakar
1990–1991	350–400	1,400–1,600
1992–1993	550–650	1,500–1,800
1994	750	1,700
1995–1996	900–1,000	2,200–2,400
1997–1998	1,250–1,500	2,100–2,500
1999–2000	1,800–2,000	2,800–3,000
2001	3,000	2,000*
Total	14,150	25,000

* As of October. Note: The same person may be included in several years.
Source: KI41–42, Infanta and Nakar 2001.

According to the police, people in Nakar applied for police clearances to (in ranked order): apply for local and foreign employment, driver licence and vehicle registration, and process papers (retirement, pension). People in Infanta applied for clearances to (in ranked order): (re)new drivers licence, vehicle registration, process papers (retirement, pension), and apply for local and foreign employment.

Considering that Nakar's population was only half of Infanta, the data in table 9.6 were remarkable. Given the difficulty for Nakar households to find employment, a much higher number applied for work outside the study area and/or abroad. As the number of applications coincided with an increase in foreign workers during the second half of the 1990s, it seemed possible to assume that improved accessibility made it easier and attracted people to apply for work outside the study area.

Following the increase in business establishments in Infanta after 1995, the situation concerning job-opportunities, both within and outside the study area, was very positive for the households in Infanta. In Nakar this was only applicable to outside the study area, where many people sought employment. Through improved interregional accessibility, the job market outside the study area expanded, and costs to apply for work decreased. However, the number of households with remittance incomes was much higher in Infanta, mainly owing to their greater access to resources, less to their higher accessibility.

9.4 Change in employment and self-employment

The major source of income (for all but the exceptionally wealthy) is an employment or self-employment. Opportunities for improved well-being and income growth in an area improve when there is an increase in the number of jobs available involving higher skills, more attractive work conditions, higher pay, and security.

As the number of business establishments increased remarkably in Infanta after 1995 and the opportunities to apply for work outside the study area improved considerably, a change in employment should have taken place. To further evaluate employment, HRs were asked if a household member had got a job since 1995 (table 9.7).

Table 9.7: Households with a member who was employed after 1995 and the number of household members employed, distributed by study area, municipalities and villages (No. & %).

Households with member employed since 1995	Study area		Infanta		Nakar		Infanta villages				Nakar villages		
							IT	Din	Ban	Lual	Pob	Cat	Pesa
	No.	%	No.	%	No.	%	No.	No.	No.	No.	No.	No.	No.
Yes	224	65	161	74	63	50	57	43	32	29	16	30	17
No	120	35	57	26	63	50	25	17	7	8	20	27	16
Total	344	100	218	100	126	100	82	60	39	37	36	57	33
No. of household members employed	366		274		92		102	69	58	50	23	47	22

Note: IT: Infanta town, Din: Dinahican, Ban: Banugao, Pob: Poblacion, Cat: Catablingan.
Note: Part-time employment excluded.
Source: HR, 2001.

While a great majority of all households had a member who received employment after 1995, there were clear differences between municipalities and villages. Household employment mainly benefited Infanta villages, where 74 % of the households experienced this, while only half in Nakar. From a distributive perspective, all villages in Infanta benefited to a very large extent, but even Nakar benefited. The lower percentage in Infanta town compared to other Infanta villages was due to an already high employment level. Overall, men have benefited most (see appendix 18).

Translated into the number of household members employed, the villages in Infanta outnumbered Nakar by far, also considering age-group composition. By dividing household members who were employed with the number of households, Infanta reached 1.25, while Nakar only 0.73. All Infanta villages had higher numbers (between 1.15-1.48) compared to Nakar (between 0.64-0.82). While table 9.7 included all household members, table 9.8a-b, showing household members employment in Infanta and Nakar, exclude children.

Table 9.8a: Household members employment in the study area, Infanta and Infanta villages, distributed by sector, sub-sector and skills 1990–1994 and 1995–2001 (average yearly number).

	Study area		Infanta		Infanta town		Dinahican		Banugao		Lual	
Employment	1990 -94	1995 -01	1990 -94	1995 -01	1990 -94	1995 -01	1990 -94	1995 -01	1990 -94	1995 -01	1990 -94	1995 -01
Agriculture	298	307	178	194	52	55	62	73	29	31	32	35
Fishing	69	75	53	60	1	2	51	58	–	–	1	0
Farming	202	210	113	125	48	51	11	15	22	24	32	35
Forestry	25	22	10	9	3	2	–	–	7	7	–	–
Government	72	66	43	40	32	28	4	4	5	4	2	4
Unskilled	8	8	3	3	1	1	–	–	1	1	1	1
Semiskilled/skilled	63	58	40	37	31	27	4	4	4	3	1	3
Self-employment	122	173	94	131	43	59	18	21	21	31	12	20
Unskilled	69	103	48	70	24	36	10	12	5	7	9	15
Semiskilled/skilled	54	71	46	61	19	23	8	9	16	23	4	5
Private	127	120	89	76	32	31	9	10	29	19	19	16
Unskilled	69	62	45	35	13	13	6	6	15	9	11	7
Semiskilled/skilled	57	58	42	41	18	18	3	4	13	10	8	9
Others*	57	60	43	40	30	30	4	3	4	4	5	3
Total	676	726	444	481	189	203	97	111	88	89	70	78
Number of households	378		246		87		65		54		40	

* Retired, unemployed, studying, dead.
Note: Husbands' and wives' employment included. Part-time employment excluded.
Note: For detailed sector employment and percentage distribution see appendix 19a–b.
Source: HR, 1999; 2001.

Table 9.8b: Household members employment in Nakar and Nakar villages, distributed by sector, sub-sector and skills 1990–1994 and 1995–2001 (average yearly number).

	Nakar		Poblacion		Catablingan		Pesa	
Employment	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001
Agriculture	120	113	10	13	65	64	45	36
Fishing	16	15	–	–	16	15	–	0
Farming	88	85	10	13	47	46	31	26
Forestry	15	13	–	–	3	3	12	10
Government	29	26	21	16	6	6	2	4
Unskilled	5	5	4	2	1	2	0	1
Semiskilled/skilled	23	21	17	14	4	4	2	3
Self-employment	28	42	15	19	10	20	3	3
Unskilled	21	33	8	11	10	19	3	3
Semiskilled/skilled	8	10	8	9	–	1	–	–
Private	38	44	7	9	15	18	16	17
Unskilled	24	27	1	2	10	11	13	14
Semiskilled/skilled	14	17	6	7	4	7	3	3
Others*	14	20	8	10	6	6	–	4
Total	229	245	61	67	102	114	66	64
No. of households	132		39		59		34	

Note: For detailed sector employment and percentage distribution see appendix 20a–b.
Source: HR, 1999; 2001.

Average household employment (including husband and wife) increased in the study area during the period following the completion of the road project. The average number of employed per households increased to 1.92 between 1995-2001, up from 1.78 between 1990-1994. The increase was slightly higher in Infanta than in Nakar. With the exception for a high average in Infanta town and in Pesa between 1990-1994, differences between villages were small during both periods. Except for Banugao in Infanta and Pesa in Nakar

that experienced very low increases (Pesa actually decreased), the differences between villages were very small, spanning between 0.15-0.21. From the perspective of the study area, the municipalities, and villages other remarks on employment could be made:

The study area

- Agriculture still dominated after the road project (43 %). Its percentage share declined slightly but its number increased (following a global pattern in developing countries).
- All agriculture sub-sectors remained almost unchanged in percent, while the numbers engaged in farming and fishing increased. Forestry decreased.
- The major change occurred in non-agricultural self-employment. It reached 24 % between 1995-2001, up from 18 % between 1990-1994.
- Government and private sector decrease both in numbers and in percent. Given the decentralization process since the local government code in 1991, this is puzzling and certainly worrisome for some villages.
- In terms of skills, the increase in the number, but also percent, of unskilled (also semiskilled/skilled) self-employment is most noteworthy.

The municipalities

- Agriculture is still the most important sector in both municipalities.
- Despite a decrease in agriculture in Nakar, its share is still higher than in Infanta.
- Farm- and fishing increased substantially in number (slightly percent) in Infanta. In Nakar all agricultural sub-sectors declined in number and percent, especially farming.
- Large increase in non-agriculture self-employment (especially unskilled) in Infanta (5.8 %) and in Nakar (4.9 %).
- Declining private sector employment in Infanta shifted to self-employment and agriculture. Declining agriculture in Nakar shifted to unskilled self-employment.
- Private sector employment is higher in Nakar. The main reason for this is an increase in casual labour, construction work, carpentry, and overseas work.

The villages

- Except for each respective municipality urban center, agriculture still dominated in all villages (but 52 % of the Infanta town households own land).
- The number of people engaged in agriculture (excluding forestry) increased in all Infanta villages (even in Poblacion), while decreasing in Catablingan and Pesa.[56]
- In the urban centers, self-employment (and government employment in Poblacion - declining but still very high) employ more people than agriculture.
- Growing self-employment was pronounced in all villages.[57]

[56] The village captain in Catabligan (KI14, Catablingan 2005) stresses that 20 to 25 % of the households sustain themselves from fishing, while other households also fish for household consumption.

[57] The increase in number of households engaged in tricycle operation, the most important municipal transport mode, was considerable, especially in Infanta (see appendix 21). While the number of households theoretically being able to survive on tricycle operation alone (incomes divided by poverty thresholds) increased considerable after the road project, in reality too many operators make this impossible, despite an increase in tricycle-drivers incomes (see appendix 22–23).

- Excluding Pesa, government sector employment declined among all villages.
- Excluding Poblacion, Pesa, and Banugao, a decline in 'others' indicates fewer people were unemployed and/or studyiing.

What then were the reasons behind these changes? Turning first to agriculture. The prerequisities in Infanta were, in comparison with Nakar, more advantegeous, especially after the road project. While favourable farming conditions and fish resources were already present (the latter also in Nakar), these were reinforced through lower distribution costs as accessibility improved. Access to farm inputs, rice mills and dealers improved, selling prices increased, and waste reduced. Inputs increased, agricultural activities became more efficient and production increased (see also the fishing sector, chapter 7).

The growing number of Infanta households engaged in farming was also a result of a growing number receiving non-farm incomes. This followed, to a large extent, the opinion that a combination of farm and non-farm incomes explains the surprising resilience of the family farm, in particular the sub-livelihood farm (Rigg 2001).[58] In Nakar, inferior conditions and resources, and low accessibility may have strengthened the downward trend in agriculture. Nakar may have become an unskilled labour pool source to areas outside the municipality, while self-employment in petty trading dominates within.

Growing self-employment (tricycles, sari stores) was related to improved opportunities to participate in trade after the road project. It was also easier to lend money. Self-employment increased in all villages, except for Pesa. Self-employment was more profitable in Infanta villages, partly due to greater access to capital. Among the Nakar villages, self-employment was more related to few other income sources and an unproductive agriculture. It was out of necessity. Another distinction was that semiskilled and skilled self-employment was much higher among Infanta villages. Due to lower education levels among Nakar households, they were restricted to such employment.

The decline in private sector employment, especially in Infanta, was related to a growing labour pool putting pressure on salaries. Many people in Infanta refrained from and/or avoided unskilled employment due to higher education level, bad working conditions, low salaries and better opportunities, both within and outside the study area. For example, while self-employment, especially unskilled, increased a lot in Banugao and Infanta town, private sector employment plunged. This kind of employment was given to poorer household in Nakar where private sector employment increased. Accordingly, many in Catablingan and Pesa were employed as unskilled labour in the private sector (especially in Manila and abroad, often with low salaries, usually on a seasonal or temporary basis).

An increase in employment can, as noted by Ellis (in Rigg 2001) either be a result of a deliberate strategy or an involuntary response to crisis. As data was based on both spouses, if both were employed the average per household would be two. In that case only Infanta town had full employment. High averages in Catablingan and Pesa were due to the fact that to many households eked out a living as casual labourers and farmers and more

[58] The desire to maintain a foothold in subsistence production is also usually seen as a risk-minimising strategy.

insecure incomes (fluctuating copra prices, small land-holdings, limited farm inputs, small vessels). Catablingan households had to find additional income sources compared to, for example, Dinahican's who got steady and secure incomes from fishing. Few employments may perhaps have indicated security (Poblacion: government employment).

The most distinctive employment changes in the respective villages were as follows:

- *Infanta town* – Increased self-employment (6 %).
- *Dinahican* – Increased fishing, especially in numbers.
- *Banugao* – Increased self-employment (10.5 %), decreased private sector (11 %).
- *Lual* – Increased self-employment (8 %), decreased private sector (6.7 %).
- *Poblacion* – Decreased government sector (9.9 %).
- *Catablingan* – Increased self-employment (7.7 %), decreased agriculture (5.3 %).
- *Lual* – Decreased agriculture (6.9 %), increased government sector (3.7 %).

Following the road improvement, employment grew considerably in the study area. The improved accessibility made it easier to participate in trade and production. As the relative improvement in accessibility in Infanta outperformed Nakar by far, the development favoured the households in Infanta villages. The major increase took place within non-agriculture self-employment, in both municipalities and all villages, except for Pesa with the lowest accessibility. Skilled/semi-skilled self-employment was foremost directed towards Infanta households, while unskilled self-employment towards Nakar households.

Employment in the agriculture sector increased considerably in Infanta, while it declined in Nakar. Improved accessibility to rice land and fish resources in Infanta stimulated production and trade, while production became relatively more expensive in Nakar owing to its much lower improvement in accessibility. Infanta town, with highest accessibility, benefited mainly through increased engagement in trade and service activities.

9.5 Income development and distribution among households

Income is the key to an individual's or a family's material welfare. Income from work is dependent on how many family members work, the income sources per member, the type of work, the salaries, as well as job security and seasonality. Income distribution is of importance as it shows the differences in living standards between places and between groups. Income is also related to other indicators of a person's standing in a community.

Average village household income

Given that living standard, access to resources, and job-opportunities improved in general since the road project, especially in Infanta villages, it could be expected that household incomes would increase (table 9.9). HFs in Infanta town, Dinahican, and Banugao were excluded. Had the HFs been included their averages would have been considerably higher. For instance, several HFs in Dinahican had a yearly income exceeding that of all Dinahican HRs taken together.

Table 9.9: Yearly average household income 1990–1994 and 1995–2001, distributed by study area, municipalities and villages (pesos).

				Infanta villages				Nakar villages		
Period	Study area	Infanta	Nakar	Infanta town	Dina-hican	Banu-gao	Lual	Pobla-cion	Catab-lingan	Pesa
1990–1994	70,400	86,500	43,300	127,000	61,700	70.000	55,400	74,300	35,000	20,900
1995–2001	102,200	125,100	61,300	194,400	91,400	87,000	87,100	101,200	42,700	46,700
Difference	31,800	38,600	17,900	67,400	29,700	17,000	31,700	26,900	7,700	25,800

Note: Number of households between 1990–1994 & 1995–2001: Infanta town 78 & 78, Dinahican 56 & 62, Banugao 45 & 47, Lual 33 & 40, Poblacion 38 & 38, Catablingan 56 & 56, and Pesa 32 & 33.
Note: Incomes rounded off to nearest hundred.
Source: HR, 1999; 2001.

Average household incomes increased considerably between 1995-2001 in both municipalities and among all villages, especially in Infanta (excluding Banugao due to the exclusion of HFs).[59] Except from this table 9.9 also showed:

- With the exception of Poblacion (owing to its municipal urban centre status), income rankings followed, to a large extent, eacg study village's level of accessibility.
- Also, income ranking followed, to a large extent, rankings in table 9.3 and 9.5, which show access to material possessions and other resources.
- Dinahican benefited exceptionally. The relationship between improved accessibility and the level of increased incomes is, perhaps, closely related to the economic sector. Infanta town benefited most. Average income increased almost 36,000 and 38,000 pesos more compared to the second and third, Lual and Dinahican.
- Only Infanta town income was above the study area during both periods.
- Only the two urban centres, Infanta town and Poblacion, had incomes above their respective municipality average during both periods.
- Catablingan income increased least.
- Dinahican and Lual, a poor fishing and rice-farming village respectively, increased their incomes more than Poblacion, Nakar urban centre, while they increased much more compared to their farmer and fisher counterparts in Pesa and Catablingan.

A more disaggregated level revealed that a huge majority of the households among all villages have increased their incomes (see appendix 25). In general, a larger share of the villages in Infanta increased their incomes. In Lual, 9 out of 10 households increased their incomes, followed by Infanta town and Dinahican, with almost 8 and 7 out of 10 households respectively.

In Catablingan, 5½ out of 10 households increased their incomes, while 7 out of 10 both in Poblacion and Pesa (the latter started from a very low level). Excluding Banugao, a majority of the households in Infanta villages showed a net increase. Only Pesa had a net increase in Nakar. While still a minority, the number of households that showed decreased incomes indicated an uneven distribution.

[59] According to village captains (KI10, 14, 26, 43–45), income development mainly benefited villages in Infanta (see appendix 24). Only Poblacion experienced a positive development in Nakar.

Relative income development between study villages

Despite a positive income development in both municipalities and all study villages it is, given the widened gap in accessibility, important to study if this was also the case with incomes (table 9.10). Had village incomes among Infanta villages increased more?

Table 9.10: Difference in average household incomes between municipalities and villages 1990–1994 and 1995–2001 (pesos).

Nakar/ Infanta	Infanta		Infanta town		Dinahican		Banugao		Lual	
	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001
Nakar	43,200	63,900								
Poblacion			52,700	93,200	12,700	9,900	4,300	14,200	18,900	14,100
Catablingan			91,900	151,700	26,600	48,700	34,900	44,300	20,300	44,200
Pesa			106,100	147,700	40,800	44,700	49,100	40,300	34,500	40,300

Source: HR, 1999; 2001.

Despite a huge gap in average household income between Infanta and Nakar before the road project, the gap increased considerably in favour of Infanta and its villages. On village level, with the exception of Poblacion and Pesa vs. Banugao (Banugao householf firms being excluded), the gaps between Nakar villages vis a vis Infanta followed the same pattern. For example, the average household income gap between Dinahican and Catablingan almost doubled in favour of Dinahican.

Households below average incomes

Following the discussion above, in a situation where perfect income equality exists, all households would have same income. Overall, income equalisation in the study area worsened after the completion of the road project. Between 1995-2001, 68.5 % of the households fell below average study area household income, up from 64.5 % between 1990-1994. The share falling below average household incomes remained almost unchanged in Infanta (around 68 %). In Nakar it increased from 65 to 67.5 %.

The share of households falling below respective village average household income was very high, spanning from 56 to 68 % between 1990-1994, and from 58 to 75 % between 1995-2001. The share increased in three villages, Banugao, Poblacion, and Pesa, remained stable in three, Infanta town, Dinahican, and Catablingan, and decreased only in Lual (but was still very high). In Pesa, the share falling below average increased considerable, indicating that a few households made up a huge share of the total village income in the period following the road project. When comparing municipalities and study villages, taking average household income as a base, the following pattern appeared:

- The share of Nakar households falling below Infanta average household income increased from 85.7 % to 88.9 % between the two periods.
- The share of Infanta households falling below Nakar average household income decreased from 38.6 % to 36.1 % between the two periods.
- Among Nakar villages the share of households falling below Infanta average income increased in two villages (Catablingan from 87.5 to 94.6 % and in Poblacion from 71 to 76.3 %), while it dropped from 100 to 93.9 % in Pesa.

- Among Infanta villages the share of households falling below Nakar average income decreased in Banugao from 44.4 to 42.5 %, Lual from 45.4 to 37.5 %, Infanta town from 17.9 to 12.8 %). It remained almost stable in Dinahican (from 58.9 to 59.6 %).

Absolute and relative income development among deciles

The number of households falling below or above average household income is only indicative of more equal or unequal income distribution. From a distributive perspective, to study whether income distribution has become more equal or not we must analyze incomes by deciles (table 9.11a-b).

Table 9.11a: Yearly average income by deciles and periodic change 1990–1994 and 1995–2001, distributed by Infanta villages (pesos).

	Infanta town		Dinahican		Banugao		Lual	
Deciles	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001
1–2	30,800	53,900	12,000	14,300	15,200	21,400	15,800	22,500
3–4	61,600	94,300	22,700	32,100	33,300	48,500	29,600	51,500
5–6	87,300	148,800	34,900	51,400	54,900	66,800	45,600	78,400
7–8	150,100	216,200	69,300	104,300	83,200	89,600	65,100	102,700
9–10	305,000	458,900	169,400	255,000	163,400	208,800	120,800	180,500
Periodic change								
1–2		23,100		2,300		6,300		6,700
3–4		32,700		9,400		15,200		21,900
5–6		61,500		16,500		11,900		32,800
7–8		66,000		35,000		6,400		37,600
9–10		153,800		85,600		45,400		59,800

Source: HR, 1999; 2001.

Table 9.11b: Yearly average income by deciles and periodic change 1990-1994 and 1995-2001, distributed by Nakar villages (pesos).

	Poblacion		Catablingan		Pesa	
Deciles	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001
1–2	9,200	15,000	3,900	8,400	800	6,600
3–4	25,700	52,000	16,800	20,700	10,600	18,900
5–6	63,600	73,300	28,800	32,300	18,900	32,600
7–8	88,000	110,600	42,100	51,600	28,800	48,100
9–10	185,200	255,400	83,400	101,300	45,400	127,200
Periodic change						
1–2		5,800		4,500		5,800
3–4		26,200		3,900		8,300
5–6		9,800		3,500		13,700
7–8		22,600		9,500		19,300
9–10		70,200		17,900		81,900

Source: HR, 1999; 2001.

All deciles in all villages increased their incomes in the period following the road project. However, deciles 9-10 incomes increased much more in real money terms compared to all other deciles (but a higher percentage increase among many lower deciles, owing to starting at very low levels, see appendix 26). For example, except for Lual, deciles 9-10 incomes increased between two to four times more than what the deciles with the second highest increase did. Except for this, table 9.11 also showed:

- Twelve deciles out of 35 increased their average income above their respective village average increase: i) deciles 9-10 in all villages except from Pesa, ii) deciles 7-8 in Dinahican, Lual, Catablingan, and Pesa, and iii) deciles 5-6 in Lual and Pesa.
- In no study village did deciles 1-4 increase incomes more than the village average.
- Except for Catablingan, in no village did deciles 1-2 incomes increase more than any other income deciles in its respective village.
- Except for Banugao, in no Infanta village did deciles 1-4 incomes increase more than any other income deciles in its respective village.
- Intravillage gaps increased in general. Out of 28 relations (comparing each decile group with the decile group above), only in 5 did the gap between deciles decrease.[60]

Respective deciles among Nakar villages increased their incomes less compared to Infanta villages. Out of 60 relations only 14 favoured Nakar.[61] So, even though average household incomes have increased in all villages and among all deciles in real money terms, the gap between deciles below and above the average has widened. Deciles 1-4 have benefited much less relative to deciles 7-10.

