

Japan's Development Aid Effects on the Rural Transport Industry in PNG: Evidence from the Bereina-Malalaua Road

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Abstract

This paper has three specific aims to fulfil in providing an analysis on the role of aid in the development process in Papua New Guinea. Firstly, this paper begins by providing an overview of development theory and the role of aid in the development processes of a country and briefly examines the nature of 'Dutch Disease' effects of aid and links this to the current debate on how aid has failed the Pacific. Secondly, a short literature review on Japanese ODA with respect to this aid's objectives and guiding principles; philosophy of this aid and discusses its role and reasons and its main characteristics as being part and parcel of an international development activity, of which Japan undertakes as an aid donor, is provided. Thirdly, an empirical analysis is provided on the Bereina-Malalaua road project (1996-2000), which was co-financed by a yen loan and (GoPNG) development budget support. Empirically, the specific aim of this study is to assess the observed effects of this project with reference to the two main investigated elements: (1) socio-economic effects on local rural economy, especially on rural transport businesses and (2) on socio-economic effects on SUAS in the Malalaua area of PNG.

Key words: Bereina-Malalaua Road, Japanese ODA, public motor vehicle (PMV), Papua New Guinea (PNG), sago using agrarian societies (SUAS), socio-economic effects

Introduction

An overview of development theory and the role of aid in development process

A discussion on the appropriate role of aid in the development process of societies tends to make the critical assumption that the developed countries have a moral duty and obligation to assist developing countries to promote sustained economic growth so as to support the welfare considerations of people. Because of varying developmental stages and natural resource endowments, there is the issue of 'resource gaps' between and among countries, which necessitates the need for development aid in the first place. A useful development theory that ascribes to this view is the two-gap developmental model, of which development economists (e.g. CHENERY and BRUNO 1962), describe it as a planning model which takes into account a savings gap (domestic savings less than the level needed to reach

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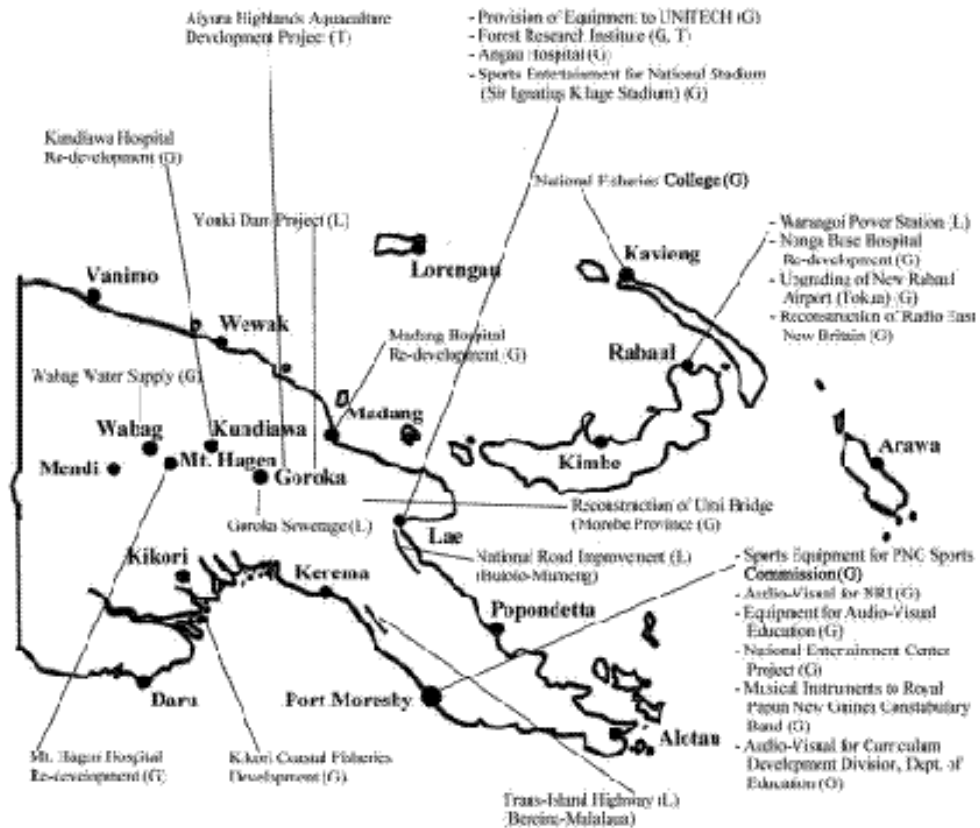


Fig. 1: Distribution of Japanese ODA projects in Papua New Guinea. Legends: (G) grant assistance projects, (L) yen loan projects and (T) project-type technical cooperation. Source: Redrawn and modified after the PNG Yearbook 2002, p.134.

a growth target) and a foreign exchange gap (between expenditure needed on imports to achieve target growth and earnings from exports). Therefore development aid in the form of foreign assistance is viewed as another institution to boost economies of the third world countries so as to support local economic development (CHENERY and STROUT 1966).

Classical economic theory proposes broad strategies for development purposes, of which the following are required: (i) human skills (labor), (ii) investment and savings and (iii) productive technology and infrastructure. Situated in that context, like most developing countries, PNG relies heavily on foreign aid, especially donor aid infrastructure projects for supporting her national development priorities and programs, owing to the lack of critical inputs of capital, machinery, equipment, technology, and more critically to supplement required level of savings at her disposal. Therefore the level of infrastructure development in a country is a crucial factor in determining the pace and diversity of economic development, let alone, “the argument for aid as necessary for development rests on the belief that possession of capital is critical for economic advance” (BAUER 1995: 364). This surely provides the economic rationale, let alone a macroeconomic link between aid and growth

for PNG seeking development aid from a developed and highly industrialized country such as Japan.

'Dutch disease' effects of Aid

The 'Dutch disease' effects of aid in developing countries describes the systematic dependence on foreign assistance for consumption purposes, of which no serious effort is made to invest for sustainable growth and economic development. Therefore development aid is a subject of intense scholarly and public debate, of which the polemic surrounding it aptly questions why aid flows (resource transfers) from OECD countries has not achieved significant levels of socio-economic development in developing countries. This is despite development aid's well-meaning objectives of assisting with national development programs with respect to appropriate levels of human resource development, infrastructure support in roads, bridges, railways, dams, water irrigation canals, telecommunications, let alone electricity, or other public works programs. Since development aid is administered between government to government, it has raised critical concerns about a country's ability to absorb foreign capital effectively (absorptive capacity), of which development aid's overall effectiveness, addressing the issues of its 'quality' and 'quantity' of this aid's administration programs, are continually challenged and critiqued in a myriad of studies.

More recently, for instance, HUGHES (2003) generally argues that aid flows akin to mineral exports are not earned income; they create economic rents that distort economies. Although Hughes's paper provides an interesting overview of how aid has failed the Pacific Islands, of which broad comparative perspectives are discernible with other developing countries and relates this to how other countries such as Taiwan and South Korea have graduated from 'aid recipient' countries to newly industrializing countries (NICs), it is fairly strong on criticism that aid is spent on consumption than on investments but rather weak on analyses and syntheses of specific aid projects undertaken for national development programs in the Pacific Island Countries. Therefore, based on the need to provide specific analyses and syntheses on the effectiveness of aid in the Pacific Islands, the author uses a case study on Bereina-Malalaua road in PNG, which was financed through Japanese yen loan and GoPNG counterpart funding arrangement. This paper, to an extent, empirically attempts to provide a counterview to