Distribution of total village income by deciles

Following from table 9.11 showing that higher deciles in all the villages have multiple incomes compared to lower deciles, it is, from a distributive perspective, important to study respective deciles share of total village income (table 9.12).

Table 9.12: Deciles share of total village income 1990–1994 and 1995–2001, distributed by villages (%).

	Infanta villages								Nakar villages					
	Infanta town		Dinahican		Banugao		Lual		Poblacion		Catablingan		Pesa	
Deciles	1990 – 94	1995 –01	1990 –94	1995 –01	1990 –94	1995 –01	1990 –94	1995 –01	1990 –94	1995 –01	1990 –94	1995 –01	1990 –94	1995 –01
1–2	4.8	5.5	3.8	3.1	4.3	4.9	5.7	5.1	2.4	2.9	2.2	3.9	0.7	2.8
3–4	9.7	9.7	7.3	7.0	9.5	11.1	10.6	11.8	6.9	10.2	9.5	9.6	10.1	8.0
5–6	13.7	15.3	11.3	11.2	15.6	15.3	16.4	17.9	17.1	14.4	16.4	15.1	18.1	13.9
7–8	23.6	22.2	22.4	22.8	23.7	20.5	23.5	23.5	23.6	21.8	24.0	24.1	27.5	20.5
9–10	48.0	47.2	54.9	55.8	46.6	47.9	43.6	41.4	49.8	50.4	47.6	47.4	43.3	54.5

Source: HR, 1999; 2001.

Income distribution remained quite stable between the two time-periods. Incomes were heavily skewed towards the upper deciles, especially deciles 9-10, and to lesser extent deciles 7-8, especially in Nakar. Deciles 9-10's share reached as high as 54.9 % between 1990-1994 and 55.8 between 1995-2001. The lower deciles share was extremely low during both periods, especially deciles 1-2, but also deciles 3-4.[62]

[60] Between 3–4 and 5–6, and between 5–6 and 7–8 in Banugao, between 3–4 and 5–6 in Poblacion, and between 1–2 and 3–4, and between 3–4 and 5–6 in Catablingan.

[61] Poblacion vs. Infanta villages: Out of 20 relations 7 favoured Poblacion: 1–4 vs. Dinahican, 3–4 and 7–10 vs. Banugao, and 3–4 and 9–10 vs. Lual. Catablingan vs. Infanta villages: Out of 20 relations two favoured Catablingan: 1–2 vs. Dinahican and 7–8 vs. Banugao. Pesa vs. Infanta villages: Out of 20 relations, five favoured Pesa: 1–2 vs. Dinahican, 5–10 vs. Banugao, and 9–10 vs. Lual.

[62] The pattern largely follows respective deciles' Philippine national share, where deciles 1–2 share between 1985–2000 spanned from 4.9 to 5.2 % and deciles 9–10 share from 51.8 to 55.5 % (NSO 1997a;b 2000).

In Infanta, deciles 3-6 benefited most. Deciles 7-8 reduced its share. Thus the gap between deciles 3-6 and 7-10's shrunk from 48.1 % between 1990-1994 to 45.4 % between 1995-2001. In Nakar, deciles 9-10 benefited, by far the most, increasing their share by 11.2 %.

Out of 35 possible changes (5 deciles groups multiplied by 7 villages), 17 remained either unchanged or changed less than 1 %. Deciles 1-2 and 9-10 experienced the smallest changes, while deciles 5-6 experienced the largest changes. Shifts were higher in Nakar. Among study villages, the smallest shifts were in Dinahican, where no decile changed its share more than one percent. The largest changes occurred in Pesa where all deciles changed their share more than one percent. Deciles 1-2 share increased, although very modestly, in five villages, while its share decreased in two, namely Dinahican and Lual. Deciles 3-4 share increased, also in modest terms, in three villages, namely Banugao, Lual, and Poblacion, while it remained the same in Infanta town, Dinahican, and Catablingan.

In sum, yearly average household incomes increased substantially in all villages and among all income deciles in the period following the road improvement, compared to the period before. However, while a majority (net) of the households in all Infanta villages (excluding one village) increased their incomes, only one village (increasing from very low income levels) out of three managed this in Nakar.

Other changes are noteworthy: i) incomes were much higher and have increased much more among Infanta villages and deciles compared to Nakar, ii) upper income deciles have benefited most while lower income deciles have benefited least, in all villages, but in particular in Nakar. A larger and smaller share of total village incomes were distributed among the highest and lowest income deciles respectively in Nakar, compared to Infanta.

Thus, incomes increased overall, but income distribution became more unequal, especially in Nakar. Income levels before and after followed, to a large extent, respective municipality and village level of, and improvement in, accessibility before and after the completion of the road project.

9.6 Availability and purchasing of goods and services – viability for trading

Availability of goods and services

The market potential in the study area, given its population, was big enough to cater for a wide selection of goods and services before 1995. Even if the average household income is low, many have a purchasing power comparable to households in more income affluent countries. Asking the HRs what goods and services that were lacking or insufficiently supplied before and after 1995 (table 9.13 and 9.14) indicates the viability or otherwise of trade in them.

Table 9.13: Goods either lacking or in insufficient supply within respective municipality according to household respondents before–after 1995, distributed by municipalities and villages (No. & %).

	Infanta		Nakar		Infanta villages (No.)				Nakar villages (No.)		
Before 1995	No.	%	No.	%	Infanta town	Dina-hican	Banu-gao	Lual	Pob.	Catab-lingan	Pesa
Vegetables and fruits	47	18.5	–	–	15	9	13	10	–	–	–
[Quality] clothes	33	13.0	–	–	12	10	5	6	–	–	–
Spare parts, farm inputs	29	11.0	–	–	7	16	5	1	–	–	–
Basic needs, groceries	28	11.0	–	–	14	4	5	5	–	–	–
Electrical appliances	17	7.0	–	–	4	6	4	3	–	–	–
Medicine/med equipment	18	7.0	–	–	11	4	2	1	–	–	–
Almost everything	–	–	134	100	–	–	–	–	40	60	34
Others	21	8.5	–	–	3	10	5	3	–	–	–
Nothing	65	25.0	–	–	28	14	8	15	–	–	–
Total	258	100	134	100	94	73	47	44	40	60	34
After 1995											
Vegetables and fruits	2	1.0	12	8.0	–	2	–	–	8	4	–
[Quality] clothes	12	5.0	5	3.0	5	6	1	–	1	2	2
Spare pars, farm inputs	16	7.0	5	3.0	3	9	4	–	4	–	1
All basic needs, groceries	–	–	98	63.0	–	–	–	–	21	47	30
Medicine, med equipment	10	4.5	4	3.0	3	4	2	1	2	2	–
Meat/fish	4	1.5	18	12.0	–	–	2	2	7	11	–
Others	9	4.0	9	6.0	2	6	–	1	4	5	–
Nothing	179	77.0	3	2.0	73	37	33	36	1	1	1
Total	232	100	155	100	86	64	45	40	48	72	35

Note: For details on commodities, see appendix 27.
Source: HR, 1999.

All HRs in Nakar lacked almost every good before 1995. Between 60-80 % of the Infanta respondents lacked something, mainly perishable goods, quality clothes, spare parts/farm inputs, but also basic groceries and medicine. Lack of perishable goods was related to the poor transport conditions. Due to delivery delays such goods were difficult to transport and frequently wasted. A huge majority of the HRs in Nakar still lacked basic needs after 1995, while a large majority of the HRs in Infanta were satisfied. HRs in Nakar also often mentioned the higher prices compared to Infanta. Nakar's inaccessibility contributes to the lack of goods and the higher prices. Turning to services, a similar pattern appeared.

Table 9.14: Services either lacking or in insufficient supply within respective municipality according to household respondents before – after 1995, distributed by municipalities and villages (No. & %).

	Infanta		Nakar		Infanta villages (No.)				Nakar villages (No.)		
Before 1995	No.	%	No.	%	Infanta town	Dinah-ican	Banu-gao	Lual	Pob.	Catab-lingan	Pesa
Telephone system	57	18.0	–	–	32	14	7	4	–	–	–
Cable-TV & TV	19	6.0	–	–	16	–	1	2	–	–	–
Public market	24	7.5	–	–	11	1	5	7	–	–	–
Lending institutions	41*	13.0	–	–	17	6	13	5	–	–	–
Medical care/services	34	10.0	–	–	10	10	11	3	–	–	–
Transp. services/infrast.	16	5.0	–	–	6	1	9	–	–	–	–
Restaurants and fast-food	21	6.5	–	–	5	6	7	3	–	–	–
Almost everything	–	–	134	100	–	–	1	–	40	60	34
Others	67	21.0	–	–	32	8	19	8	–	–	–
Nothing	40	12.0	–	–	10	20	3	7	–	–	–
Total	319	100	134	100	139	67	76	40	40	60	34

Table 9.14 continued.

After 1995	Infanta No.	Infanta %	Nakar No.	Nakar %	Infanta villages (No.) Infanta town	Dina-hican	Banu-gao	Lual	Nakar villages (No.) Pobl-acion	Catab-lingan	Pesa
Telephone system	11	5.0	–	–	–	11	–	n.d.	–	–	–
Public market	–	–	56	35.0	–	–	–		22	22	12
Medical care/services	27	12.5	31	19.0	8	9	10		14	14	3
Restaurants and fast-food	13	6.0	6	3.5	2	4	7		3	3	–
Transport infrastructure	–	–	23	14.5	–	–	1		5	5	13
All available in Infanta	–	–	12	8.0	–	–	–		4	4	4
Others	37	17.5	31	19.0	9	13	15		10	10	11
Nothing	130	59.0	2	1.0	70	27	33		1	1	–
Total	219	100	161	100	89	67	66		59	59	43

* Insurance companies made up 14. Note: For details on services, see appendix 28.
Source: HR, 1999.

A large share of the Infanta HRs lacked some service before 1995, especially a telephone system, a functioning public market and public services, banks, and medical care. Many also lacked food outlets. After 1995, the situation improved considerably and a great majority of the HRs lacked nothing. However, quite a few still believed that medical care was insufficient. In Nakar, all HRs lacked almost everything before 1995. Afterwards almost all HRs still lacked something, especially a public market and av hospital (neither operating in 2005), and a bridge across the river Agos. The latter influenced the absence of a public market and other services.

The availability of goods and services was low before 1995, especially in Nakar. After 1995, the situation in Infanta was, overall, satisfactory but still unsatisfactory in Nakar. In Nakar, high costs due to low interregional accessibility contributed to this.

Purchasing of goods and services

Rising incomes increase purchasing powers and influence consumer preferences. Infanta and Nakar household purchasing power is in general very low. Purchasing is not only conditioned by income. Access to electricity influences, for example TV sales, while the level of accessibility affects motor vehicle sales, and also influences goods and service supply. Easy supply encourages consumption. Table 9.15 shows changes in purchasing as more goods and services were available at the local market and when incomes had increased since the road project. It also shows purchasing outside the study area.

Table 9.15: Change in purchasing of goods and services within and outside Infanta since 1995, distributed by study area, municipality and villages (No. & %).

Purchase	Study area No.	Study area %	Infanta No.	Infanta %	Nakar No.	Nakar %	Infanta villages IT No.	Din. No.	Ban. No.	Lual No.	Nakar villages Pob. No.	Cat. No.	Pesa No.
Within													
Increase	257	71	175	75.5	82	62.5	64	34	42	35	24	31	27
Little increase	19	5	13	5.5	6	4.5	–	7	6	–	–	6	–
Same	79	22	38	16.5	41	31.0	20	12	4	2	12	22	7
Decrease	8	2	6	2.5	2	2.0	2	2	1	1	2	–	–
Total	363	100	232	100	131	100	86	55	53	38	38	59	34

Table 9.15 continued.

	Study area		Infanta		Nakar		Infanta villages				Nakar villages		
							IT	Din.	Ban.	Lual	Pob.	Cat.	Pesa
Purchase	No.	%	No.	%	No.	%	No.	No.	No.	No.	No.	No.	No.
Outside													
Increase	108	57	95	60.5	13	39.5	36	8	15	36	9	3	1
Same	35	18	26	16.5	9	27.5	10	10	4	2	2	4	3
Decrease	47	25	36	23.0	11	33.0	17	14	4	1	4	5	2
Total	190	100	157	100	33	100	63	32	23	39	15	12	6

Note: IT: Infanta town, Din.: Dinahican, Ban.: Banugao, Pob.: Poblacion, Cat.: Catablingan.
Note: Data for purchasing outside the municipality is based only on households purchasing goods/services outside. A large share does not purchase goods/services outside their own municipality.
Source: HR, 1999.

While a huge majority of the households in all villages increased their purchasing after 1995 as a result of the increase in incomes, Infanta households increased much more, both within and, in particular, outside the study area. Dinahican's lower increase was related to a condiderable group of very poor households.

9.7 Analysis

This chapter has dealt with the *third research question*, namely in what ways households' welfare has changed after the implementation of the Famy-Infanta road project.

The main findings in this chaper was that the welfare in general in the study area improved considerably after the completion of the road project, as the number of household members being employed increased substantially. Accordingly, average household incomes increased among all villages and income groups. Likewise, the households purchasing of goods and services increased, both within and outside the study area.

Despite the positive development outlined above, the differences in welfare between municipalities and villages were considerable. Those villages with greatest improvement in accessibility, namely the households among Infanta villages benefited to a much larger extent. Thus, the gap between Infanta and Nakar households widened after the completion of the road project compared to before. Best living conditions were found in Infanta town, followed by Poblacion, Lual, Banugao, Dinahican, Catablingan, and finally, Pesa. The gap between Infanta town and the remainder was large, while the gap between the two villages with lowest living conditions, Catablingan and Pesa, and the remainder was also large. Finally, the gap between the urban centre in Nakar, Poblacion, and the three rural villages in Infanta narrowed in favour of the villages in Infanta.

Job opportunities and the number of people that found work grew considerably, mainly benefing the households in Infanta. The improved accessibility made it easier for people in Infanta to participate in trade and production. And the number of business establishments increased far more in Infanta than in Nakar in the period following the road project. On average 75 % of all households in Infanta and 50 % of those in Nakar had a member who had been employed after the completion of the road project. Measured in the total number of household members employed, Infanta outnumbered Nakar even more.

Good job opportunities in Nakar remained scarce as low accessibility restricted production and trade through high interaction costs. Improved accessibility also enabled the expansion of the job market outside the study area and reduced the cost of applying for work. Owing to few opportunities in Nakar, many people from Nakar sought work outside the study area. However, the number of households generating remittance incomes was much higher among Infanta households.

The major increase in employment took place within non-agriculture self-employment, in both municipalities and all villages, except for one. Skilled/semi-skilled self-employment was mainly found in Infanta households, while unskilled self-employment was found in Nakar households. Employment in the agriculture sector increased considerably in Infanta, while it declined in Nakar. Improved accessibility to rice land and fish resources in Infanta villages stimulated production and trade, while such production became relatively more expensive in Nakar owing to its much lower improvement in accessibility. Infanta town, with the highest accessibility both before and after the road project, benefited mainly through increased engagement in trade and service activities.

Yearly average household incomes increased substantially in all villages and among all income deciles, especially in Infanta, in the period following the road project. A large majority of the households in all villages increased their incomes. However, income distribution became more unequal. Incomes were much higher and increased much more among Infanta villages and deciles than in Nakar. Also, the difference between deciles within each respective village increased (with few exceptions). Upper income deciles benefited most while lower income deciles benefited least, in all villages, in particular in Nakar. Larger and smaller shares of total village incomes were distributed among the highest and lowest income deciles respectively in Nakar. Finally, high incomes were concentrated towards the urban centres, although to a much lesser extent in Nakar in the period after the completion of the road project.

Following the increase in incomes, a large number of Infanta households demanded new goods and services previously not available, due to low demand and poor transport conditions. The economic viability of providing goods and services improved in Infanta, but not in Nakar. The presence of goods and services was low before 1995, especially in Nakar, as poor transport conditions restricted trade. After 1995 the situation in Infanta is, overall, satisfactorily. The situation in Nakar worsened after 1995 relative to Infanta.

While the distribution of welfare impacts among the households were dependent on many conditions and measures, the improved accessibility influenced each village societal transformation process, both its scope and its pace. High accessibility is a resource and the differences in household living condition among the municipalities and villages followed, to a large extent, changes in relative improvement in accessibility.

The level of accessibility differed greatly between Infanta and Nakar before the road project, but Nakar's relative level worsened afterwards. Infanta interregional accessibility went from *Below* to *Above Basic Accessibility*. Likewise, its intramunicipal accessibility

(between villages and Infanta town and the national road) improved. Both interregional and intramunicipal accessibility were *Substantially Below Basic Accessibility* in Nakar.

Following the completion of the road project, transport costs and travel times were reduced, delays decreased, vehicle load capacity increased, and reliability improved. As such, the opportunities and incentives to put untapped resources and a previously limited use of resources into more productive uses were stimulated. The road project raised the productivity of other production factors and investments poured into the local economy. As a result more people were employed and more people generated incomes.

Reduced travel times widened the labour market area. It improved labour productivity. The road project also connected and provided people with services they needed and wanted. In this sense there was a relationship between the road project and local economic growth and socio-economic development. Simply, the road project lowered costs, enlarged markets and facilitated trade. As goods were connected to markets, workers to work opportunities and services it affected welfare, more so among the households in Infanta villages through their substantially higher improvement in accessibility.

Despite a positive development we should not be misled to believe that overall living conditions are good, far from it. A majority of the households in both municipalities are still poor. Many cannot even provide simple basic needs, such as nutritious food, clothes, good housing facilities, and education for their children. And a decent life including safety and the possibility to plan ahead for ones family is still far out of reach for many households. While it is a minor comfort, perhaps their situation had been worse without the changes that took place after the road project.

Neither should we be misled to believe that investment in road infrastructure is the solution to all problems. Notwithstanding the importance of accessibility, greater access to other resources and productive assets among Infanta households certainly contributed to them being better prepared and having greater opportunities to take advantage and reap the benefits of the road project.

Chapter 10

Households' spatial mobility behaviour before and after the Famy-Infanta road project

10.1 Introduction

In this chapter, the study's *fourth research question* is dealt with, namely in which ways have the households' regional and local mobility changed after the implementation of the Famy-Infanta road project. Transport demand is often seen as a derived demand, where increased production and consumption are the driving forces. However, road supply, resulting in an improved accessibility situation also induces demand as the opportunities for a latent demand are established as transport costs are reduced and services improve. Given the increase in employment in the study area after the completion of the road project, and the following increase in incomes and general improvement in living standard, it is likely to assume that the households' mobility has improved. As a consequence their demand for intra- and interregional passenger transport should have increased. Accordingly, this chapter contains a presentation and analysis of the direct road project-related impacts on the households' mobility. The chapter is mainly based on data collected from household respondents (HRs).

Impacts on the household level span from dependency on public transportation, plan to purchase own vehicles and opinion on transport services, to choice of mode, travel time saving, perception of comfort and safety, and passenger destinations, via transport demand. It also includes mobility restrictions among households, as well as travel expenses effect upon the household economy. While all villages are represented, focus is on Dinahican in Infanta and Catablingan in Nakar. Trips are long distance (above 60 kilometres), made with public passenger transport operators (PTOs). Children and trips made with privately owned vehicles are excluded.

10.2 Households dependency on public transports and plans to purchase vehicles

In peripheral areas with poorly developed economies and poor transport conditions, public transport services are scarce and a majority of the riding public is dependent on this service. From time to time when service fails or stops operating due to low profits and/or poor transport conditions, participation in activities may more or less come to a stand still. Therefore it is important to know the households' dependancy on public transport (table 10.1). Likwise, as income is a major determinant of car ownership it is of importance to know their plans to purchase a vehicle.

A huge majority of the households were completely dependant on public transport. Dependence in Nakar was higher than in Infanta and Dinahican. Dependence in Catablingan was even higher (see appendix 29 for other villages). Those not dependent owned vehicles or had access through relatives or family member living elsewhere.

Table 10.1: Household respondents' dependent on public transport for interregional trips and plans to buy private motor vehicle in three years, distributed by municipalities and villages (No. & %).

	Infanta		Nakar		Dinahican	Catablingan
Dependent	No.	%	No.	%	No.	No.
Completely dependent	198	79.5	112	83.5	55	47
Not completely dependent	20	8.0	10	7.5	4	8
Not dependent	31	12.5	12	9.0	6	4
Total	249	100	134	100	65	59
Plan to purchase own motor vehicle						
No	191	82.0	112	85.5	53	54
Yes	29	12.5	11	8.5	9	2
Plan to	5	2.0	3	2.0	–	3
Maybe	8	3.5	5	4.0	1	1
Total	233	100	131	100	63	60

Source: HR, 1999.

A plan to purchase a vehicle is not fulfilled until performed, but plans indicate the present and expected economic situation. While a huge majority expected themselves to be dependant on public transport, 15 % would or planned to, purchase a vehicle within three years in Infanta, while 10 % in Nakar and Dinahican, and only 5 % in Catablingan. The high percent in Nakar was due to income affluent households in Poblacion and the buying of simpler and cheaper vehicles. Dinahican had the highest percentage responding yes. The combination of fishing sector growth and improved accessibility partly explained this.

The purchasing of a vehicle was, according to the HRs, influenced by present and/or expected incomes and accessibility. In Infanta, given its higher accessibility, income was most important. In Nakar, both income and accessibility were important. Households would, or planned to, purchase vehicles if intra- and intermuncipal accessibility improved. In Infanta there had been a shift from motorcycles, jeepneys and owner-type jeeps towards cars, vans, light trucks, and vespas. In Nakar light motorcycles still dominated. Few planned to purchase jeepneys or owner-type jeeps. No one planned to buy a truck. All three owners of trucks in Nakar operated from Infanta.

10.3 The household opinion about passenger services

Given that a huge majority was completely dependant on public PTOs for their regional trips (see table 10.1), it is important to see how passengers perceived the transport service situation after the road project compared to the situation before (table 10.2).

Table 10.2: Household respondents' views of the rate of public transport departures to the most frequently visited destinations, 1990–1994 and 1995–1999 (No. & %).

	Infanta				Nakar				Dinahican		Catablingan	
	1990–1994		1995–1999		1990–1994		1995–1999		1990–1994	1995–1999	1990–1994	1995–1999
View	No.	%	No.	%	No.	%	No.	%	No.	No.	No.	No.
Not enough	175	80	15	6.5	107	85	7	5.5	35	8	48	4
Almost enough	1	1	13	5.5	–	–	2	1.5	–	5	–	2
Enough	43	19	105	44	19	15	70	57	6	36	8	35
More than enough	–	–	105	44	–	–	45	36	–	11	–	13
Total	219	100	238	100	126	100	124	100	41	59	56	54

Source: HR, 1999.

There was a general consent among a large majority of the HR that the rates of departures were insufficient before 1995 (see appendix 30 for other villages). An equally big majority found that the number of departures was enough or more than enough after 1995. Thus, following the increase in departures to all destinations after the road improvement, the previous passenger hazard with fully packed buses and jeepneys disappeared, and a huge majority found the number of departures to be sufficient or more than sufficient.

10.4 Public passenger transport demand

General demand for passenger transport in the study area

It is relevant to see how improved accessibility and additional operators have influenced transport demand and stimulated particpation in activities outside the study area. Table 10.3 shows intra- and interprovincial passenger transport demand.

Table 10.3: Average monthly intra- and interprovincial passenger trips in the study area 1990–1999, distributed by vehicle types (passengers/one direction).

Year	Ordinary bus 1-2	Minibus 1-2	Jeepney 1-4	Total average
1990	25,200	n.s.	33,600–36,000	60,000
1991–1992	34,300–35,500	n.s.	33,600–36,000	69,100–70,300
1993–1994	27,600–30,900	n.s.	33,600–36,000	62,400–65,700
1995	32,800	3,000	48,200–50,300	85,000
1996	35,400	10,300	43,800–45,600	90,300
1997–1998	35,100–39,700	8,000–9,000	38,700–42,400	85,400–87,400
1999	35,600	5,400–7,600	35,200–35,900	74,300

Note: The ordinary bus operators servicing Sta. Cruz and Lucena City are excluded.
Source: PTO, Infanta town 1999.

Average monthly passenger trips increased substantially after 1994. Monthly passenger trips between 1995-1999 were 29 % higher than the previous period. Around 1 million passenger trips/year were performed with PTOs between 1995-1999, while less than 800,000/year before 1995. The decline after 1997 was partly explained by the low economic growth in the country, a shift towards private vehicles, and access to telephones. However, the increases are minimum. Uncertainties that promises of confidentiality would be kept and a very competitive market prevented operators from giving correct data. Also, minibus and jeepney operators often facilitated services by renting out vehicles.

Household respondent's transport demand – the enabling power of roads

The quantity of travel is the degree in which a person exercises his/her ability to move around. While ability depends on, amongst other things, desires and needs, outcomes tend to hide the influence of transport facilities and services, making it difficult to relate transport system characteristics to mobility levels.

While public transport services were available, but limited, before the road project, participation in activities was not 'feasible enough'. Taking time and money expenses, physical hardship and poor safety into consideration, and weighing these against the gains from participating in activities it was understandable why travel was not feasible.

'Before 1995 my husband drove a tricycle within Nakar. After the road project he delivers fish to Antipolo outside Manila. This was not possible before, neither physically nor economically'. (HR No. 48, Catablingan 1999).

It is in this light that the road project should be viewed, as an enabler to participate in activities. A huge majority of the HRs in the study area calculated on increasing their travel frequencies after the road project, indicating a previously unfulfilled latent demand. It also showed their awareness of expected reductions in travel costs as a result of improved accessibility set against the expenses to participate in activities.

The calculated increase was very high in Dinahican (80 %) compared to the other villages (see appendix 31). Given its fish production potential and improved accessibility, it was well grounded. The increase was lower in Catablingan, more as a result of low accessibility, rather than lack of production potential. It is important to note that calculated increases were not 'due to the road' per se, as if people traveled for the pleasure of travelling in itself. There were motives behind. The respondents merely expressed that the road project released an already existing demand and financial capacity to travel.

Travel demand distribution among household respondents

To understand who has benefited from improved transport conditions after 1995 and how many people participate in activities outside the study area, table 10.4 shows the number of household members performing intra- and interregional trips between 1990-2001.

Table 10.4: Total number of household members performing intra- and interregional trips (excluding children) 1990–1999, distributed by study area, municipalities and villages.

Year	Study area	Infanta	Nakar	Dinahican	Catablingan
1990–1991	645–664	420–434	225–230	92–94	88–89
1992–1994	690–722	459–482	231–240	99–107	88–94
1995–1996	764–774	511–517	253–257	113–116	105–110
1997–1998	783–785	518–525	265–260	116–113	114–115
1999	785	523	262	108	119

Source: HR, 1999.

Given that the total number of household members was the same throughout the period, 140 additional people travelled outside the study area in 1999 compared to 1990, or a 22 % increase. On municipal level, Infanta increased 25 % and Nakar 16 %. On village level Dinahican increased 15 % and Catablingan 26 % (see appendix 32 for other villages). An exception was Pesa, the poorest village with the lowest accessibility that showed a decline. On a yearly basis, the increase was highest between 1994-1995, the year when the road project was completed. Differences in household members' participation between villages were explained by division of labour, initial levels of travelling, incomes, and accessibility.

10.5 Household trip frequency and frequency distribution

Since a trip is performed to participate in an activity, travel frequency shows how often participation in activities takes place. Table 10.5 shows household travel frequencies.

Table 10.5: Households' average yearly intra- and interregional travel frequency (excluding children) 1990–1994 and 1995–1999, distributed by municipalities and villages (No. of trips per year).

Period	Infanta	Nakar	Dinahican	Catablingan
1990–1994	21.5	15.0	27.0	10.5
1995–1999	29.5	22.5	30.5	17.5

Source: HR, 1999.

While average travel frequency increased among all villages, except for Pesa, after the road project, disparities were huge (see appendix 33). Infanta household frequencies were much higher than those of Nakar before 1995. It increased after 1995. The difference between Dinahican-Catablingan was very high before 1995, but declined after. Initial high frequency in Dinahican, and starting from very low levels in Catablingan partly explained this. However, Dinahican households made, on average, 12 extra trips/year compared to Catablingan.[63] Lower transport costs due to improved accessibility and the economic boom partly explained Dinahican's higher frequency. Excluding the urban centre in Nakar, the villages with lowest levels of accessibility and incomes, Catablingan and Pesa, had much lower travel frequencies compared to all other villages.[64]

Travel frequency distribution

A high percentage of households below a village average travel frequency indicates that a few households make up a huge share of all trips. Given there is a strong link between income and travel frequencies, this also indicates an unequal income distribution.

Households' average yearly travel frequency became slightly more equal in Infanta and more unequal in Nakar after the road project. The share of households below average yearly village travel frequency in Infanta went from 64 % between 1990-1994 to 62 % between 1995-1999, while from 69 % to 77 % during the same periods in Nakar.

The share of households below average decreased in three out of four villages in Infanta between 1995-1999, while it increased in all three villages in Nakar (for details, see appendix 38). Percentage difference between municipalities was 15 % between 1995-1999, up from 5 % between 1990-1994. The difference between Dinahican-Catablingan was 4 % between 1990-1994 while 25 % between 1995-1999.

The difference in frequencies was partly related to higher income inequality in Nakar, where upper deciles increased their share substantially due to a much higher increase in

[63] The increase in regional trips had great impact on local transports. The members among the study villages tricycle-associations, the mode used in almost all local transports, increased from 140 in 1990 to 524 in 2001. The increase was most pronounced among Infanta's study villages (see appendix 34). Intramunicipal trips increased a lot, especially in Infanta. According to the study villages' tricycle association chairmen, average weekly trips increased from around 17,000 in 1990, to 42,000 in 1998 (see appendix 35). The HRs trip frequency from their village into Infanta town was much higher amongst Infanta HRs (see appendix 36).

[64] The introduction of a telephone system also influenced passenger trips in all Infanta villages, especially in Infanta town, and to a lesser extent among Nakar's villages. The number of long distance calls made from two calling centres increased from between 55,000–73,000/year in 1994 to between 200,000–274,000/year in 2001. The network was poorly distributed. Only one village in Nakar was connected. Installation fees depended on location in relation to Infanta town and the village road. Finally, installation fees (reaching 20,000, HR No.27, Lual 2001) and minimum charges restricted many households from installing private telephones (for details, see appendix 37).

incomes compared to lower deciles. The incomes among lower deciles in Infanta increased much more than in Nakar. When incomes among lower deciles increase, a larger share is allocated to travelling. Also, due to restrictions, there is a ceiling in terms of travel frequencies that is difficult to go beyond for higher deciles, irrespective of income. Table 10.6 shows various household deciles' share of total household trips.

Table 10.6: Respective deciles share of total household trips (excluding children) performed 1990–1994 and 1995–1999, distributed by study area, municipalities and villages (%).

	Study area		Infanta		Nakar		Dinahican		Catablingan	
Deciles	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999
1–2	1.2	1.3	1.3	1.3	1.0	1.1	0.2	0.2	1.0	1.1
3–4	4.9	5.4	5.0	5.4	4.6	5.4	2.0	2.2	5.0	4.7
5–6	11.2	12.6	11.8	13.2	9.6	10.8	9.2	14.7	7.5	9.5
7–8	23.6	29.7	24.0	25.9	22.3	20.7	27.4	27.1	21.4	23.7
9–10	59.0	56.2	57.9	54.2	62.5	61.9	61.2	55.6	65.9	60.8

Source: HR, 1999.

Deciles 1-2's share was negligible and their increase rudimentary in both municipalities and all villages (see appendix 39). Deciles 9-10 made up a huge majority of all trips performed in both municipalities and all villages, especially in Nakar. But their share decreased, as frequencies were already high. Equality improved in Infanta, while it remained almost unchanged in Nakar. The difference between deciles 9-10 widened between Infanta-Nakar and Dinahican-Catablingan (following a general pattern with the exception of one village in Infanta, see appendix 39). Equality increased more in Dinahican than in Catablingan. How respective deciles' travel frequency changed during the two time-periods is presented in table 10.7.

Table 10.7: Households' average yearly travel frequency (excluding children) 1990–1994 and 1995–1999, distributed by deciles at study area, municipality and village levels.

	Study area		Infanta		Nakar		Dinahican		Catablingan	
Deciles	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999
1–2	1,3	1.7	1.6	2.0	0.8	1.2	0.2	0.4	0.5	1.0
3–4	5.0	7.3	6.0	8.3	3.4	5.5	2.7	3.4	2.1	4.2
5–6	11.6	17.2	14.0	20.5	7.2	11.1	12.5	22.3	4.0	8.5
7–8	24.0	40.4	28.5	40.0	16.8	21.5	37.1	41.2	11.4	21.2
9–10	61.0	76.6	68.5	83.7	46.9	63.5	82.6	84.6	34.9	54.2

Source: HR, 1999.

All deciles among all villages increased their average yearly travel frequency during the period after the completion of the road project (except for deciles 1-2 in Pesa, see appendix 40). Except for a few deciles in Poblacion, respective deciles' frequencies and increase in frequencies in Infanta were higher compared to their counterparts in Nakar.

Despite an overall increase, high frequencies were concentrated to deciles 9-10. The gap between deciles 9-10 and the remaining deciles widened. The increase among deciles 1-2 was rudimentary, low among deciles 3-4, quite low among deciles 5-6, but high among deciles 7-8. However, an increase among the lower deciles may be of greater importance compared to an increase among households belonging to higher deciles.

The modest increase in travel frequencies among deciles 1-4 in Infanta and deciles 1-6 in Nakar were related to very low income in general and low income increases, time budgets, low access to vehicles, stationary living conditions etc. These households were poor, partly because the financial returns of their time and labour were low. If then accessibility is low, choices must be made. In case of sickness, the village herbalist is visited instead of a hospital. A trip can also be performed by another person, where his/her travel costs are shouldered. Many send money to studying children with bus drivers.

The low increase in deciles 9-10 in Dinahican was partly explained by already very high average travel frequencies, close to 50 additional trips per year per household between 1990-1994 compared to Catablingan. The high increase in deciles 9-10 in Catablingan was mainly explained by their huge increase in incomes between 1995-2001. Disparities between deciles were huge both in Dinahican and Catablingan, especially between deciles 3-4 and 5-6 in Dinahican, deciles 5-6 and 7-8 in both villages, but in particular between deciles 7-8 and 9-10 in both villages. It followed a general village pattern. The relationship between incomes and travel frequencies was strong.

10.6 Household choice of transport mode

As the number of PTOs increased so did passenger options. Table 10.8 shows the HRs modal choice.

Table 10.8: Household respondents' modal choice, when performing interregional trips 1990–1994 and 1995–1999, distributed by study area, municipalities and villages (No. & %).

	Study area		Infanta		Nakar		Dinahican	Catablingan
Modal choice	No.	%	No.	%	No.	%	No.	No.
1990–1994								
Ordinary bus	317	57.0	208	56.0	109	59.0	41	53
Jeepney	220	39.5	151	40.5	69	37.0	36	23
Others	19	3.5	12	3.5	7	4.0	5	–
Total	556	100	371	100	185	100	82	76
1995–1999								
Ordinary bus	349	51.0	234	51.0	115	50.0	44	55
Jeepney	132	19.0	72	16.0	60	26.0	21	23
Minibus	178	26.0	129	28.0	49	21.5	24	25
Others	28	4.0	22	5.0	6	2.5	7	–
Total	687	100	457	100	230	100	96	103

Source: HR, 1999.

Ordinary buses and jeepneys dominated completely before 1995, on all levels (for modal choice and other villages, see appendix 41). After 1995, two major shifts took place; a strong decrease in jeepneys and a strong increase in minibuses. Jeepneys lost huge shares in favour of minibuses. Ordinary buses also lost shares on all levels. Despite higher fares and no insurance coverage, minibuses attracted customers prepared to pay for fast and convenient direct service, air-conditioning, and door-to-door service in Manila. This development followed a pattern where increased incomes lead to demand for faster and more comfortable, and thereby more expensive, services. Since minibuses only service Manila it was here that ordinary buses and jeepneys lost market shares.

Infanta households shifted from jeepneys and ordinary buses towards minibuses to a larger extent than in Nakar. This is a result of a higher increase in average incomes and a higher share of households with Manila as destination. The choice of minibus was the same in Dinahican and Catablingan. This may be difficult to understand as incomes in Dinahican have increased more.

Minibus owners and drivers stressed they felt no competition from ordinary buses. Not even in 2001 when one operator introduced air conditioning, a former advantage with minibuses (HR No. 18, 37, Lual 1999; 2001, HR No. 27, 89, Banugao & Infanta town 2001). Minibus operators stressed that competition was low as they catered for different customers. But one bus operator wanted to stop minibuses, stressing the minibus associations and their stations in Manila were illegal (PTO: OB2, Infanta town 2001). Also, a recent trend of longer waiting time before minibuses depart and a tendency to depart without fully loaded vehicles indicated that minibuses were exposed to competition.

10.7 Wasted time – the price of poor accessibility

Time can be viewed as a travel expense and a gain. Time is something that has been gained, a direct benefit of the road project. Before 1995 it was almost impossible to return home the same day from any destination beyond Famy, 60 kilometres away. Poor road conditions resulted in long travel times and delays. Around a third of all trips (50 to 60 % during the rainy season between October-January) were delayed (PTO: J1-2, Infanta town 1999). After the road project travel times decreased substantially to all destinations (see appendix 42). Passengers could travel to any destination within a radius of 150 kilometres from Infanta, fulfil their activities, and return home the same night.

> *"Today I can visit my studying son in Manila and my working daughter in Sta. Maria, Laguna province, during the same day. This was impossible before the Famy-Infanta road project."* (HR No. 10, Banugao 1999).

Today, transport-related delays along the Famy-Infanta road are not a problem. Instead, traffic congestion in and around Manila is the major traffic concern. Except for savings on food and accommodation, the ability to return to work duties and spend more time with the family and not being physically and mentally exhausted were other benefits from reduced travel times. The latter is very seldom accounted for in impact studies.

> *"To return home as fast as possible is the top priority for a large majority of all households. You save expenses and it enable you to work more and spend more time with your family".* (HR No. 27, Banugao 2001).

Finally, reduced travel time was an incentive for relatives and friends to visit the study area. Table 10.9 shows the changes in time spent at the final destination before returning home when performing long distance trips.

Table 10.9: Average time household respondents spent at destination when travelling before returning home 1990–1994 and 1995–2001, distributed by study area, municipalities and villages (No. & %).

	Study area		Infanta		Nakar		Dinahican	Catablingan
Period and average time	No.	%	No.	%	No.	%	No.	No.
1990–1994								
Return same day	47	9.0	38	11.0	9	5.0	8	1
1 night	85	16.0	52	15.0	33	19.0	21	10
1–2 days	59	11.0	23	6.5	36	20.5	4	11
3–7 days	300	58.0	221	63.5	79	45.5	34	42
> 7 days	32	6.0	15	4.0	17	10.0	7	6
Total	523	100	349	100	174	100	74	70
1995-2001								
Return same day	281	48.0	191	49.5	90	44.5	32	26
1 night	108	18.5	65	17.0	43	21.0	20	19
1–2 days	61	10.5	40	10.5	21	19.0	4	12
3–7 days	116	19.5	78	20.0	38	19.0	21	20
> 7 days	21	3.5	11	3.0	10	5.0	8	7
Total	587	100	385	100	202	100	85	84

Source: HR, 1999.

HRs returning home the same day when performing long distance trips net increased around 40 % in the study area, while those staying away 3 days or more decreased by 41 %. The differences between municipalities were small but large between some villages (see appendix 43). A larger share of Infanta HRs returned home the same day both before and after 1995, partly due to its higher accessibility, not in an interregional perspective, but as regards access to bus and jeepney stations in Infanta town.

In-box 1: Factors explaining household respondents' time spent away from home when travelling.

Differences between returning home the same day were huge, spanning from 1 to 13 % between 1990–1994 and 31 to 63 % between 1995–1999. Pesa, with the lowest accessibility and highest poverty, had the largest share returning home same day. Generally, Pesa household members travelled to destinations closer to home. This was partly a result of demand. Most of what Pesa households demanded was available close by. Money was another restriction. Households in Pesa had low incomes and weak social networks. They could not get free accommodation at their destination. The share of Pesa HRs staying with siblings or children when travelling was much lower compared to other villages (see appendix 44). Low accessibility added to this. Few households could shoulder the costs of hiring a tricycle when arriving at Infanta town at night. It was circumvented by travelling to destinations closer to home. As a result, Pesa HRs could return home before 6 p.m. and did not need to hire a tricycle. Hence, a combination of income, demand, social network, and accessibility explained differences about returning home and the choice of destinations.

Infanta town had the highest accessibility and Lual was the closest adjoining village. HRs in these two villages returned home quickly before-after 1995. HRs in Infanta town did not need tricycles when arriving home. It was possible to walk from Infanta town to Lual and tricycle costs were lower compared to other villages. The likelihood of hiring a tricycle when arriving in Infanta town after 6 p.m. was huge among other villages and generated extra expenses. Added to this was Nakar's low intra- and intermunicipal accessibility. To avoid extra costs, many HRs stayed longer at the destination for free or slept at the transport terminal and arrived home early next morning.

The reason for the journey also was influential. That a lower share of Dinahicans' returned home the same day was related to fishmarket location. As fish auctions do not start until midnight, vehicles left Dinahican late afternoon and returned home early the next day. The share of HRs departing in the afternoon was more than two times higher in Dinahican than in the study area in general (see appendix 45). Finally, many household members working outside the study area until 1994 stayed 'at home' for a long time when visiting families due to low accessibility. After 1995 visits were more frequent but shorter. Before 1995 a week's salary could be lost by visiting the family. After 1995 one or two days or no salary at all was lost.

Travel time saving on the improved road section was uniform from a distributive perspective, disrespective of village, level of accessibility or income. Savings could then be invested in more productive activities. Given that a majority of the HRs were self-employed it was difficult to estimate time savings in terms of money. However, savings and earnings from returning home earlier, excluding fares, spanned between 70-500 pesos/trip (see appendix 46). Had the road project resulted in minor time reductions, the pattern before the project may have remained. Major time gains are found in the initial stages of major road network improvements, and on poorly developed networks.[65]

10.8 Safety and comfort

Road safety, resulting in fewer accidents and improved comfort, are important for all road users. It is an economic and social issue. Whether PTOs in developing countries, especially those in monopolised markets, consider passenger safety and comfort to be of importance can be questioned, however. In the Philippines, road accidents continue to increase due to a larger vehicle fleet and poor road standards (ADB 1996). This is a loss and a cost for society. A better reason for improving roads is hard to imagine.

In 1993, one bus operator's vehicle went over the edge in the Sierra mountains and 23 died. The memory of this tragedy still detered some HRs from travelling or only travelling when absolutely necessary. Poor road conditions also resulted in discomforts. The HRs often metioned physical hardships and insecurity.

> *"Upon arrival in Manila the body ached. You did not want to think about returning home, especially not if you had to stand up during the trip".*
> (HR 110, Infanta town 1999).

While a huge majority of the HRs in all villages felt uncomfortable and insecure when travelling before the implementation of the road project, a huge majority felt comfortable and secure when travelling with public PTO afterwards (for details, see appendix 47). Less crowded buses, safety devices, and a smooth pavement configuration all contribute to this. Changes in modes also improved comfort. Jeepney passengers sit facing inwards and the low roof (not possible to stand up) and cramped conditions prevented good views. Buses provided more appropriate seating and had space for luggage and goods. Airconditioned minibuses were even more comfortable. Despite this, many still felt insecure after 1995 as vehicle speed had become a competitive measure.

10.9 Destinations

Change in number of destinations

Reduced travel times give opportunities to travel further, visit several destinations and/or fulfil several activities during the same trip. Table 10.10 shows the number of destinations and their regional distribution before and after the completion of the road project.

[65] Average time HFs and GTOs in Infanta town and Banugao spent at the destination of delivery decreases substantially.

Table 10.10: Total number of destinations visited by household respondents and destinations distribution by province, 1990–1999 (No. & %).

	1990–1991	1992	1993–1994	1995	1996–1997	1998–1999
Total destinations per year (No.)	44	47	52–51	60	57–59	57–56
Share (%)						
Laguna province	30–32	30	28–30	30	28–29	30–31
Rizal province	18	18	17–16	14	14	14
Quezon province	14–13	15	12	14	14	14–12
Others (> 150 km.)*	38–37	37	43–42	42	44–43	42–43

* Provinces requiring boat from Manila, provinces south of Lucena City and south and north of Manila.
Source: HR, 1999.

On average, ten additional destinations were added after the road project. The increase started during the initial road project in 1993 and peaked in 1995. Destinations in the home province Quezon and the neighbouring provinces of Laguna and Rizal dominated (see map 4), but their share decreased slightly after 1995. Destinations over 150 kilometres away increased, following the trend in which people travel further (and faster) when incomes rise, both in developed and developing countries (Roth 1996).

The new destinations after the road project were visited by few and very seldom. From a household firm perspective it was not necessary to visit markets beyond 150 kilometres. The population within the 150 kilometres radius, including Metro Manila and Quezon, Rizal, and Laguna provinces amounted to around 15 million in 1999 (NSO 2002). On average, HRs in Infanta travelled to 7 extra destinations before and after the road project than in Nakar (21 and 23.5 destinations between 1990-1994 and 1995-1999 for Infanta respectively, while 14 and 16.5 destinations during the same periods in Nakar, see appendix 48). Only Dinahican and Catablingan added many new destinations.

Explaining the number of destinations visited is difficult. Explanations must be found in demand pattern, income, occupation, people's origin, education, socioeconomic networks. HRs in Nakar visiting destinations over 150 kilometres away spanned between 0-1 for the two rural villages before 1995 and between 0-3 after. In Infanta it spanned between 4-9 before and between 4-10 after. If the difference was due to higher accessibility, income levels, or market trade directions is difficult to say. A combination is most likely.

Manila – the dominating passenger destination

Given Manila's primate city status and its relative closeness to the study area, it is not surprising that Manila dominates as a passenger destination (see table 10.11).

Table 10.11: Household respondents' trip destination 1990–1999, distributed by municipalities and villages (%).

	1990–1994				1995–1999			
Destination	Infanta	Nakar	Dinahican	Catablingan	Infanta	Nakar	Dinahican	Catabingan
Manila	66.0	54.0	55.0	71.0	63.0	52.0	58.0	70.0
Lucena City	6.0	10.0	7.0	4.0	7.0	10.0	5.0	4.0
Siniloan	3.0	13.0	7.0	1.0	3.0	13.0	2.0	2.0
Manila suburbs	1.0	4.0	2.0	6.0	3.0	3.0	6.0	4.0
Others	24.0	19.0	29.0	18.0	24.0	22.0	29.0	20.0

Note: For other villages and total destinations, see appendix 49–50 and map 4.
Source: HR, 1999.

While more people travelled to Manila in absolute terms, its overall share in terms of total passenger trips declined. Before the road project Manila was often the only destination visited by a person. Manila's increase in Dinahican was due to increased participation in fish marketing. Lucena was important as a provincial capitol. HRs employed at the local government, especially those from the urban villages, visited Lucena City on work duties.

Owing to Manila's primate city status, a majority of the HRs trips were destined here. Manila and other destinations within a 150 kilometres radius from Infanta town made up a large majority of all destinations. Other destinations' share increased after the road project, especially in Infanta, as people's opportunities to visit other destinations improved after the project, both owing to improved accessibility, and increased incomes and trade.

10.10 Mobility restrictions among households after the road project

Mobility restrictions, excluding accessibility

In table 10.12, mobility restrictions amongst the HRs are presented. Accessibility is excluded as section 10.4 dealt with it as a restriction before 1995.

Table 10.12: Factors restricting household respondents' mobility after the road project, distributed by study area, municipalities and villages (No. & %).

	Study area		Infanta		Nakar		Dinahican	Catablingan
Restriction	No.	%	No.	%	No.	%	No.	No.
Money	216	33.5	113	28.5	103	32.0	35	49
Busy working	127	18.0	54	13.5	73	23.0	14	34
Take care of children/household member	88	12.5	50	12.5	38	12.0	14	17
No access to vehicle	65	9.0	27	7.0	38	12.0	11	20
Too old	38	5.5	21	5.5	17	5.0	6	8
Sickness	36	5.0	20	5.0	16	5.0	6	5
Feel sick and tired travelling	21	3.0	21	5.5	–	–	6	–
No important matters – stationary lifestyle	43	6.0	28	7.0	15	4.5	3	8
Others	47	6.0	32	8.5	15	5.5	15	5
Nothing	31	4.5	27	7.0	4	1.0	5	–
Total	712	100	393	100	319	100	115	145

Note: A HR was allowed to choose three restrictions. For data on other villages, see appendix 51.
Source: HR, 1999.

Money was the major factor restricing mobility, especially in Nakar where incomes were lower in general. Money as a restriction was the same in Dinahican and Catablingan. Dinahican's higher percentage compared to its municipal average was mainly due to many affluent households in Infanta town.[66] Access to a vehicle was related to expected incomes from fish marketing.

In Catablingan, access to a vehicle was not important. Despite large resources, with low accessibility, production was limited. Time, here represented by busy working, also restricted in a major way. If the time required to reach a destination declines, it enables participation in activities, given there is a demand and that the budget allows it.

[66] If only including household 1st choice, money as a restriction was 49½ % in Infanta (Infanta town and Lual 34 %, Dinahican 65½ %, Banugao 72½ %) and 71 % in Nakar (Poblacion 64½ %, Catablingan 71½ %, Pesa 80 %).

Passenger transport costs affect on the households' economy

Given that many households are income poor, it is important to understand to what extent travel expenses affected the household economy.

Travel expenses affected 51 % of the households economies in the study area after the road project. Among the households affected, a majority (57 %) had small effect. Nakar household's were much more affected compared to Infanta's, 67 % against 42 %. Nakar's low intra- and intermunicipal accessibility, generating additional transport costs, influenced this. The households in Catablingan were affected to an even larger extent than in Dinahican (for details, see appendix 52). Also, while people in Dinahican were often engaged in income generating activities when they travelled, people in Catablingan mainly participated in social activities. In order to participate in activities, trade-offs were made:

- households in Nakar (32 % among those with big effect, 42 % in Catablingan) cut down on basic needs and income generating inputs compared to zero in Infanta.
- households in Nakar had to cut down on food and clothes expenses to a much larger extent (cuts in clothes expenses in Infanta were related to expensive clothes).
- many households in Nakar (14 %, 19 % in Catablingan) had to borrow money to cover travel expenses. No household in Infanta had to do this.
- among households with big effect, 5 % reduced farm input expenditures in Nakar, while 0 % in Infanta. This affected production and incomes directly.
- Infanta households (35 %) cut down on electricity, gas, telephone, cable-tv, and water bills, while only around 3 % did so in Nakar (for trade offs, see appendix 53).

Continued latent demand for passenger transport

A wish to travel more or less often may be present but restricted due to various factors. Table 10.13 shows travel frequency satisfaction in 1999.

Table 10.13: Household respondents travel frequency satisfaction in 1999, distributed by study area, municipalities and villages (No. & %).

Frequency satisfaction	Study area		Infanta		Nakar		Dinahican	Catablingan
	No.	%	No.	%	No.	%	No.	No.
Increase	133	36.0	97	40.0	40	31.5	33	21
Satisfied	199	54.0	124	51.5	75	59.0	23	26
Decrease	36	10.0	20	8.5	16	9.5	7	10
Total	368	100.0	241	100.0	127	100.0	63	57

Source: HR, 1999.

A majority of the HRs in the study area were satisfied with their travel frequencies in 1999, given they had increased their frequencies since the upgrading of the road. Still, one fourth (net) of the HRs wanted to increase their frequencies. Only one HR out of ten wanted to decrease their frequency.

A larger net share of Infanta HRs wanted to increase their travel frequency compared to HRs in Nakar. More than 30 % (net) of all HRs wanted to travel more often than they did in 1999 in Infanta. In Dinahican this figure was even higher compared to other villages (see appendix 54). Especially HRs with very low frequencies and those benefiting from

already increased frequencies wanted to increase further in Dinahican. The main reasons among those who wanted to decrease their frequency were old age, sickness and dislike of travelling in general. Satisfaction was partly due to the fact that many had reached levels where demand was fulfilled. Many stressed they lacked capital to spend at the destination or had no other resources requiring them to travel.

10.11 Analysis

This chapter has dealt with the study's *fourth research question*, namely in which ways the households' regional, as well as local, mobility has changed after the implementation of the Famy-Infanta road project.

The main finding was that the households' regional and local mobility improved considerabley after the completion of the road project, especially among the households in Infanta. A much greater number of household members performed regional trips outside the study area, theirs travel frequencies in themselves increased, and they visited a greater number of destinations. The capital city of Manila dominated as a destination, both before and after the project. The time spent at the destination before returning home decreased substantially. Dependence on public transport was still very high, but a shift towards faster, more convenient and more expensive modes and private vehicles was pronounced.

The public opinion towards the public passenger transport operators' services was positive after the completion of the road project. However, many were still unsatisfied with their travelling frequencies. The major restriction for performing regional trips was lack of money. The travel costs strained many housholds' economies and trade offs had to be made, especially in Nakar. Very low interregional accessibility before the road project restricted the households' mobility. Travel expenses exceeded assumed benefits.

A latent passenger transport demand was released after the completion of the project and a greater number of people in all villages performed regional and local trips, especially in Infanta that enjoyed the greatest improvement in accessibility and incomes. Average yearly passenger trips performed by the total population in the study area also increased considerably. In the late 1990s, passenger trips declined due to certain factors, such as private vehicle ownership, usage of telephones etc.

The households trip frequencies increased among all deciles. However, the higher deciles (9-10's) made up a huge share of all trips performed in both municipalities and among all villages, especiall in Nakar. Deciles 1-2's share was negligible and their increase rudimentary in both municipalities and all villages. Equality, measured in travel frequency, improved in Infanta, while it remained almost unchanged in Nakar. Likewise, all deciles among all villages (except for one) increased their average yearly travel frequency during the period after the completion of the road project. The gap between deciles 9-10 and the remaining deciles widened, and the difference in travel frequencies widened between the municipalities, favouring Infanta. Except for a few deciles, respective deciles' frequencies and their increase were higher in Infanta compared to their counterparts in Nakar.

A large majority of the households in all villages were satisfied with their frequencies after the road project, although many households wanted to increase further, especially in Infanta. Following the improvement in accessibility, money was the major factor restricting the households' mobility after the road project in all villages, especially in Nakar. Lower accessibility and incomes in general in Nakar put large strains on travel expenses and its affect on the economy was much higher, than in Infanta. As a consequence, households in Nakar made much greater trade-offs (e.g. cuts in basic goods and purchasing of farm inputs) in daily life in order to travel.

A very large majority of the households among all villages were still completely dependant on public passenger transport operators, but a larger share in Infanta planned to purchase private vehicles, especially more expensive vehicles. Purchasing in Infanta was mainly related to present and/or expected income. Owing to Nakar's much lower accessibility, this, together with income, was the main determinant factor. Ordinary buses and jeepneys dominated the interregional passenger transport market completely before the road project. Since then a shift toward minibuses with more comfortable, extensive, and faster services took place. Following an increase in incomes a larger number of people demanded such services, especially in Infanta.

Due to low interregional accessibility before 1995, the road project impact on travel time reduction was substantial among all villages. While only 10 % of the household respondents returned home the same day when travelling before the road project, 50 % did that after the road project. Instead, people could allocate more time for work, family members, reduce expenses on food and accommodation, and return home without being physically and mentally exhausted. Finally, several activities and destinations could be included within the same trip.

While a large majority of the household respondents in all villages felt uncomfortable and insecure when travelling before the implementation of the road project, a very large majority felt comfortable and secure after due to road surface improvement and more comfortable vehicles. Likewise, while a large majority had the opinion that the passenger operators provided too few scheduled departures before the road project, a large majority had the opinion the number of departures were enough or more than enough after the road project.

Owing to Manila's status as a primate city in the country, a large majority of the household respondents' trips were destined here, both before and after the completion of the road project. Manila and other destinations within a 150 kilometres radius from Infanta town made up a large majority of all destinations visited. Additional destinations, as well as their share, also increased, especially in Infanta, as people's opportunities to visit other destinations improved after the project, owing to improved accessibility and increased incomes and trade.

Chapter 11

Results and conclusions

11.1 Introduction

This chapter summarizes the most important results and conclusions of the study. The conclusions are divided into specific conclusions related to the empirical findings, conclusions set in a wider context, and conclusions on a general level. Before turning to results and conclusions, the research questions formulated in the introductory chapter are repeated. The *first* and *second research questions* concerns the ways in which the local fishing sector's, and other production sectors' and economic activities' conditions have changed after the completion of the road project? The *third research question* concerns changes in household welfare aspects, while the *fourth research question* concerns the households' regional and local mobility. The results and conclusions related to respective research question are presented in an integrative manner below.

11.2 Specific conclusions related to the main empirical findings

Direct impacts
The completion of the Famy-Infanta road project led to substantial direct impacts. A primary and a major result with causal power is that the former hazard with delays on the Famy-Infanta road section almost disappeared. The punctuality and flexibility of goods and passenger transports improved. Previous unrealistically high transport costs and travel times were reduced considerably, vehicle load capacity increased, while passability, safety and comfort improved substantially.

The travel time to Manila was reduced by 40 to 44 %, fuel consumption (litre) decreased by 19 to 50 %, total maintenance costs decreased by more than 40 %, while the legal vehicle load capacity on the road was doubled.

In conclusion, given the poor transport conditions and low levels of accessibility in the Philippines in general and in the study area before the road project, the level of accessibility in the latter improved in relation to most other areas after the project.

Indirect socio-economic development impacts
Indirect socio-economic development impacts appears, on one hand, as a result from improved accessibility and, on the other hand, due to that economic actors respond to new opportunities to exploit resources, previously not utilised or underutilised. Here improved accessibility play a central role as an enabler and releaser in production chains that includes investments, in-migration, improved access to information and knowledge etc., that eventually results in increased production and increased sales, where the latter leads to further investment in production.

All the indirect impacts included in this study were of a considerable size. *Investments*, formerly tied up elsewhere, increased, both local and investments from outside. Capital was invested in production factors such as land, fishing vessels, more advanced production methods and equipment (stimulated *specialization*). This process influenced *land use*. While land previously not under cultivation expanded, productivity also increased on land under cultivation. The number of land sales and land values rose.

At the same time, the number of *new firms* and the number of people being *employed* by old and new firms grew considerably. Firms lowered production costs and operated in a *more productive* and *competitive* manner. With lower transport costs, both the *labour* and *export markets* widened. As a result of this, both *production* and *exports* increased in all economic sectors of most importance, except for the logging sector. These included rice farming, the fishing sector, the furniture and wood processing sectors, and the transport and the service sectors.

Further, through additional actors, such as fisher *immigrants* and improved *information flows*, *competition* strengthened in all economic sectors and activities (also due to lower interest rates) that were formerly controlled by oligopolies. A very positive *income development* followed after the road project, and accordingly, the households' mobility increased considerably. A much greater number of people performed *regional* and *local trips*, at higher frequencies to a greater number of destinations outside the study area. People could perform such trips cheaper, faster, more reliably and comfortably, at extended service hours, and with a greater choice of means after the road project.

With higher incomes people demanded a wider variety of *commodities and services*. Due to this and the lack of transport delays, it became economically viable to *trade* in a greater variety of goods. This resulted in higher *consumption* within and outside the study area. The economy of the study area shifted from one based on oligopolies, toward a more competitive economy based on market principles. The economy also became more *diversified* and was thereby less *dependant* on and less *sensitive* to external conditions. As a result of all these impacts, local government *revenues* increased.

All in all, this leads to the conclusion that, in absolute terms a socio-economic development and an economic growth was attained within the study area following the period after the completion of the Famy-Infanta road project.

Distributional outcomes of direct and indirect socio-economic development impacts
Owing to the wide extention of the direct impacts, a very large majority of all households, firms, and transport operators in the study area benefited. Increased competition resulted in that customers benefited through lower costs. Many actors previously protected by high transport costs could not stand up to competition once it appeared. Those who adapted to the new situation benefited. Differences in outcomes between the municipalities and villages were considerable. The households in Infanta villages benefited to a much larger extent than the households in Nakar.

This leads to the conclusion that the variations in levels of accessibility severely affected the distributional outcomes of socio-economic development impacts and economic growth.

Lowered transport expenses in the villages in Infanta compared to Nakar was, perhaps, the best indicator among the direct impacts. A much greater increase in firms, employment and incomes in Infanta indicated that the indirect impacts benefited Infanta to a much larger extent. All income groups in all villages increased their incomes remarkably in the time-period following the completion of the road project, compared to the period before, especially in Infanta. However, high-income groups benefited disproportionately more than low-income groups. Income distribution became more unequal. Absolute poverty was reduced, but a majority of the households remained below the poverty line.

A conclusion then is that, from a poverty reduction perspective, the road project was good, but not good enough.

11.3 The role of improved accessibility put into perspective

The spatial distribution of socio-economic development in a region is influenced by the cooperation between the improved road accessibility and the improved network-accessibility.

Following the accessibility index in table 4.3, where the upgraded roads were classified by means of the road quality changes, four conclusions are apparent. After the completion of the road project the study area and Infanta's level of ***intra-*** and ***interregional*** network accessibility shifted from one *Below Basic Accessibility* to one *Above Basic Accessibility*, while Nakar's remained *Substantially Below Basic Accessibility*. In Nakar's case it was due to being disconnected from the Famy-Infanta road and Infanta through the river Agos without a bridge connection.

Accordingly, ***intermunicipal*** network accessibility between Infanta and Nakar was *Substantially Below Basic Accessibility*, both before and after the road project. On village level, ***intervillage*** accessibility improved more among the villages in Infanta than for the villages in Nakar. After 1995, all four villages in Infanta had *Basic Accessibility* or *Above Basic Accessibility*. In Nakar one village had *Basic Accessibility* after 1995, while the other two had *Below* and *Substantially Below Basic Accessibility*.

The levels of accessibility improved in absolute terms in the study area, in the municipalities, and in the villages. Infanta's level of accessibility was highest. Infanta and its villages accessibility improved much more in relative terms compared to Nakar. This pattern is congruent with the direct and the indirect impacts. The society and the local economy changed rapidly in Infanta, while to a much less extent in the latter.

In conclusion, the level of improved accessibility severely affected in what extent a previously suppressed and untapped resource outtake, production, and demand among people to participate in activities were released and enabled.

Notwithstanding the influence of improved accessibility, we must bear in mind that development seldom follows in a straightforward way. Instead the relationship is intricate. It takes place in a wide context where the necessary conditions are several and difficult to attain. The distributional outcomes in this study were also closely related to and influenced by other external and internal conditions and measures, such as:

i) abundance of natural resources, ii) a quite highly educated population, iii) initial conditions and access to resources among households and firms, iv) national sector deregulations, v) national policies, vi) increased prices and demand, vii) management measures, viii) relocated skills and knowledge brought by immigrants, ix) the weakened position of other production sites, and x) physical geographical features.

These conditions and measures could, in themselves or by interacting with each other, either reinforce or paralyze the village or municipal economy, no matter whether a road investment was made or not. However, despite their importance, the greater improvement in accessibility in Infanta certainly influenced the distributional outcomes. It should be noted that, even though average income levels (village, household and deciles) were higher in Infanta before the implementation of the road project, the difference vis-à-vis Nakar widened in the period following the completion of the road project.

In conclusion, the improved accessibility gave better opportunities to Infanta households and firms to make use of their resources. Despite its abundant natural resources, this did not materialize in Nakar to the same extent. Another conclusion is that, for a road to play an enabling and a releasing role, other conditions and measures must coincide and interact.

11.4 Conclusions in a wider context: accessibility – a necessary but not a sufficient factor for socio-economic development

Socio-economic development necessitates that a demanded resource is available and that transport costs, together with production costs, are below the sales value and competive with other production sites. Here, the complementarity, transferability, and intervening opportunity concepts, explaining the underlying factors for the movement of goods and people and interaction (trade) between regions are still valid as analytical tools to analyse a societal transformation process.

The Famy-Infanta road project was mainly a result of the demand for agricultural goods and fish from a growing and more income affluent population in Manila, its neighbouring industrial cities, and from abroad. The demand was enhanced as a predominantly share of the traditional fishing waters in the country were overfished and land in traditional major agricultural producing areas close to Manila shifted into non-agricultural uses. It also included a regional policy to integrate urban and rural areas, and industry and agriculture.

None of these two scenarios were present in the study area. On the contrary, the study area is located along the Pacific Ocean coast, the sea from where future fish production was expected to come. Likewise, agricultural land was abundant. So, in order to transport

agricultural goods and fish in a cost efficient way, the provision of an adequate road between the west coast (Manila) and the east coast (study area, Pacific) was necessary.

In conclusion, the exogenously and endogenously derived motives to implement the road project were fulfilled. While the project did not aim at local development, it did not restrict it, on the contrary. From a local perspective, the project became supply-led socio-economic development, while from a national perspective, it was demand-led.

The fishing sector – a key branch of the development process in the study area

The fishing sector in Dinahican is a good example of the intricate relationship between transport infrastructure investment and socio-economic development, and how road investment can work as an enabler and releaser.

In Dinahican there were abundant fish stocks available that were not fully utilized before the road project, even though fishing was the dominating livelihood. There were many reasons why this situation persisted, such as: poor transport conditions, no advanced fishing methods and equipment, the presence of management measures and an oligopoly production system that limited fishing efforts and the accumulation of capital, and other fish supply area's not yet being overfished.

Within Dinahican, the major problem restricting fisheries production before the road project was poor transport conditions. Few actors could assure *fast and reliable deliveries of huge volumes of fish often throughout the year* to major markets outside the study area. Accordingly, investor's interest in extending capital to invest in production factors was limited. Here a poor road condition functioned as a brake block to production. It made little sense to increase fish production when deliveries to markets could not be assured.

When the west and east coast were interlinked through the road project the complementarity was reinforced, especially as other fishing grounds competitiveness and production potential diminished through their dwindling fish supplies and Dinahican's higher transferability due to its improved interregional road accessibility.

Once fish are landed, speed and reliability of deliveries to markets is central as fresh fish receive high selling prices. To fulfil this, ice, vehicles, and adequate roads, passable throughout the year, during all types of weather and with all vehicle types must be present. However, this does not assure increased production. For growth to take place harvest must increase or the same volumes must be caught and distributed in a more efficient manner. Big fishing vessels, more advanced equipment and methods must be available. And the ability to build and operate big vessels and fequipment, and find fish must be present. The immigrants from islands south of Dinahican brought with them such skills and knowledge.

Further, fish landings must reach volumes attractive to traders and investors. It requires a deep enough fishing port able to accommodate and give shelter to big fishing vessels. Good landing facilities draw attention to fishing vessels from other locations if connected by adequate and passable roads leading to markets. As more vessels land their captures it

draws attention to fish-dealers. It also generates a demand for more fishers, transport, vehicles, ice-producers, haulers etc. Competition between dealers and transport operators results in higher selling prices and reduced freight rates for fishers. It also puts pressure on local oligopoly markets. The situation can be counteracted where population growth is high and an abundant and unskilled labour pool puts pressure on salaries.

In the Dinahican case, the physical and cultural barriers restricting the fishing sector before the road project were eliminated one by one. The changes in the fishing sector occurred through the relationship between technological leaps, entrepreneurship, relocated knowledge and skills, supply and demand, fish selling prices, the investment climate, fish port, improved transport infrastructure, and physical geographical features. The improved accessibility functioned as an enabler, something that speeded up a process in motion, but at a much slower pace. A large majority of the firms and households benefited from this process. However, fish exploitation since the completion of the road project may exceed sustainable production levels soon enough if enforcements of laws are not followed. In this perspective, the road project 'perhaps' also enabled an unsustainable resource outtake.

Other sectors of production

As regards other production and villages, within Infanta the households in villages Lual and Banugao benefited as their initial resources, arable soils and abundant fresh water, enabled increased production and productivity in rice farming. The households in Banugao were also able to switch to new types of production, furniture making and other wood related products. The households in Infanta town mainly benefited through the advantages offered in the service and trade sector as they could take advantage of their resources (capital, education, socio-economic networks, vehicles, land, political influence).

In other cases, other conditions and measures were of such nature that the road project could not alter the situation, despite its enabling qualities. In Nakar, village Pesa, but also Catablingan and Poblacion were severely hit by the log-ban. It paralyzed the economy. Likewise, fluctuating copra world market prices, less favourable farming conditions, and physical geographical features (a straight coast not able to give shelter to a fishing port and vessels) added to the lower improvements. Despite a similar resource base, Nakar households' opportunities to make use of them were less advantageous.

11.5 Conclusions on a general level

Following the study's main objective, the conclusions should be related to the conditions under which a road investment can function as an enabler and releaser for socio-economic development, and how this is distributed, geographically and among actors. These conclusions are also related to how such knowledge can be produced. The latter is mainly related to methodological considerations.

Distributional outcomes of socio-economic development impacts stemming from improved road accessibility

- The distributional outcomes of socio-economic development impacts can be better understood and explained by identifying levels of intra- and inter-network accessibility on regional, local and sub-local levels. By applying *Substantially Below Basic Accessibility* through to *Above Basic Accessibility* the level of understanding and explanation is strengthened further. By including passability, itself including missing links, within the concept of accessibility the distributional outcomes can be understood and explained further. This is of special importance under conditions where climate or weather is a restricting factor of movements.
- If only absolute accessibility improvement to a region is measured, very little can be understood in terms of distributional outcomes. Given that accessibility is continuous in space, relative improvement in accessibility should be measured to understand and explain distributional outcomes, geographically and among various actors.

Methodological considerations

- To understand and explain distributional outcomes on local level we need disaggregated data at household and firm level. Spatial indicators at the regional, provincial, or even municipal level are not sufficient. Following Hägerstrand: *Nothing truly general can be said about aggregate regularities until it has been made clear how far they remain invariant with organizational differences at the micro-level* (1970:144).
- By using a double difference technique we can take a step forward in assessing distributional outcomes stemming from road investment. However, there is the difficulty to identify places within the same influence area of a project, where some places have been directly exposed to an improvement while others have not. Likewise, the particular region under study must be understood in terms of the conditions within which the transport infrastructure is meant to work, not as an isolated part.

As stated in the introductory chapter, the conditions found in the study area are not unique, but are merely typical of the situation in many other peripheral areas in the Philippines and in developing countries in general. Accordingly, some findings in this study are, hopefully, also valuable for other areas operating under similar conditions. By using a set of cases certain uniformities may be suggested that would permit a wider degree of generalization.

While humans transforms an area's physical landscape, societal transformation is mainly a result of a constant interplay between human and physical geographical conditions. What seperates one transformation from another is timeframe and scope, both in terms of geographical area and the number of people affected.

Further, while any development process should ultimately gain everyone, this is seldom or never the case, especially not in relative terms. In all societies some groups have better access to resources and therefore enjoy higher influence and better living conditions. These groups are better prepared and equipped to benefit from changed conditions, while several restrictions limit the ability of other groups. It can be the lack of productive assets such as land or capital, or a low education level preventing them to shift to better work

opportunities. Or it can be lack of adequate transport infrastructure, resulting in low accessibility. Owing to this, society is prevented from benefiting from the full realization of all its human potential.

Finally, high transport costs still paralyse many areas' opportunities and abilities to develop their economy and overall situation vis-à-vis other areas. Hence, to neglect the importance of transport costs is premature. This situation is most pronounced in rural peripheral areas due to insufficient provision of adequate transport infrastructure and low intra- and inter-network accessibility.

In conclusion, peripheral areas' opportunities to participate in activities, reach higher socio-economic development, improve their living conditions, and contribute to overall national development, are limited owing to restrictions upon their potential to interact.

Appendices

1. General fund expenditures in Infanta municipality, 1991–2004 (million pesos).

Expenditures	1991	1992	1993	1994	1995	1996	1997
Total	4.7	6.5	9.6	13.2	13.3	15.9	23.8
• Personal Services	3.4	4.5	6.3	7.3	8.3	11.1	14.8
• Maintenance and Other Operational Expenses	0.92	0.95	1.6	1.9	2	1.4	3.7
– Repair/maintenance of local roads and bridges	–	–	–	–	–	–	0.55
• Capital Outlay	0.02	0.04	0.23	0.2	0.07	–	0.25
• Non–Office Expenditures	0.37	0.39	1.2	2.8	2.8	3.3	5
– Municipal economic development fund*	0.16	0.38	0.87	2.15	2.2	2.6	4
Infrastructure development (no dis-aggregation)	–	–	–	–	–	–	1.7
Construction/repair/maintenance of municipal and village roads	–	–	–	–	0.37	0.25	–
Concreting village roads and bridges	–	–	–	0.34	–	–	–
Bridge projects	–	–	0.15	–	–	–	–
	1998	1999	2000	2001	2002	2003	2004
Total	31.1	39.4	45.5	47	47.4	53	58
• Personal Services	17.6	18.6	21.6	25	26.4	27.7	29.5
• Maintenance and Other Operational Expenses	7.5	11.3	12.8	12	10.6	13.2	14.9
– Repair/construction/maintenance of roads and bridges	0.5	0.85	0.64	0.2	0.35	0.4	–
• Capital Outlay	0.05	2.3	2.1	0.02	0.11	0.8	0.4
Construction of roads shoulder	–	–	–	–	–	0.25	0.1
• Non–Office Expenditures	5.8	7.1	8.9	10	10.3	11.4	13
– Municipal economic development fund	4.5	5.3	6.8	7.1	7.1	8.1	8.8
Construction of local roads and bridges	–	–	n.d.a	1.5	1.1	1.1	2.5
Circumferential road (survey and planning)	–	–	n.d.a	–	–	–	0.5
Infrastructure development (no dis-aggregation)	1.9	2.4	–	–	–	–	–

* Not dis-aggregated between 1991–1992.

Source: Author's elaboration of Provincial Budget Office information, Lucena City, Quezon Province.

2a. Questionnaire, household respondents.

1st part	
1. Sex. 2. Household members (number & age). 3a. Household members education level. 3b. Why children not continue to higher education?	4. Year married or live-in. 5a. Origin (Infanta, Nakar, elsewhere). 5b. If from elsewhere, when and where from.
2nd part	**2nd part continued**
1. Income.** 2. Occupation/employment.** 3. Job opportunities within municipality after 1995. 4. Household member who were employed after 1995. 5a. Household member/relative working abroad.** 5b. When and where. 5c. Receive anything: money, gifts, nothing. 6. Travel costs effect on household economy. 7a. Eat three meals per day. 7b. Meat and fish consumption/week. 8a. Access to vehicle, plan to buy vehicle within 3 years.	8b. Bought vehicle between 1999–2001. 9. Purchasing of goods/services within/outside municipality after 1995.* 10. Lend money. 11. Capital savings. 12. Own or rent house and lot. 13. Medical care. 14. Fuel source. 15. How often read newspaper. 16a. Electricity, telephone, TV, radio, refrigerator, toilet, potable water.* 16b. What year and costs.
3rd part	**3rd part continued**
1a. Farmland/boat size.* 1b. Owner and/or tenant. 1c. If tenant, the owners situation (farmer, origin).* 2. Crop. 3. Average harvest.* 4a. Ability to sell produce.* 4b. To whom do you sell produce.**	5. Does wife work/help with farm work.* 6. Ability to stock harvest. 7. Disadvantage being tenant. 8. Help from local government to improve production situation.* 9. Employees on boat.* 10. Usage of and access to farm-inputs.*
4th part	**4th part continued**
1. Perception of transport service (departures, destinations).* 2. Choice of transport mode and why this mode.* 3. Travel frequency, destination, time, purpose, outside and inside municipality.* 4. Perception of transport comfort and safety.* 5. Dependence on public transport operators.* 6a. Travel frequency satisfaction in 1999. 6b. Why not satisfied. 6c. What restricts you from travelling more or less. 7. Mobility restrictions (15 options).	8. Further need of road improvement (particular road or stretch). 9. Who decide who is going to travel? 10. What is considered before a trip is made? 11. Accommodation at destination when travelling. 12. Departure time when travelling. 13a. Travel expenses effect on the household economy and trade-offs. 13b. Does travel expenses within or outside municipality affect the household economy the most. 14a. Time away at destination before returning home when travelling.** 14b. Value and benefits from being able to return home earlier.
5th part	
1a. Did you plan to increase travel frequency after the road project was completed. 1b. Would you still have increased travel frequency, if that is the case, if the road project had not been implemented? 2. Most positive and negative effect from the road project. 3. What would be most important for your family in order to improve situation (15 options)? 4a. Living condition within the village? 4b. Monthly income needed in order not to be considered poor and cover basic needs. 5. Who has benefited the most from the road project within (i) the municipality (ii) the village. 6. Would farm to market roads have had bigger effect on your family's situation? 7. Goods/services lacking or in insufficient supply within the municipality.**	

* 1990–1999. ** 1990–2001.

2b. Questionnaire, passenger transport operators.

1st part	2nd part
1. Company name. 2. Type of company. 3. From Infanta or elsewhere. 4. Year established.	1. Income.* 2. Employees.* 3. Number of vehicles, vehicle(s) age, load capacity.* 4. Member in association or cooperative.* 5. Government subsidiary.*
3rd part	**3rd part continued**
1. Destination serviced.* 2. Passengers and occupancy rate.* 3. Transport costs.* 4. Number of and time of departures.* 5. Travel time and delays.* 6. Accidents.* 7. Passengers most common destination.*	8. Type and volume of goods delivered.* 9. Ticket fares.* 10. Competition.* 11. Route choice and transfer terminal.* 12. How long can a driver drive without a break. 13. Investments in new vehicles. 14. Is ticket prices higher/lower than official rates, why.
4th part	
1. What hampered/hamper the company before-after 1995 (11 options). 2. Transport related impact from the road project with greatest effect on the company. 3. Other improvement/measure within the municipality affecting your company. 4. Further need for road improvements (particular road or stretch). 5. How did the Asian crisis in 1997 affect the company. 6. Plan to close down. 7. Values and benefits being able to return home earlier due to reduced travel time since the road project. 8. Why did you decide to start your company (eight options).	

* 1990–1999. Note: No. 1–3 in 2nd part and No. 1–11 in 3rd part also asked why this change, regardless of change (increase, decrease or no change).

2c. Questionnaire, goods transport operators.

1st part	2nd part
1. Type of company 2. Sex and age. 3. Education level. 4. From Infanta or elsewhere. 5. Year established. 6. Occupation.*	1. Income.* 2. Employees.* 3. Boat ownership (Dinahican).* 4. Number of vehicles.* 5. Why not purchase own vehicle.* 6. Vehicle(s) age and load capacity.* 7. Member in association or cooperative.* 8. Ability to borrow money.
3rd part	**3rd part continued**
1. Delivery destination(s), and frequency outside study area.* 2. Competition.* 3. Delivery time and delays outside study area.* 4. Origin of goods within and outside study area.* 5. Volumes delivered within and outside study area.* 6. Delivery area within municipality.* 7. How long at destination before returning home.* 8. Renting prices of vehicle.*	9. Purchasing/selling prices.* 10. Transport costs.* 11. Access to vehicle.* 12. When do you deliver:* 13. Type of goods delivered.* 14. Profit per trip.* 15. Route choice to destination.* 16. Using transfer terminal.
4th part	
1. Plan to in- or decrease employees and service. 2. Job opportunities within the municipality after 1995 compared to before. 3. What hampered/hamper the company before-after 1995 (11 options). 4. Transport related impact from the road project with greatest effect on the company. 5. Other improvement/measure within the municipality affecting your company. 6. Further need for road improvements (particular road or stretch). 7. How did the Asian crisis in 1997 affect your company. 8. Plan to transfer to other business or close down. 9. Values and benefits from being able to return home earlier due to decreased travel time. 10. Why did you decide to start your company/business (eight options).	

* 1990–1999. Note: No. 1-4 in 2nd part and No. 1–15 in 3rd part also asked why this change, regardless of change (increase decrease or no change).

2d. Questionnaire, household firms.

1st part	2nd part
1. Sex. 2. Age. 3. Education level. 4a. From Infanta or elsewhere. 4.b If from elsewhere, when and where from? 5. Type of company/business 6. Year established. 7. Household members. 8. Spouse occupation.*	1. Income.* 2. Employees.* 3. Boat ownership.* 4. Why not purchase own vehicle.* 5. Support from local government.* 6. Job opportunities within municipality after 1995 compared to before. 7. Household member who were employed after 1995. 8. Member in association or cooperative.* 9. Lending money (source and interest rate).
3rd part	3rd part continued
1. Delivery destination.* 2. Delivery frequency.* 3. Competition.* 4. Choice of vehicle.* 5. Origin of goods.* 6. Volumes delivered.* 7. Delivery area.* 8. Time away at destination before returning home.*	9. Purchasing & selling prices.* 10. Transport costs.* 11. Access to vehicles.* 12. When do you deliver.* 13. Delivery delays.* 14. Discount agreement (volumes, frequencies). 15. Ice, labour, material costs.*
4th Part	
1. Plans to increase number of employees and production. 2. What hampered/hamper the company before-after 1995 (27 options). 3. Transport related impact from the road project with greatest effect on your firm/business. 4. How did the Asian economic crisis in 1997 affect your firm/business. 5. Further need for road improvement (particular road or stretch). 6. Future demand and supply of your good. 7. Any [other] improvement/measure within the municipality that has affected your firm. 8. Plan to transfer to another business or close down. 9. Values and benefits of being able to return home earlier due to faster travel time since the road project. 10. Why did you decide to start your firm/business (eight options)	

* 1990–1999. Note: No. 1–3 in 2nd part and No. 1–12 in 3rd part also asked why this change regardless of change (increase, decrease or no change).

2e. Questionnaire, tricycle associations.

1st part	
1. Route plied. 2. Fares.* 3. Members.* 4. Income/month.* 5. Working days/week.*	6. Passengers/week.* 7. Howling costs.* 8. Busy and slow hours. 9. Time to fill up vehicle (busy & slow hours).
2nd part	
1. Why this increase in association members. 2. Can tricycles transport passengers and goods throughout the year to the villages? 3. How many tricycles not connected to the association operate the route. 4. Are the tricycles always full when departing or do they wait a certain time before departure.	

* 1990–1999.

3. Key informants 1998-2005, distributed by Infanta, Nakar and elsewhere.

Key informant	Information collected	Inf.	Nak.	Els.
1. Village captains	Employment, major occupations, average household incomes by major sources. Farming/fishing sector related information.	4	3	–
2. Municipal Treasurer	Number of business establishment permits issued.	1	1	–
3. Municipal Budget Officer	Total tax collection, distributed by sources.	1	1	–
4. Agri-supplier	Year established, volumes sold, purchasing and selling prices, price	1	–	–
5. Feeds-supplier	and delivery policy, competition situation.	2	–	–
6. Quezon Electric Cooperation	Electrification year by village, households with access to electricity, kilowatt prices, monthly minimum charge.	1	–	–
7. Philippine Long Distance Telephone Co. & General Telephone System Incorp.	Year established, households with private telephone by village, number of long distance calls made from public calling centre, fares at public calling centre, telephone installation fees, minimum charge.	2	–	–
8. National Food Authority & Infanta Rice Retailers Association	Volumes purchased, purchasing prices from farmers, selling prices to retailers, purchasing area, number of issued rice retailer, competition.	2	–	–
9. Fish dealer, Dinahican	Purchasing/selling prices, by fish classification and season.	3	–	–
10. Fisher immigrant, Dinahican	Fishing sector information.	1	–	–
11. Fish dealer, Infanta public market	Prices	2	–	–
12. Bank	Year established, interest rates, investments into Infanta, investment origin, lending policies, land prices.	6	–	–
13. Land Registration Authority	Number of land transfers, transfer amounts, land size.	1	–	–
14. National Irrigation Administration	Area irrigated, problems, irrigation rates, road projects.	1	–	–
15. Philippine National Police	Number of PNP clearances.	1	1	–
16. Northern Quezon Coop. College & Southern Luzon Polytechnic College	Year established, no. of students, student origin, curriculum, work opportunities, ad-/disadvantages towards other schools.	2	–	–
17. DENR: Main office, Region IV, Manila	Logging policies and laws in Infanta, Nakar, and Real .	–	–	1
18. DENR: Local office, Real	Road projects (upgrading, improvement, maintenance).	–	–	1
19. Ice-plant	Year established, production, power situation, and prices.	1	–	–
20. Mayor	Policies, aims, visions.	1	–	–
21. Office of Municipal Agriculture	Land use, farm inputs, production (rice, fishing), fishing sector data, road projects.	1	–	–
22. Municipal Department of Agrarian Reform	Land ownership pattern, agrarian reform community data, policies, measures (credit, institutional infrastructure etc.).	1 1	– –	– –
23. Land Assessors Office	Number of land transfers, transfer amounts, land size.	1	–	–
24. Former Gov. Employee	Land sales and land transactions.	1	–	–
25. Municipal Planning and Development Coordinator, Infanta and Real	Number of beach resorts.	1	–	1
26. DPWH (provincial headquarter, 1st district, Quezon province	Road sector information.	1	–	1
27. Production manager – Ice-plant, Dinahican	Production information.	1	–	–
28. Petrol station manager – Real	Volumes, delivery destination, competition, customers etc.	–	–	2
29. Municipal Budget Officer	Municipal taxes, revenues	1	1	–
30. Municipal Treasurer	Municipal taxes, revenues	1	1	–

Inf.: Infanta, Nak.: Nakar, Els.: Elsewhere.

Note: Some KIs in Infanta also cover Nakar, e.g. the National Food Authority.

5. Shares of fish deliveries delayed before the road project and delays affect on the selling price in Manila, distributed by Dinahican household firms (No.).

Percentage of deliveries delayed due to poor transport conditions	No. of HF	Reduced selling price in Manila due to transport delatys (%)	No. of HF
20–30	5	5–15	2
50–70	6	20–30	5
90	1	30–40	2
		45–55	4
		75	1

6. Production restrictions based on three choices 1990–1994 and 1995–2001, distributed by Dinahican household firms (No.).

1990–1994 Ranking based on 3 choices	No.	1995–2001 Ranking based on 3 choices	No.
Poor road condition	11	Competition	9
Vessels not big enough	8	No own vessel	5
No own motor vehicle	7	Spare part costs	5
No own fishing vessel	5	Peso/dollar depreciation	5
Poor fishing methods/equipment	4	No own motor vehicle	4
Labour & spare part costs	4	Fishing vessels not big enough	4
Difficult to get bank loan & high interests	3	Difficult to get bank loan/high interests	3
Competition	–	Telephone system	2
Log ban	–	Weather conditions	2
Others*	4	Log ban	–
Total	46	Transport costs (renting)	–
		Others**	4
		Total	43

* Competition, low demand, far away from markets, peso value.

** Transport costs (to Infanta town), labour costs, far away from markets, poor fishing mthods/equipment.

7. Household firms perception of competition and origin of competition in the fishing sector.

Competition	No.	Origin	No.
Strong since the road project	6	Dinahican	8
Strong before but increased after road project	2	Infanta	1
Existed before but increased since road project	2	Manila	1
Increased vehicle fleet since 1995	1	Polillo Island	1
Competition is at sea (foreign fishing vessels)	2	Outside study area (not specified)	2
Neither before or after the road project	3		
None after	3		
Total	20	Total	13

8. Annual, and six and three months interest rates on borrowed capital among Infanta banks, 1990–2001.

	Highest		Lowest		
Annual rates	New banks I–V	Old bank VI	New banks I–IV	New bank V	Old bank VI
1990–1995	n.s	24	n.s.	n.s.	20
1996	18	24	14	n.s.	20
1997	17–23	24	14–18	23	20
1998	17–21	24	13–18	19	20
1999	13–21	24	12–14	19	20
2000–2001	15–21	24	10–16	21	20
	Highest		Lowest		
Six months rates	New banks I–V	Old bank VI	New banks I–V	Old bank VI	
1990–1995	n.s.	24	n.s.	24	
1996	n.s.	24	n.s.	24	
1997	11.5 –18	24	11.5–18	24	
1998	10.5–18	24	9.5–18	24	
1999	10.5–16	24	9.5–18	24	
2000–2001	10.5–16	24	11.5–16	24	
	Highest		Lowest		
Three months rates	New banks I–V	Old bank VI	New banks I–V	Old bank VI	
1990–1995	n.s.	25	n.s.	25	
1996	n.s.	25	n.s.	25	
1997	5.75–15	25	5.75–6	25	
1998	5.25–13	25	4.75–6	25	
1999	5.25–12	25	4.75–6	25	
2000–2001	5.25–10	25	5.25–6	25	

Source: KI28–33, Infanta town 2001.

9. Number of certified rice-retailers in Infanta, 1990–2001.

Year	No.	Year	No.
1990	50	1997–1999	90–100
1991–1994	60–65	2000	140
1995–1996	70–75	2001	105

Source: KI23, Infanta 2001.

10. Purchasing of palay (unmilled rice) by NFA and purchasing of rice by IRRA, 1990–2001 (Kg.).

Year	NFA (palay)	IRRA (rice)
1990	723,350	65,000–75,000
1991	1,974,550	65,000–75,000
1992	330,200	65,000–75,000
1993	559,200	65,000–75,000
1994	62,000	65,000–75,000
1995	800	65,000–75,000
1996	144,350	65,000–75,000
1997	125,900	50,000–60,000
1998	33,100	50,000–60,000
1999	445,800	50,000–60,000
2000	726,900	50,000–60,000
2001	n.d.	50,000–60,000

Source: KI22–23, Infanta 2001.

11. Purchasing and selling prices of unmilled and milled rice in the study area, 1990–2001.

	National Food Authority*		Infanta Rice Retailers Association
	Purchasing price unmilled rice from farmers (peso/kg.)***	Selling price to rice retailers (peso/kg.)**	Purchasing price from farmers (peso/kg.)**
Year	A–grade 1st & 2nd harvest	C–grade	A–grade 1st harvest
1990	5	6.5	14
1991	6	7	14
1992	6	8.5	15
1993	6	9.5	15
1994–1995	6	9.5	16
1996	8 & 6	13	17
1997–1998	8	14	17
1999–2001	10 & 9	14	18

* 65 % of the NFA purchased palay come from Infanta, the remaining from Nakar, Real, and Polillo Island.
** Milled rice. *** Price for B, C, and D–grade rice is 14, 19, and 28 % lower than A–grade respectively.
Source: KI22–23, Infanta town 2001.

12. Passenger vehicle units 1990–2001, distributed by mode and destination (average No.).

Year	Ordinary bus Manila	Jeepney Manila	Minibus Manila	Jeepney Siniloan	Jeepney Real*	Total
1990–1991	10–12	30	n.s.	60–70	n.d.	100–112
1992	14	30	n.s.	60–70	150 (100)	254–264
1993–1994	11	30	n.s.	60–70	150 (100)	251–261
1995	11	30	9	100	150 (100)	300
1996	12	n.s.	35	175	150 (100)	372
1997	19	n.s.	45	190	150 (100)	404
1998–1999	26–33	n.s.	58–68	215–230	150 (100)	449–481
2000–2001	20	n.s.	n.d.	n.d.	150 (100)	240

* Only two thirds operate actively to some extent.
Source: PTO: OB1–2, J1–4, MB1–2, Infanta town 1999; 2001.

13. Passenger fares 1990–2001, distributed by transport operators and final destinations servicing Infanta town (pesos/one way).

	Manila				Siniloan			Real	Sta. Cruz/Lucena City
Year	OB1	OB2	MB1 & 2	Jeep 4	Jeep 1	Jeep 2	Jeep 3	Jeep 1–3	OB3
1990	66.7	n.s.	n.s.	60	n.s.	15	12	3.5	n.s.
1991	72.3	n.s.	n.s.	60	n.s.	15	12	3.5	n.s.
1992–1993	79.2	58.4*	n.s.	60	n.s.	20	22	3.5	n.s. – 70
1994	79.2	n.s.	n.s.	60	n.s.	25	27	5.5	70
1995	83.4	n.s.	100	60	n.s.	25	27	5.5	70
1996–1997	88.9	n.s.– 80	100	n.s.	n.s.	28	35	5.5	75
1998	97.3	80	100	n.s.	n.s.	28	35	6.5	80
1999	97.3	80	100	n.s.	40	35	40	7.5	80
2000–2001	n.s.	100	100	n.s.	40	n.d.	40–45	7.5–9	90

* Passenger capacity 45, 1992-1993. OB: Ordinary Bus. MB: Minibus.
Source: PTO: OB1–2, J1–4, MB1–2, Infanta town 1999; 2001.

14. Passenger fares and goods haul costs by tricycle within Infanta and Nakar, 1990–2001 (pesos/one way).

	1990 – 1991	1992 – 1993	1994 – 1995	1996	1997-1998	1999	2000	2001	Cost per Km. 1990	1993	1995	1998	2001
Passenger													
Mag.	n.s.	n.s.	n.s.	10	12	14	14	14	–	–	–	1	1.16
Mag. (J)	4	6	8	10	10	10	10	10	0.33	0.5	0.66	0.83	0.83
Lual	4	4	4	4	5	5	5	6.5	1.6	1.6	1.6	2	2.6
Ilog	3.5	3.5–4	4–5	5	5–6	6	7	7	0.87	1	1.25	1.5	1.75
Ban.	4.5–5	6	6	6	8	8	8	9	0.9	1.2	1.2	1.6	1.8
Din.	12	12	12	12	12	12	15	15	1	1	1	1	1.25
Pob. low	2	2	2	2	3	3	4	4	1	1	1	1.5	2
Pob. high	5	5	5	5	7	7	8	8	0.83	0.83	0.83	1.16	1.33
Anoling	2	2.5	2.5	3.5	n.s.	n.s.	n.s.	n.s.	2	2.5	2.5	–	–
Agos	3–4	3–4	3–4	3–4	3–4	3–4	3–4	4–6					
Rice													
Mag.	n.s.	n.s.	n.s.	10	12	12	14	14	–	–	–	1	1.16
Lual	4	4	4	4	5	5	5	6.5	1.6	1.6	1.6	2	2.6
Ilog	4.5	4.5–5	5–6	6	6–7	7	8	8	1.12	1.25	1.5	1.75	2
Ban.	4.5–5	6	6	6	8	8	8	9	0.9	1.2	1.2	1.6	1.8
Din.	12	12	12	12	12	12	15	15	1	1	1	1	1.25
Pob. low	2.5	2.5	2.5	2.5	3.5	3.5	4.5	4.5	1.25	1.25	1.25	1.75	2
Pob. high	5.5	5.5	5.5	5.5	7.5	7.5	8.5	8.5	0.9	0.9	0.9	1.25	1.41
Anoling	2.5	2.5–3.5	3.5	3.5	n.s.	n.s.	n.s.	n.s.	2.5	3.5	3.5	–	–
LPG													
Mag.	n.s.	n.s.	n.s.	8	8	8	8	10	–	–	–	0.66	0.83
Lual	4	4	4	4	5	5	5	6.5	1.6	1.6	1.6	2	2.6
Ilog	3.5	3.5–4	4–5	5	5–6	6	7	7	0.87	1	1.25	1.5	1.75
Ban.	4.5–5	6	6	6	8	8	8	9	0.9	1.2	1.2	1.6	1.8
Din.	5	5	5–7	7	7	7	10	10	0.41	0.41	0.58	0.58	0.83
Pob. low	2.5	2.5	2.5	2.5	3.5	3.5	4.5	4.5	1.25	1.25	1.25	1.75	2.25
Pob. high	5.5	5.5	5.5	5.5	7.5	7.5	8.5	8.5	0.91	0.91	0.91	1.25	1.41
Anoling	2	2–2.5	2.5	3	n.s.	n.s.	n.s.	n.s.	2	2.5	2.5	–	–
Copra													
Mag.	n.s.	n.s.	n.s.	20	20	20	20	25	–	–	–	1.66	2.08
Lual	10	10	10	10	15	15	15	20	4	4	4	6	8
Ilog	25	25	25	25	25	25	25	25	6.25	6.25	6.25	6.25	6.25
Din.	25	25	25	25	25	25	25	25	2.08	2.08	2.08	2.08	2.08
Ban.	15	15	15	15	15	15	15	15	3	3	3	3	3
Pob. low	7	7	7	7	6	6	6	6	3.5	3.5	3.5	3	3
Pob. high	15	15	15	15	15	15	15	15	2.5	2.5	2.5	2.5	2.5
Anoling	15–25	15–25	15–25	20–25	n.s.	n.s.	n.s.	n.s.	15	15	15	–	–
Fish													
Din.	25	25	25–30	30	30	30	35	35	2.08	2.08	2.5	2.5	2.91
Nakar	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.
Ilog	10	10	10	10	10	10	10	15	2.5	2.5	2.5	2.5	3.75

Mag.: Magsaysay, Ban.: Banugao, Din.: Dinahican, Pob.: Poblacion. Anoling to Poblacion, Agos to Pesa.
(J): Jeepney. n.s.: no service. n.c.: no charge. LPG: Liquified petroleum gas – 1 tank.
Rice and fish: 50 kg. Copra: 50–75 kg.
Source: Author's calculation of PTO data, Infanta town 1999.

15. Transport operators' average monthly gross income from passenger fares, 1990–1999 (one way/million pesos).

Year	Average (OB 1–3, Jeepney 1–4, MB 1–2)
1990	2.5
1991–1994	3–3.7
1995	4.4
1996–1999	5–5.5

Note: Incomes rounded off to closest hundred thousand.
Source: Author's calculation of PTO data, Infanta town 1999.

16. Farming conditions in 1999, distributed by study area, municipalities, and villages (%, elsewhere noted).

Farming conditions	Study area	Infanta	Nakar	Infanta villages				Nakar villages		
				IT	Din	Ban	Lual	Pob	Cat.	Pesa
Owner also farmer – yes	46	34.5	62	0	100	37.5	0	50	61	75
Owner's residence										
Within village	29.5	18.5	44	–	–	50	25	12.5	70	50
Infanta	35.5	45	23	100	–	25	56	34	10	25
Nakar	11.5	–	27.5	–	–	–	–	37.5	20	25
Outside study area	22.5	36	5.5	–	100	25	18.5	16	–	–
Size rice-field (average Ha.)	0.66	0.83	0.45	1.43	0.45	0.56	0.88	0.64	0.42	0.3
Water supply										
Irrigation	44.5	55.5	30	76.5	–	46	100	28.5	11	50
Irrigation and rain-fed	9	12.5	5	–	50	–	–	–	–	15
Rain-fed	26	18	36.5	10	50	11.5	–	14	61	35
Water pump	20	14	28	13.5	–	42.5	–	57	27.5	–
Tenancy disadvantage										
Only 50% of harvest	86.5	100	69	100	100	100	100	70	94.5	43
Shoulder worker salaries	2	–	4.5	–	–	–	–	–	–	14
Shoulder farm-input costs	1.5	–	3.5	–	–	–	–	10	–	–
Owner make decisions	3	–	6.5	–	–	–	–	20	–	–
No disadvantage	7	–	16	–	–	–	–	–	5.5	43
Able to sell rice										
Yes	27.5	28	26.5	30	20	13	50	50	20	10
Enough for family	46.5	45.5	48.5	60	40	52	30.5	50	52	43
Sometimes not enough	9.5	9	10	2.5	20	13	–	–	20	10
Not enough for family	16	17	14.5	7.5	20	21.5	19.5	–	8	35
Assistance from LGU – yes	15	8	24	10	0	9	13	18	19	35
Yields (average Kg./Ha.)										
Low	25.6	26.4	24.5	23.8	22.2	30	29.6	28.1	19.7	25.9
Medium	32.4	33.1	31.4	30.6	30.6	36.5	35	34.4	28.4	31.4
High	39.2	39.9	38.3	37.4	39	43	40.5	40.8	37.2	36.9
Fertilizer usage (average Kg./Ha.)	626.5	640	608	700	525	649	686	870	456	500
Wife working										
Yes	59.5	51	70.5	17	80	66.5	40.5	50	68.5	93.5
Yes – before	2.5	–	5.5	–	–	–	–	8.5	8.5	–
Yes – supervising	1	2	–	7.5	–	–	–	–	–	–
Sometimes	5	3.5	7	–	–	–	15	8.5	5.5	6.5
No	32	43.5	17	75.5	20	33.5	44.5	33.5	17	–

IT: Infanta Town, Din: Dinahican, Ban: Banugao, Pob: Poblacion, Cat: Catablingan. LGU: Local Government Unit. Ha.: hectare.
Source: HR, 1999; 2001.

17. Destination where family members and/or relatives work abroad (%).

Destination	Study area	Infanta	Nakar	Infanta villages				Nakar villages		
				IT	Din	Ban	Lual	Pob	Cat	Pesa
North America	28	34	20	49	34	45	8	45	17	–
Europe	6	5	8	6	8	–	5	10	13	–
Middle East	22	23	22	20	17	26	28	17	38	9
East/Southeast	31	22	43	7	17	21	42	21	17	91
Asia	10	12	7	15	9	8	16	7	14	–
Seaman	3	4	–	3	15	–	1	–	1	–
Spread out										

IT: Infanta Town, Din: Dinahican, Ban: Banugao, Pob: Poblacion, Cat: Catablingan.

18. Number of household members employed, distributed by by gender on study area, municipalities, and villages (No.).

Household memeber	Study area	Infanta	Nakar	Infanta villages				Nakar villages		
				IT	Din	Ban	Lual	Pob	Cat	Pesa
Wife	50	38	12	21	6	2	8	1	8	3
Daughter	79	55	24	24	7	15	11	9	11	4
Husband	108	84	24	20	37	13	15	4	13	7
Son	120	98	22	37	19	28	16	9	15	8
Total	366	274	92	102	69	58	50	23	47	22

IT: Infanta Town, Din: Dinahican, Ban: Banugao, Pob: Poblacion, Cat: Catablingan.

19a. Average yearly number of household members (excluding children) engaged in various employments 1990–2001, distributed by Infanta villages.

	Lual		Banugao		Dinahican		Infanta town	
Employment	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001
Fishing sector	0.6	0.4	–	–	51	58	1	1.6
Fisherman/sometimes fisherman	–	–	–	–	31.8	35	–	–
Fish-dealer/sometimes fish-dealer	–	–	–	–	7.8	12.7	–	0.2
Fish-vendor/sometimes fish-vendor	–	–	–	–	8	8	1	1
Others **(1)**	0.6	0.4	–	–	3.4	2.3	–	0.4
Farming sector	31.6	34.9	22.2	24.2	11.4	15.3	48.4	51.2
Rice and/or copra farmer (owner)	12.8*	12*	12.6	12.7	4	4.7	44.2	46.2
Rice and/or copra farmer (tenant)	15*	16*	8	7.7	4.2	5.6	2	2.3
Farm-worker	3	3	–	–	1.2	3	–	–
Piggery	0.8	3.9	1	0.1	1	1	2.2	2.7
Others **(2)**	–	–	0.6	2.7	1	1	–	–
Forest sector	–	–	7.2	6.7	–	–	3	2.2
Logging	–	–	1.4	0.4	–	–	1	0.6
Others **(3)**	–	–	5.8	6.3	–	–	2	1.6
Government sector	1.8	3.9	5	3.7	4	4.3	31.6	28.4
Unskilled **(4)**	0.6	1.4	1	1	–	–	0.8	1.4
Semiskilled/skilled **(5)**	1.2	2.5	4	2.7	4	4.3	30.8	27
Self-employment	12.4	20	21	30.7	17.8	21.2	43.2	58.6
Unskilled **(6)**	8.6	15.4	5	7.4	10	12.3	24.4	35.6
Semiskilled/skilled **(7)**	3.8	4.6	16	23.3	7.8	8.9	18.8	23
Private sector	19	15.9	28.6	19.4	9.4	9.9	31.6	31
Unskilled **(8)**	10.8	6.9	15.2	9.4	6	6	13.4	12.6
Semiskilled/skilled **(9)**	8.2	9	13.4	10	3.4	3.9	18.2	18.4
Others **(10)** (retired, unemployed, dead/student, sick)	4.6	2.7	3.6	4.4	3.8	3.3	30.1	30.2
Total	70	77.8	87.6	89.1	97.4	112	188.9	203.2

(1) Lual 1990–1994/1995–2001: fishpond caretaker (0/1). Dinahican: Vessel owner 5/7, Boat captain 7/0, Fishpond 0/6, Howler 5/3. Infanta town: Fishpond 0/3.
(2) Dinahican 1990–1994/1995–2001: Livestock 5/7.
(3) Banugao 1990–1994/1995–2001: Furniture maker 2/8, Lumber 2/5, Deliver copra 5/7, Deliver finished wood-products 10/7, Sash-factory 0/3. Infanta town: Logging 5/4, Wood-products 10/11
(4) Lual 1990–1994/1995–2001: Village councillor 3/10. Banugao: Village health worker 5/7. Infanta town: Village Councillor 4/10
(5) Lual 1990–1994/1995–2001: Teacher 0/9, NAPOCOR 5/7, NIA 1/2. Banugao: Village treasurer 5/7, Social Security Service Manila 3/0, Municipal assessor 2/0, Village justice 5/7, Teacher 0/4, National Irrigation Authority 5/1. Dinahican: Teacher 15/16, Town councillor 0/7, Policeman 5/7.
(6) Lual: 1990–1994/1995–2001: Catering 4/7, Food/merienda vendor 1/22, Washing clothes 5/7, Vegetable dealer 5/6, Sari sari 10/14, Business woman 3/16, Tricycle-driver 15/34, Restaurant public market 0/2. Banugao: Sari sari 20/32, Dry goods vendor Infanta town 4/12, Canteen Inanta town 0/2, School vendor 5/7, Child caretaker 1/7, Tupperware dealer 5/7, Tricycle-driver 29/57, Grains dealer 5/7, Business woman/man 4/17, Minibus owner/driver 0/3, Washer 5/7, Small restaurant 2/5. Dinahican: Sari sari 30/51, Herbal business 5/7, Tricycle-driver 5/13, Billiard hall 5/4, Real estate 0/5, Hollow blocks 0/5, Babysitter 5/1. Infanta town: Shop-keeper 0/5, Business Woman 5/10, Newspaper stand 5/7, Flower-shop 3/7, Restaurant/videoke 0/8, Salesagent Avon 0/3, Beauty parlour 10/14, Buy/sell dresses 16/18, Dry-goods shop 11/20, Catering 5/7, Fruit-vendor 0/10, Sales-agent 0/3, Tricycle-driver/owner 20/40, Rice-dealer 1/7, Manicurist 5/6, Sell bananas Manila 5/0, Merienda/eatery 10/20, 2nd hand clothes 0/2, Glassware 5/5, Minibus owner 0/5, Jeepney owner Manila 0/4, Boarding house Manila 5/7, Sari 16/41.
(7) Lual 1990–1994/1995–2001: Sewer 10/14, Rice mill 3/7, Vulcaniser shop 0/1, Electrician 1/7, Welding shop 5/3. Banugao: Sewer 16/1, Insurance agent 0/5, Eletrician 1/12, Rice mill 3/7, Mechanic 5/7. Dinahican: Sewer 14/14, Bakery 10/15, General merchant owner 0/12, Dressmaker 5/8, Electrician 5/6, Processing papers 5/7. Infanta town: Sewer 27/49, Dentist 10/21, Dental technician 2/7, Handicraft 5/7, Montessori school 0/5, Pastor 5/7, Construction supplies 5/7, Processing papers 5/7, Furniture maker 5/7, Land surveyor 0/3, Agriculturist 5/3, Tailor 5/14, Rice mill 5/7, Upholstery 5/3, Welding shop 5/7, Printing press Manila 5/7.
(8) Lual 1990–1994/1995–2001: Saleslady Manila 5/1, Housemaid Manila 5/1, Housemaid Kuwai/Saudi 6/8, Factory Korea 0/6, Security guard Manila 10/9, Tree planter 5/0, Casual lab. 15/16, Construction worker 8/7. Banugao: Hotel waitress Dubai 5/4, Saleslady Manila 2/0, Housemaid Manila 5/4, Casual labourer 30/33,

Jeepney driver 5/7, Jeepney driver Manila 5/4, Driver 5/7, Security guard Infanta town 0/3, Security guard Manila 4/6, Factory worker Manila 5/4, Factory worker Taiwan 0/4, Construction worker Manila 9/7, Pharmacy assistant Manila 0/3. Dinahican: Casual lab. 15/21, Caretaker copra warehouse 5/7, Jeepney driver 10/14. Infanta town: Housemaid Hong Kong 5/4, Jeepney driver 12/20, Work abroad agency 5/0, Eatery/restaurant manager 5/6, Janitor 5/7, Construction worker Saudi/Manila 5/9, Bakery worker 5/7, Casual lab. 10/14, Driver Manila 5/3, Caretaker funeral homes 0/4, Hotel attendant USA 5/7, Deliver furniture 5/7.
(9) Lual 1990–1994/1995–2001: Driver 15/21, Carpenter 21/26, Seaman 5/16. Banugao: Accountant 4/7, Office work Hong Kong 2/0, Seaman 24/27, Electrician 5/0, Carpenter Guam 5/7, Carpenter 15/14, Aluminum USA 1/4, Machine shop worker 4/0, Beauty parlour 0/5, Steel curbing Manila 5/6. Dinahican: Engineer 5/7, Construction supervisor Manila 0/5, Carpenter 5/1, Seaman 2/7, Animator Manila 5/7. Infanta town: Industrial engineer 5/7, Midwife 5/7, Midwife Saudi Arabia 5/5, Nurse 0/6, Philippine Airlines 5/1, Seaman 15/27, Electrician Manila 5/1, Electrician 10/14, QUEZELCO 10/11, Carpenter 20/28, Aircraft mechanic 0/3, Amusement centre 0/4, Equipment operator Saudi 5/1, Telephone company 1/7, Rice mill 5/7.
(10) Lual 1990–1994/1995–2001: Study 8/2, Retired 5/7, Dead 5/7, Unemployed 5/3. Banugao: Retired 0/4, Dead 14/27, Unemployed 4/0. Dinahican: Study 5/2, Retired 10/14, Dead 4/7. Infanta town: Study 25/9, Pension 92/146, Dead 25/49, Unempl. 9/7.

19b. Household members (excluding children) employment in study area, Infanta and Infanta villages, distributed by sector, sub-sector, and skillness 1990–1994 and 1995–2001 (%)

	Study area		Infanta		Infanta town		Dinahican		Banugao		Lual	
Employment	1990-1994	1995-2001	1990-1994	1995-2001	1990-1994	1995-2001	1990-1994	1995-2001	1990-1994	1995-2001	1990-1994	1995-2001
Agriculture	43.9	42.5	39.7	40.3	27.6	26.8	64.0	65.3	33.5	34.6	45.9	45.3
Fishing	10.1	10.3	11.8	12.4	0.5	0.7	52.3	51.7	–	–	0.8	0.5
Farming	30.1	29.1	25.6	26.0	25.6	25.1	11.7	13.6	25.3	27.1	45.1	44.8
Forest	3.7	3.0	2.3	1.8	1.5	1.0	–	–	8.2	7.5	–	–
Government	10.5	9.1	9.5	8.3	16.7	13.9	4.1	3.8	5.7	4.1	2.5	5.0
Unskilled	1.3	1.1	0.7	0.7	0.4	0.6	–	–	1.1	1.1	0.8	1.7
Semi-skilled/skilled	9.2	8.0	8.8	7.5	16.3	13.2	4.1	3.8	4.5	3.0	1.7	3.2
Self-employment	18.3	23.9	21.2	27.0	22.8	28.8	18.2	18.9	23.9	34.4	17.7	25.7
Unskilled	10.2	14.3	10.8	14.6	12.9	17.5	10.2	10.9	5.7	8.3	12.2	19.7
Semi-skilled/skilled	8.1	9.6	10.4	12.4	9.9	11.3	8.0	7.9	18.2	26.1	5.4	5.9
Private	18.8	16.5	20.0	15.8	16.7	15.2	9.6	8.8	32.6	21.7	27.1	20.4
Unskilled	10.3	8.5	10.2	7.3	7.0	6.2	6.1	5.3	17.3	10.5	15.4	8.8
Semi-skilled/skilled	8.5	8.0	9.7	8.5	9.6	9.0	3.4	3.4	15.2	11.2	11.7	11.5
Others	8.3	8.3	13.5	8.4	15.9	14.8	3.9	2.9	4.1	4.9	6.5	3.4

20a. Average number of households members (excluding children) engaged per year in various employments 1990–2001, distributed by Nakar villages.

	Pesa		Poblacion		Catablingan	
Employment	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001
Fishing sector	–	0.2	–	–	15.8	14.9
Fisherman/sometimes fisher	–	–	–	–	13	11.9
Fish-vendor/somet. fish-vendor	–	–	–	–	2.8	3
Farming sector	31	26.3	10	12.8	47	46.2
Rice and/or copra farmer (owner)	15	13	10	11.8	20.4	21.3
Rice and/or copra farmer (tenant)	12	9.6	–	–	25.6	23.3
Farm-worker	1	1	–	–	1	1
Piggery	2	1.4	–	1	–	0.6
Others **(1)**	1	1.3	–		–	–
Forest sector	12	10	–	–	2.6	3
Logging	12	10	–	–	1	1
Other **(2)**	–	–	–	–	1.6	2
Government sector	2.2	4.3	20.6	16.1	5.6	5.6
Unskilled **(3)**	0.2	1	3.8	2	1.4	1.6
Semiskilled/skilled **(4)**	2	3.3	16.8	14.1	4.2	4
Self-employment	3	3	15.4	19.4	10.4	20.3
Unskilled **(5)**	3	3	7.6	10.7	10.4	19.4
Semiskilled/skilled **(6)**	–	–	7.8	8.7	–	0.9
Private sector	15.8	16.9	7.2	9.1	14.6	17.8
Unskilled **(7)**	12.8	13.6	1	2.1	10.2	11.1
Semiskilled/skilled **(8)**	3	3.3	6.2	7	4.4	6.7
Others (retired/unemployed/dead/student/sick) **(9)**	–	3.8	7.6	9.9	6.2	5.9
Total	64	60.7	60.8	67.3	102.2	113.7

(1) Poblacion: 1990–1994/1995–2001: Livestock 0/7.
(2) Catablingan: 1990–1994/1995–2001: Lumber 8/7, Finished wood products 0/7.
(3) Pesa: 1990–1994/1995–2001: Village health worker 8/12, Village captain 1/7, Village secretary 0/4. Poblacion: Local government unit clerk 9/4, Village health worker (volunteer) 5/7, Village captain 5/3. Catablingan: Village secretary 4/7, Village captain 0/4, Village councillor 3/0.
(4) Pesa 1990–1994/1995–2001: Village treasurer 2/7. Poblacion: Municipal employee 10/10, Nurse 2/7, Teacher 13/16, Midwife 6/14, Municipal treasurer 8/7, Revenue collector 5/7, COMELEC 5/0, Department of Transportation and Communications 5/5, Soldier 10/14, Vice mayor 5/0, Policeman 15/15, Department of Agriculture 0/4. Catablingan: Midwife 10/14, NIA 5/7, Teacher 5/7, Nurse 1/0.
(5) Pesa 1990–1994/1995–2001: Buy/sell 10/9, Sari 5/8. Poblacion: Canteen 0/4, Sari 20/32, Sell homemade foods 5/7, Avon 5/7, Hollow blocks 3/7, Trucking 5/14, Tricycle-driver 0/4. Catablingan: Buy/sell (wood-carving, herbs, clothes) 11/29, Sari 12/26, Fruit vendor 0/6, Hauling (charcoal, palay, gravel) 5/10, Tricycle-driver 2/65.
(6) Poblacion 1990–1994/ 1995–2001: Sewer 5/7, Bakery 5/7, Hardware 5/7, Rice-mill 5/7, Mechanic 5/2, Artist 5/7, Agriculturist 1/7, Feeds supplier 0/3, Electrician 5/7, Lawyer 5/7. Catablingan: Sewer 0/6.
(7) Pesa 1990–1994/1995–2001: Saleslady Manila & Infanta 3/2, Casual labourer 60/75, Security guard Manila 0/3, Construction worker Manila 0/5, Factory Korea 0/5, Part time driver 0/2, Waiter Manila 1/1. Poblacion: Pizza deliverer Manila 0/4, Factory worker Manila 4/0, Boat association 0/4, Casual labourer 1/7. Catablingan: Housemaid Emirates 2/1, Sales representative Manila 0/2, Cook 5/7, Factory worker Manila 8/7, Construction worker Manila 5/6 & Bulacan 0/4, Bodyguard Manila 4/0, Casual labourer 23/37, Security guard Manila 0/7, Bell-boy at hotel Manila 4/7.
(8) Pesa 1990–1994/1995–2001: Carpenter 15/21, Aluminium 0/2. Poblacion: Carpenter 20/25, Seaman 6/14, Minister 0/4, QUEZELCO 5/7. Catablingan: Radiologist 1/0, Day care teacher 2/7, Accounting clerk Manila 0/4, Printing worker Manila 0/1, Seaman 1/7, Well driller Manila 3/0, QUEZELCO 5/14, Refrigerator/air-condition Technician Manila 5/7, Custom broker Manila 5/7.
(9) Poblacion 1990–1994/1995–2001: Study 11/0, Dead 15/21, Retired 5/7, Sick 0/6, Unemployed 0/7.

20b. Household members (excluding children) employment in Nakar and Nakar villages, distributed by sector, sub-sector, and skillness, 1990–1994 and 1995–2001 (%)

	Nakar		Poblacion		Catablingan		Pesa	
Employment	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001	1990–1994	1995–2001
Agriculture	51.6	46.2	16.4	19.0	63.8	56.3	67.1	60.2
Fishing	6.8	6.1	–	–	15.4	13.1	–	0.5
Farming	38.3	34.7	16.4	19.0	45.9	40.6	48.4	43.3
Forest	6.3	5.2	–	–	2.5	2.6	18.7	16.4
Government	12.3	10.6	33.8	23.9	5.4	4.9	3.4	7.1
Unskilled	2.3	1.8	6.2	2.9	1.3	1.4	0.3	1.6
Semi-skilled/skilled	10.0	8.7	27.6	20.9	4.1	3.5	3.1	5.4
Self-employment	12.5	17.4	25.3	28.8	10.1	17.8	4.6	4.9
Unskilled	9.1	13.4	12.5	15.8	10.1	17.0	4.6	4.9
Semi-skilled/skilled	3.4	3.9	12.8	12.9	–	0.8	–	–
Private	16.4	17.8	11.8	13.5	14.2	15.6	24.6	27.8
Unskilled	10.4	10.9	1.6	3.1	9.9	9.7	20.0	22.4
Semi-skilled/skilled	5.9	6.9	10.1	10.4	4.3	5.8	4.6	5.4
Others	6.0	8.0	12.5	14.7	6.0	5.1	–	6.2

21. Households engaged in tricycle operation 1994 and 2001, distributed by villages (%).

	Infanta villages				Nakar villages		
Year	Infanta town	Dinahican	Banugao	Lual	Poblacion	Catablingan	Pesa
1994	3	1	11	10	0	10	0
2001	7	1	15	10	5	17	0

22. Number of households generating income from tricycle operation 1990–2001, distributed by study area, municipalities and villages.

				Infanta villages					Nakar
Year	Study area	Infanta	Nakar	Dinahican	Banugao	Lual	Ilog	Magsaysay	Poblacion
1990	201	179	22	39	52	26	43	n.s.	22
1994	260	229	31	39	91	26	56	n.s.	31
1995	299	263	36	39	91	39	78	16	36
1999	492	427	65	117	130	59	94	27	65
2001	682	586	96	156	195	74	127	34	95

Source: Author's analysis of PTO: TC1–6 information, 2001.

23. Tricycle-drivers average daily income 1990–2001, distributed by villages (pesos).

	Infanta villages					Nakar villages	
Year	Dinahican	Banugao	Lual	Ilog	Magsaysay	Poblacion	Anoling
1990–1992	250	90	250	65	n.s.	40	100
1993–1994	250	90	250	90	n.s.	40	110
1995–1996	250	90	190	95	n.s. – 650	40	110–125
1997–1998	250	90	175	150	650	70	n.s.
1999–2000	325	90	175	150–175	650	70–100	n.s.
2001	325	275	135	175	175	100	n.s.

Source: Author's analysis of PTO: TC1–6 information, 2001.

24. Yearly average incomes, distributed by employment among villages 1990–2001/2005 ('000 pesos/year, elsewhere noted).

	Dinahican (gross)		Banugao		Lual	
Infanta	1990–1994	1995–2005	1990–1994	1995–2001	1990–1994	1995–2001
Casual labour*	30	55–60	38,8	53,4		
Tricycle-driver******			33,8–43,2	36–45,2	28,8–54	35–69,4
Farm owner (rice)** <0.5 ha.			18,2–22,8	22,1–27,6		
0.5 – 1 ha.			36,4–41	44,1–49,6		
Farm tenant (rice) <0.5 ha.			7,8–9,7	9,5–11,8		
0.5 – 1 ha.			15,6–17,5	18,9–21,2	10–12,5	10–18
Semi-finished wood products			129–158	96–108		
Furniture maker			105 – 129	87–111		
Delivering lumber – hard wood			230–290	176–229		
– soft wood			86,4–110	54,8–78,8		
Carpenter*					36–43,2	46,2–67,8
	Poblacion		Catablingan**		Pesa	
Nakar	1990–1994	1995–2001	1990–1994	1995–2005	1990–1994	1995–2001
Teacher	72	103				
Policeman	60	80,5				
Government employee	50,5	72				
Tricycle driver (gross per day)	100	300–400				
Farm owner (rice) 1–2 ha.	30–40	40–60	–	–		
n/d	–	–	10–52	7,7–57		
Farm owner (copra) n/d			30–90	24–78		
Farm worker – Rice***			1,6–2,4	1,6–2,6		
– Copra			15–30	11,5–22		
Fish-vendor*			18–24	24–48		
Logger**** – Official					60–216	43–151
– Unofficial					120–432	86–302

Note: Incomes are net, elsewhere noted. Dinahican & Catablingan are 1995–2005, excluding 2002 to 2004.
* Based on 20 days/month. ** 2 harvests. *** Monthly incomes. **** Based on 30 days/month.
Source: Village captains, 2001, HR No. 6 & 42, Dinahican 2001.

25. Households in- and decreasing their incomes 1995–2001 compared to 1990–1994, distributed by villages (No.).

	Infanta villages				Nakar villages		
Income changes	Infanta town	Dinahican	Banugao	Lual	Poblacion	Catablingan	Pesa
Increasing	53	40	27	30	26	30	22
Decreasing	10	6	13	0	8	14	5
Same	4	1	5	3	4	9	4
Total households	67	57	45	33	38	53	32

26. Periodic change decile incomes 1995–2001 compared to 1990–1995 (%).

	Infanta villages				Nakar villages		
Decile	Infanta town	Dinahican	Banugao	Lual	Poblacion	Catablingan	Pesa
1–2	75.1	19.1	41.4	42.4	63.1	113.7	726
3–4	53.0	41.3	45.6	74.1	101.9	22.9	77.7
5–6	70.4	47.3	21.7	71.7	15.3	12.1	72.7
7–8	43.9	50.5	7.6	57.7	25.6	22.5	66.9
9–10	50.4	50.5	27.7	49.4	37.9	21.4	180.5

27. Commodities either lacking or in insufficient supply within respective municipality according to household respondents before–after 1995, distributed by municipalities and villages (No.).

	Infanta		Nakar		Infanta villages				Nakar villages		
					IT	Din	Ban	Lual	Pob	Cat	Pesa
Before 1995	No.	%	No.	%	No.	No.	No.	No.	No.	No.	No.
Vegetables and fruits	47	18.5	–	–	15	9	13	10	–	–	–
[Quality] clothes	33	13	–	–	12	10	5	6	–	–	–
Spare parts, farm inputs	29	11	–	–	7	16	5	1	–	–	–
Basic needs, groceries*	28	11	–	–	14	4	5	5	–	–	–
Electrical appliances	17	7	–	–	4	6	4	3	–	–	–
Medicine/medical equipment	18	7	–	–	11	4	2	1	–	–	–
High quality products	6	2.5	–	–	–	5	–	1	–	–	–
Meat/fish	1	0.5	–	–	–	–	–	1	–	–	–
Almost everything	2	1	134	100	1	–	1	–	40	60	34
Construction material	3	1	–	–	–	2	–	1	–	–	–
Others*	9	3.5	–	–	2	3	4	w	–	–	–
Nothing	65	25	–	–	28	14	8	15	–	–	–
Total	258	100	134	100	94	73	47	44	40	60	34
After 1995											
Vegetables and fruits	2	1	12	8	–	2	–	n.d.	8	4	–
[Quality] clothes	12	6	5	3	5	6	1		1	2	2
Spare pars, farm inputs	16	8.5	5	3	3	9	4		4	–	1
All basic needs, groceries	–	–	98	63	–	–	–		21	47	30**
Electrical appliances	1	0.5	1	0.5	–	1	–		1	–	–
Medicine, medical equipment	9	4.5	4	3	3	4	2		2	2	–
High quality products	1	0.5	–	–	–	1	–		–	–	–
Meat/fish	2	1	18	12	–	–	2		7	11	–
Everything available in Infanta	–	–	3	2	–	–	–		3	–	–
Construction material	2	1	3	2	–	2	–		–	3	–
Others	4	2	2	1.5	2	2	–		–	2	–
Nothing	143	75	3	2	73	37	33		1	1	1
Total	192	100	155	100	86	64	45		48	72	35

IT: Infanta town, Din: Dinahican, Ban: Banugao, Pob: Poblacion, Cat: Catablingan.

* Basic needs: rice, salt, sugar, cooking oil, utensils, gas etc.

** 22 % answered everything/almost everything.

28. Services either lacking or in insufficient supply within respective municipality according to household respondents before – after 1995, distributed by municipalities and villages (No.).

	Infanta		Nakar		Infanta villages (No.)				Nakar villages (No.)		
Before 1995	No.	%	No.	%	IT	Din	Ban	Lual	Pob	Cat	Pesa
Telephone system	57	18	–	–	32	14	7	4	–	–	–
Cable-TV & TV	19	6	–	–	16	–	1	2	–	–	–
Public market	24	7.5	–	–	11	1	5	7	–	–	–
Lending institutions	27	8.5	–	–	12	4	6	5	–	–	–
Medical care*	34	10	–	–	10	10	11	3	–	–	–
Insurance companies	14	4.5	–	–	5	2	7	–	–	–	–
Transportation services and infrastructure	16	5	–	–	6	1	9	–	–	–	–
Restaurants and fast-food outlets	21	6.5	–	–	5	6	7	3	–	–	–
Private companies	2	0.5	–	–	2	–	–	–	–	–	–
Electricity/water system	9	3	–	–	5	1	1	2	–	–	–
Public services**	9	3	–	–	3	3	2	2	–	–	–
Pawnshop	6	2	–	–	5	–	–	1	–	–	–
Radio station	4	1	–	–	4	–	–	–	–	–	–
Almost everything	1	0.5	134	100	–	–	1	–	40	60	34
Others***	36	11	–	–	13	4	16	3	–	–	–
Nothing	40	12	–	–	10	20	3	7	–	–	–
Total	319	100	134	100	139	67	76	40	40	60	34
After 1995											
Telephone system	11	5	–	–	–	11	–	n.d.	–	–	–
Public market	–	–	56	35	–	–	–		22	22	12
Lending institutions	4	2	–	–	–	4	–		–	–	–
Medical care*	27	12.5	31	19	8	9	10		14	14	3
Insurance companies	7	3	–	–	5	2	–		–	–	–
Restaurants and fast-food outlets	13	6	6	3.5	2	4	7		3	3	–
Electricity	2	1	–	–	1	1	–		–	–	–
Public services**	3	1.5	–	–	–	2	1		–	–	–
Bridge across the river Agos	1	0.5	17	11	–	–	1		5	5	7
All available in Infanta	–	–	12	8	–	–	–		4	4	4
Road into Poblacion	–	–	6	3.5	–	–	–		–	–	6
Others***	21	9.5	31	19	3	4	14		10	10	11
Nothing	130	59	2	1	70	27	33		1	1	–
Total	219	100	161	100	89	67	66		59	59	43

IT: Infanta town, Din: Dinahican, Ban: Banugao, Pob: Poblacion, Cat: Catablingan.

* Hospital, clinic, doctor, pharmacy. ** Gov. offices, police, school, ambulance, veterinary, postal service.

*** Before 1995: Beach resorts, grocery stores, book stores, photo processing, vehicle outlet, videoke, funeral service, notary public, jewelry shop, cinema/new movies, schools, groceries/mini-marts, factories creating job, department stores, livelihood projects, sport facilities, veterinaries, public phone service, computers, land evaluators.

*** After 1995: Book stores, cinema/new movies, schools, potable water, factories creating job, [department] stores, air-con buses, sports facilities, veterinaries, beach resorts, cooperatives

29. Household respondents dependency on public transport for trips outside the municipality and purchasing of private motor vehicle within three years in 1999, distributed by villages (No.).

	Infanta villages			Nakar villages	
Dependency	Infanta town	Banugao	Lual	Poblacion	Pesa
Completely dependent	66	41	36	34	31
Not completely dependent	9	5	2	–	2
Not dependent	15	8	2	7	1
Purchasing of own motor vehicle					
No	58	46	34	27	31
Yes	9	5	6	6	3
Plan to	5	–	–	–	–
Maybe	4	3	–	4	–

30. Household respondents view of the rate of public transport departures to most frequently visited destination 1990–1994 and 1995–1999 (no.).

	Infanta villages						Nakar villages			
	Infanta town		Banugao		Lual		Poblacion		Pesa	
View	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999
Not enough	71	2	39	3	30	2	33	2	26	1
Almost enough	–	6	1	1	–	1	–	–	–	–
Enough	19	36	12	23	6	10	5	17	6	18
More than enough	–	46	–	26	–	22	–	21	–	11

31. Household respondents expectations on the road project before implementation, distributed by villages (no.).

Did you calculate on increasing travel frequency after the road project?	Infanta villages			Nakar villages	
	Infanta town	Banugao	Lual	Poblacion	Pesa
Yes	46	24	20	26	17
No	34	16	16	9	11

32. Total number of household members (excluding children) performing intra- and interregional trips 1990–1999, distributed by villages in Infanta and Nakar.

	Infanta villages			Nakar villages	
Year	Infanta town	Banugao	Lual	Poblacion	Pesa
1990	186	77	65	82	55
1991	193	81	66	86	55
1992	198	93	69	87	56
1993	201	100	69	90	53
1994	204	101	70	88	58
1995	213	108	77	91	57
1996	212	112	77	92	55
1997	215	107	80	96	55
1998	222	107	83	95	50
1999	227	104	84	97	46

33. Households average yearly travel frequency (exc. children) 1990–1994 and 1995–1999, distributed by villages (trips per year).

	Infanta villages			Nakar villages	
Period	Infanta town	Banugao	Lual	Poblacion	Pesa
1990–1994	30	12.5	16	27	8
1995–1999	40	22	25	39	11

34. Tricycle-association members 1990–2001, distributed by study area, municipalities and villages (No.).

	Study			Infanta villages					Nakar village
Year	area	Infanta	Nakar	Dinahican	Banugao	Lual	Ilog	Magsaysay	Poblacion
1990	140	123	17	30	40	20	33	n.s.	17
1994	187	163	24	30	70	20	43	n.s.	24
1995	208	180	28	30	70	30	60	n.s.	28
1996	264	232	32	30	100	30	60	12	32
1997	327	291	36	70	100	45	60	16	36
1998	342	302	40	70	100	45	67	20	40
1999	382	332	50	90	100	45	75	22	50
2000	422	362	60	95	100	45	98	24	60
2001	524	451	73	120	150	57	98	26	73

Note: Five associations in Infanta covered 14 villages.
Note: Tricycle units operating without authorisation excluded.
Note: Pesa passengers travelled with jeepneys between Infanta town–Magsaysay 1990–1995.
Source: PTO: TC1–6, 2001.

35. Average weekly intramunicipal passenger trips per week 1990–2000, distributed on study area, municipality and villages (back/forth).

Year	Study area	Infanta	Nakar	Infanta villages					Nakar villages	
				Dina-hican	Banu-gao	Lual	Ilog*	Magsaysay***	Poblacion	Anoling**
1990–1992	17,300	15,500	1,800	5,900	3,300	3,800	2,500	n.s.	200	1,600
1994	20,200	18,600	1,600	5,900	5,500	3,800	3,400	n.s.	300	1,300
1995	23,700	22,100	1,600	5,900	5,500	5,700	5,000	n.s.	300	1,300
1996	30,100	28,100	2,000	5,900	8,500	5,700	5,000	3,000	300	1,700
1997	40,000	39,700	300	13,700	8,500	8,500	5,000	4,000	300	n.s.
1998	41,900	41,300	630	13,700	8,500	8,500	5,600	5,000	600	n.s.
1999	38,900	38,300	630	9,500	8,500	8,500	6,300	5,500	600	n.s.
2000	35,900	35,300	630	9,500	8,000	8,500	6,300	3,000	600	n.s.

* Ilog is the final destination before embarking on boats crossing Agos river to Poblacion (and Anoling until 1996). ** Anoling is located at Agos river and serviced Poblacion until 1996.

*** Passengers from Pesa departure from Magsaysay when travelling to Infanta town.

Note: Passengers rounded up to nearest hundred.

Note: Total passengers do not represent increase in study village. Associations service more than one village.

Source: Author's calculations of PTO: TC1–6 information, 2001.

36. Household respondents trip frequency into Infanta town in 1999, distributed by study area, municipality, villages and gender (No. & %).

Frequency	Study area		Infanta		Nakar		Infanta villages			Nakar villages		
							Dina-hican	Banu-gao	Lual	Pobla-cion	Catab-lingan	Pesa
	No.	%	No.	%	No.	%	No.	No.	No.	No.	No.	No.
< 1/week	176	37.0	72	31.0	104	43.0	33	19	20	17	51	36
1–3 days/week	226	47.5	106	45.5	120	49.5	52	33	21	36	59	25
4–7 days/week	73	15.5	55	23.5	18	7.5	13	21	21	7	6	5
Total	475	100	233	100	242	100	98	73	62	60	116	66
Male												
< 1/week	94	42.5	37	34.0	57	51	17	13	7	9	28	20
1–3 days/week	84	38.0	39	35.5	45	40	24	8	7	9	25	11
4–7 days/week	43	19.5	33	30.5	10	9	7	12	14	6	3	1
Total	221	100	109	100	112	100	48	33	28	24	56	32
Female												
< 1/week	82	32	35	28	47	36.5	16	6	13	8	23	16
1–3 days/week	142	56	67	54	75	57.5	28	25	14	27	34	14
4–7 days/week	30	12	22	18	8	6.0	6	9	7	1	3	4
Total	254	100	124	100	130	100	50	40	34	36	60	34

37. Various characteristics of the telephone system 1994–2001, distributed by residence.

Year	Installation fee (private)		Households with private telephone (No.)				Average daily long distance calls (No.)	Minimum charge (3 min.)	Monthly min. charge private phone
	IT	Pob	IT	Lual	Ban	Pob			Residential / Business
1994	–	–	–	–	–	–	150–200	14	– / –
1996	4,190	–	152	–	–	–	370–420	14	220 / 385
1997	4,190	–	533	–	–	–	420–520	14–30	242 / 424
1998	2,933	6,000	712	–	–	13	477–577	30	242 / 424
1999	2,933	6,000	847	–	–	13	485–585	30	242 / 424
2000	1,700	6,000	1,021	–	–	13	507–607	30	242 / 424
2001	1,700	6,000	1,300	17	4	13	550–750	30	327 / 572

IT: Infanta town, Pob: Poblacion, Ban: Banugao.

Source: Author's compilation of KI18–19 information, Infanta town 2001.

38. Share of households below average yearly village travel frequency 1990–1994 and 1995–1999, distributed by villages (%).

Period	Infanta villages			Nakar villages	
	Infanta town	Banugao	Lual	Poblacion	Pesa
1990–1994	63	64	67.5	67.5	73.5
1995–1999	59	67	65	75	76.5

39. Share of total household (excluding children) trips performed 1990–1994 and 1995–1999, distributed by deciles on villages (%).

	Infanta villages			Nakar villages	
1990–1994	Infanta town	Banugao	Lual	Poblacion	Pesa
1–2	1.8	1.4	2.0	1.0	0.7
3–4	7.2	3.4	5.0	5.3	2.9
5–6	14.0	8.2	12.8	11.5	6.5
7–8	22.6	23.1	21.6	23.9	18.3
9–10	54.2	63.7	58.9	58.1	71.4
1995–1999					
1–2	1.8	1.5	1.2	1.4	0.1
3–4	7.7	3.8	4.9	6.4	3.5
5–6	14.0	10.2	11.4	12.8	7.3
7–8	27.2	23.7	21.3	19.4	16.6
9–10	49	60.7	61.4	59.8	72.3

40. Households (excluding children) average yearly travel frequency 1990–1994 and 1995–1999, distributed by deciles on villages.

	Infanta villages			Nakar villages	
1990–1994	Infanta town	Banugao	Lual	Poblacion	Pesa
1–2	2.9	0.9	1.6	1.4	0.3
3–4	11.2	2.3	4.1	7.2	1.2
5–6	21.7	5.5	10.4	15.6	2.8
7–8	31.1	15.1	17.6	32.3	7.8
9–10	84.0	41.5	47.8	78.6	30.4
1995–1999					
1–2	3.7	1.7	1.6	2.4	0.1
3–4	15.0	4.1	6.4	10.6	1.8
5–6	27.5	11.0	14.6	21.2	3.8
7–8	53.5	25.6	27.3	32.1	8.7
9–10	96.0	65.6	78.5	98.9	38.0

41. Household respondents modal choice, interregional trips 1990–1994 and 1995–1999, distributed by study area, municipalities, and villages (No. & %).

	Study area		Infanta		Nakar		Infanta villages				Nakar villages		
							IT	Din	Ban	Lual	Pob	Cat	Pesa
1990–1994	No.	%	No.	%	No.	%	No.	No.	No.	No.	No.	No.	No.
Ordinary bus	220	48	133	45	87	54	61	22	29	21	32	42	13
Jeepney	123	26	76	25.5	47	29	31	17	13	15	15	12	20
Ordinary bus/jeepney	97	21	75	25.5	22	13.5	30	19	21	5	8	11	3
Hired jeepney	4	1	4	2	–	–	–	4	–	–	–	–	–
Car	2	0.5	1	–	1	0.5	1	–	–	–	1	–	–
Owner type jeep	3	0.5	3	1	–	–	2	1	–	–	–	–	–
Motorcycle	1	–	1	–	–	–	1	–	–	–	–	–	–
Tricycle	6	1.5	3	1	3	1.5	–	–	–	3	–	–	–
Truck	3	0.5	–	–	3	1.5	–	–	–	–	3	–	–
Total	459	100	296	100	163	100	126	63	63	44	59	65	36
1995–1999													
Ordinary bus	162	32.5	102	31.5	60	34	47	17	32	6	24	21	15
Jeepney	91	18	48	14.5	43	25	10	15	15	8	10	14	19
Ordinary bus/jeepney	41	8	24	7.5	17	10	8	6	8	2	5	9	3
Ordinary bus/minibus	26	5	19	6	7	4	10	6	–	3	–	7	–
Ordinary bus/somet. minibus	108	21.5	79	24.5	29	16.5	36	15	14	14	11	18	–
Minibus	32	6.5	21	6.5	11	6	10	3	2	6	7	–	4
Minibus/somet. ordinary bus	12	2.5	10	3	2	1	10	–	–	–	2	–	–
Hired jeepney	4	1	3	1	1	0.5	–	3	–	–	–	–	1
Car	7	1.5	5	1.5	2	1	4	–	1	–	2	–	–
Owner type jeep	8	1.5	8	2.5	–	–	6	2	–	–	–	–	–
Motorcycle	2	0.5	2	0.5	–	–	2	–	–	–	–	–	–
Tricycle	2	0.5	2	0.5	–	–	–	–	–	2	–	–	–
Truck	5	1	2	0.5	3	1.5	–	2	–	–	3	–	–
Total	500	100	325	100	175	100	143	69	72	41	64	69	42

Note: When more than one mode is presented, HRs alternates or uses several modes to reach destination.

42. Average passenger travel time and decrease 1990–1994 and 1995–1999 (minutes/one way).

Destination	Average 1990–1994	Average 1995–1999	Decrease minutes	Destination	Average 1990–1994	Average 1995–1999	Decrease minutes
Sta. Maria	420	120	300	Majayjay	360	180	180
Valenzuela	600	210	390	Cainta	353	176	177
Paete	245	95	150	Mauban	500	250	250
Siniloan	225	92	133	Tereza	270	135	135
San Pablo	270	120	150	Sta. Rosa	285	150	135
Marikina	420	190	230	Los Banos	405	217	187
Binangonan	465	210	255	Manila	413	223	190
Pagsanjan	240	110	130	Calauan	360	195	165
Famy	195	90	105	Lucena City	381	213	168
Pangil	260	122	138	Lipa	420	240	180
Morong	255	120	135	Bulacan	510	300	210
Tanay	301	142	159	Antipolo	302	183	118
Pila	315	150	165	Batangas City	570	360	210
Cavite	440	210	230	Pagbilao	420	270	150
Sta. Cruz	244	118	126	Nueva Ecija	360	240	120
Dagupan City	840	570	270	Olongapo	600	480	120
Cabuya	420	300	120	Tarlac	300	270	30
Calamba	420	300	120	Atimonan	390	360	30
Taytay	240	180	60				

Note: Destinations not travelled to during both periods excluded.

43. Average time household respondents spend away at destination when travelling before returning home 1990–1994 and 1995–2001, distributed by villages (No.).

	Infanta villages			Nakar villages	
1990–1994	Infanta town	Banugao	Lual	Poblacion	Pesa
Return same day	16	7	7	2	6
1 night	25	–	6	9	14
1–2 days	6	12	1	14	11
3–7 days	103	42	42	30	7
> 7 days	4	3	1	5	6
Total	154	64	57	60	44
1995–2001					
Return same day	94	31	34	33	31
1 night	18	24	3	15	9
1–2 days	28	8	–	7	2
3–7 days	16	20	21	15	3
> 7 days	2	–	1	–	3
Total	158	83	59	70	48

44. Accommodation at destination when travelling outside the study area in 1999 (%).

				Infanta villages				Nakar villages		
Accomodation	Study area	Infanta	Nakar	Infanta town	Dina-hican	Banu-gao	Lual	Popla-cion	Catabl-ingan	Pesa
Brother/sister	20.0	18.5	22.0	22.5	21.0	17.5	12.5	34.5	23.0	8.5
Son/daughter	27.5	31.5	22.5	26.0	21.0	41.0	37.5	27.0	31.5	8.5
Relative	33.5	27.5	42.5	15.5	41.5	23.5	29.0	27.0	34.0	66.0
Friend	6.0	3.0	10.0	3.5	4.0	–	4.0	7.5	5.5	16.5
Others	5.5	8.0	2.5	20.0	4.0	9.0	–	4.0	3.0	–
Mother/father	2.5	4.5	–	3.5	8.5	3.0	4.0	–	–	–
Wife/husband	4.0	6.5	–	8.5	–	6.0	12.5	–	–	–

45. Time of departure when travelling outside the study area in 1999 (%).

				Infanta villages				Nakar villages		
Time of departure	Study area	Infanta	Nakar	Infanta town	Dina-hican	Banu-gao	Lual	Popla-cion	Catabl-ingan	Pesa
Morning	59.0	58.0	60.5	59.0	48.0	62.0	62.5	53.0	51.0	77.5
Afternoon	11.5	11.0	12.0	7.0	24.0	8.0	6.0	11.5	17.5	7.5
Night	11.5	11.0	12.5	14.0	11.0	16.0	3.0	9.0	13.5	15.0
No definite time	17.5	19.5	14.5	19.5	17.0	13.5	28.0	26.5	17.5	–

46. Share of households with economic savings due to being able to return home earlier when travelling since 1995 (%).

	Infanta villages			Nakar villages	
Economic savings	Infanta town	Banugao	Lual	Poblacion	Pesa
Yes	45	48.5	44	64.5	55

47. Household respondents opinion on transport comfort and safety 1990–1994 and 1995–1999, distributed by municipalities and villages (No.).

	Infanta		Nakar		Infanta villages							
					Infanta town		Dinahican		Banugao		Lual	
Opion on comfort and safety	90–94	95–99	90–94	95–99	90–94	95–99	90–94	95–99	90–94	95–99	90–94	95–99
Uncomfortable & insecure	152	12	67	7	67	7	36	1	34	2	15	2
Unomfortable but secure	41	2	15	1	15	1	3	–	14	–	9	1
Comfortable but insecure	9	84	3	35	3	35	2	10	–	22	4	17
Comfortable & secure	22	133	8	45	8	45	2	45	4	28	8	15

	Poblacion		Catablingan		Pesa	
Opion on comfort and safety	1990–1994	1995–1999	1990–1994	1995–1999	1990–1994	1995–1999
Uncomfortable & insecure	24	3	51	1	21	2
Unomfortable but secure	9	–	5	1	8	–
Comfortable but insecure	1	8	–	14	–	13
Comfortable & secure	3	28	1	38	2	13

48. Total number of destinations visited by household respondents 1990–1999, distributed by municipalities and villages (No.).

			Infanta villages				Nakar villages		
Period	Infanta	Nakar	Infanta town	Dinahican	Banugao	Lual	Poblacion	Catablingan	Pesa
1990–1994	21.0	14.0	23	21.0	25	15	12	19.0	11
1995–1999	23.5	16.5	25	25.0	27	17	14	24.0	12

Note: Infanta and Nakar are averages.

49. Households respondents trip destination 1990–1999 (%).

	Infanta villages			Nakar villages	
1990–1994	Infanta town	Banugao	Lual	Poblacion	Pesa
Manila	67.0	65.0	77.5	56.5	34.5
Lucena City	14.5	2.5	1.5	20.5	4.5
Siniloan	1.0	1.5	6.0	7.0	31.5
Manila suburbs	2.5	–	1.5	4.0	–
Others	15.0	31.0	13.5	11.0	29.5
1995–1999					
Manila	64.0	59.0	68.5	55.0	31.0
Lucena City	17.0	4.0	2.5	19.5	5.0
Siniloan	1.0	3.0	6.5	6.5	30.0
Manila suburbs	2.5	2.0	2.5	5.5	–
Others	15.5	32.0	20.0	13.5	34.0

50. Destinations visited by household respondents 1990-1999, distributed by each year visited.

Destination	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1. Antipolo (Rizal), 2. Atimonan (Quezon), 3. Baguio C. (Benguet), 4. Baler (Aurora), 5. Baliuag (Bulacan), 6. Batangas C. (Batangas), 7. Biñan (Laguna), 8. Binangonan (Rizal), 9. Burdeos (Polillo), 10. Cabanatuan (Nueva Ecija), 11. Cainta (Rizal), 12. Calamba (Laguna), 13. Calapan (Mindoro Oriental), 14. Calubang, 15. Kawit (Cavite), 16. Cubuyao (Quezon), 17. Dagupan C. (Pangasinan), 18. Famy (Laguna), 19. Laguna (La Union), 20. Laoag (Ilocos Norte), 21. Los Baños (Laguna), 22. Lucban (Quezon), 23. Lucena C. (Quezon), 24. Manila, 25. Marikina (Rizal), 26. Masbate (Masbate Isl.), 27. Morong (Rizal), 28. Naga (Camarines Sur), 29. Paete (Laguna), 30. Pagbilao (Quezon), 31. Pagsanjan (Laguna), 32. Pangil (Laguna), 33. Pila (Laguna), 34. San Fernando (Pampanga), 35. San Pablo (Laguna), 36. Siniloan (Laguna), 37. Sta. Cruz (Laguna), 38. Sta. Maria (Bulacan), 39. Sta. Rosa (Laguna), 40. Tanay (Rizal), 41. Taytay (Rizal), 42. Teresa (Rizal).	x	x	x	x	x	x	x	x	x	x
43. Majayjay (Laguna)		x	x	x	x	x	x	x	x	x
44. Mauban (Quezon)	x	x	x	x	x	x	x	x	x	
45. Tarlac (Tarlac)			x	x	x	x	x	x	x	x
46. Olongapo ((Bataan)				x	x	x	x	x	x	x
47. Balaan	x					x	x	x	x	x
48. Calauan (Laguna), 49. Gumaca (Quezon), 50. Ilagan (Isabela), 51. Ilocos Sur, 52. Mulanay (Quezon).						x	x	x	x	x
53. Nagcarlan (Laguna)					x	x	x	x	x	
54. Mexico (Pampanga)						x	x	x	x	
55. Alabang (Laguna)								x	x	x
56. Catarman (North Samar)				x	x	x				
57. Zambales							x			x
59. Davao C. (North Cotabato)				x	x					
60. Cagayan Valley (Cagayan)										x
61. Dingalan (Aurora)								x		
62. Angano						x				
63. Lilw						x				
64. Zamboanga C. (Zamboanga del Norte)				x						
Total	44	44	47	52	51	60	57	59	57	56

x indicate the year the destination was visited. ( ) indicate province wherein destination is located.

51. Factors restricting household respondents mobility after the road project, distributed by villages (No.).

	Infanta villages			Nakar villages	
Restriction	Infanta town	Banugao	Lual	Poblacion	Pesa
Money	32	31	15	27	27
Busy working	25	9	6	21	18
Take care of children/household member	15	10	11	8	13
No access to vehicle	8	5	3	6	12
Too old	9	2	4	6	3
Sickness	14	–	–	5	6
Feel sick and tired travelling	–	7	8	–	–
Weather condition	1	–	–	1	–
No important matters – stationary lifestyle	11	3	11	1	6
Preferred destination too far away	2	2	–	2	2
Take care of house/rice-field	3	3	–	–	–
Afraid of accidents/uncomfortable vehicles	–	1	–	–	–
Cannot find location at destination	–	–	1	1	–
Others	2	1	1	2	2
Nothing	16	2	4	4	–
Total	138	76	64	84	89

52. Travel expenses effect on household economy, distributed by study area, municipalities and villages (No. & %).

	Study area		Infanta		Nakar		Infanta villages				Nakar villages	
							IT	Din	Ban	Lual	Cat	Pesa
	No.	%	No.	%	No.	%	No.	No.	No.	No.	No.	No.
No effect	180	49	135	58	31	33.5	63	31	25	16	12	11
Effect	186	51	97	42	30	66.5	25	30	28	14	48	23
Small effect	*105*	*56.5*	*53*	*56.5*	*16*	*58.5*	*20*	*16*	*8*	*9*	*29*	*13*
Big effect	*81*	*43.5*	*44*	*43.5*	*14*	*41.5*	*5*	*14*	*20*	*15*	*19*	*10*
Total	366	100	232	100	61	100	88	61	53	30	60	34

IT: Infanta town, Din: Dinahican, Ban: Banugao, Cat: Catablingan.

53. Trade-offs made in order to be able to travel, distributed by study area, municipalities, and villages (No.).

Trade-off	Study area	Infanta	Nakar	Infanta villages				Nakar villages		
				IT	Din	Ban	Lual	Pob	Cat	Pesa
Small effect								n.d.		
Basic needs	4	1	3	1	–	–	–		2	1
Food	46	23	23	4	11	4	4		15	8
Clothes	10	7	3	–	4	–	3		2	1
Electricity	26	22	4	11	4	2	5		4	–
Water	5	5	–	5	–	–	–		–	–
Cable-TV	2	2	–	2	–	–	–		–	–
Telephone	1	1	–	1	–	–	–		–	–
Allowance to children	4	4	–	1	1	–	2		–	–
Snacks	5	3	2	1	–	1	1		2	–
Little bit of everything	2	2	–	1	1	–	–		–	–
Gas	1	1	–	–	–	–	1		–	–
Pig feeds	1	1	–	–	–	–	1		–	–
Borrow money	4	–	4	–	–	–	–		3	1
Others	5	2	3	–	2	–	–		1	2
Total	117	75	42	28	23	7	17		29	13
Big effect								n.d.		
All household expenses	55	45	10	–	–	–	–		7	3
Food	34	20	14	3	8	20	14		7	7
Clothes	30	28	2	–	3	15	10		2	–
Electricity	25	25	–	5	1	15	4		–	–
Water	4	4	–	4	–	–	–		–	–
Cable-TV	2	2	–	2	–	–	–		–	–
Telephone	1	1	–	1	–	–	–		–	–
Allowance to children	4	3	1	–	–	1	2		–	1
School budget	1	1	–	–	1	–	–		–	–
Borrow money	5	1	4	–	–	–	1		4	–
Snacks	3	3	–	–	–	–	3		–	–
Farm input expenses	1	–	1	–	–	–	–		1	–
Total	165	133	32	15	13	51	34		21	11

IT: Infanta town, Din: Dinahican, Ban: Banugao, Pob: Poblacion, Cat: Catablingan.

54. Household respondents travel frequency satisfaction in 1999, distributed by villages (No.).

	Infanta villages			Nakar villages	
	Infanta town	Banugao	Lual	Poblacion	Pesa
Increase	23	23	18	12	7
Satisfied	54	27	20	26	23
Decrease	11	2	–	2	4
Total	88	52	38	40	34

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Questionnaire respondents

Infanta municipality

Goods transport operators	No. 1-4, Village Infanta town, 1999; 2001.
Household firms	No. 1-9, Village Banugao, 1999; 2001.
___	No. 1-18, Village Dinahican, 1999; 2001.
___	No. 1-31, Village Infanta town, 1999; 2001.
Household respondents	No. 1-55, Village Banugao, 1999; 2001.
___	No. 1-67, Village Dinahican, 1999; 2001.
___	No. 1-92, Village Infanta town, 1999; 2001.
___	No. 1-40, Village Lual, 1999; 2001.
Passenger transport operators	No. 1-10, Village Infanta town 1999; 2001.

General Nakar municipality

Household respondents	No. 1-60, Village Catablingan, 1999; 2001.
___	No. 1-34, Village Pesa, 1999; 2001.
___	No. 1-40, Village Poblacion, 1999; 2001.
Passenger transport operators	No. 1, Village Poblacion, 2001.

Key Informants

1 OMA (Office of the Municipal Agriculture), Infanta 1999; 2001; 2005.
2 NIA (National Irrigation Administration), Infanta 1999; 2005.
3 DPWH (Department of Public Works and Highways), Provincial Headquarter 1st district, Mauban, Quezon Province, 2005.
4 MPDC (Municipal Planning Development Coordinator), Infanta 1999; 2005.
5 SLPC (Southern Luzon Polytechnic College), Infanta 2001.
6 NQCC (Norhern Quezon Cooperative College), Infanta 2001.
7 DENR (Department of Environment and Natural Resources), Main Office Region IV, Manila 2001.
8 QUEZELCO (Quezon Electric Cooperation), Infanta 2001.
9 MDAR (Municipal Department of Agrarian Reform), Infanta 1999.
10 Village captain, Dinahican 1999; 2001; 2005.
11 Major fish-dealer, Dinahican 1999; 2001; 2005.
12 Fisher migrant, Dinahican 2001; 2005.
13 Fish-dealer, vehicle and fishing vessel owner, Dinahican 2001; 2005.
14 Village captain, Catablingan 1999; 2001; 2005.

15 Fisherman, village Pamplona, Catablingan 2005.
16 Production manager, ice-plant, Dinahican 2001.
17 Fish-dealer, Infanta Public Market, Infanta town 2001.
18 PLDT (Philippine Long Distance Telephone Company), Infanta town 2001.
19 GTSI (General Telephone System Incorporation), Infanta town 2001.
20-21 Petrol Station Managers: Real Poblacion 2001.
22 IRRA (Infanta Rice Retailers Association), Infanta town 2001.
23 NFA (National Food Authority), Infanta town 2001.
24 Jetstar Agri-supplier, Infanta town 2001.
25 Hog and Poultry Feeds Supplier, Infanta town 2001.
26 Village captain, Lual 1999; 2001.
27 Land Registration Authority, Infanta 1999; 2005.
28-33 Bank Managers: Rural Bank of Infanta, Infanta town 1999; 2001. Rural Bank of Pangil, Magdalena, and Mabitac, Quezon Cooperative Rural Bank, and LandBank of the Philippines, Infanta town 2001.
34 Infanta Mayor, Infanta 1998.
35 Municipal Land Assesseror, Infanta 1998.
36 Former National Government Employee, Infanta town 1998.
37-38 Municipal Budget Officers: Infanta 2001; 2005 and General Nakar 2001.
39-40 Municipal Treasurers: Infanta and General Nakar 2001.
41-42 Philippine National Police: Infanta and General Nakar 2001.
43-45 Village captains: Banugao, Poblacion and Pesa 1999; 2001.

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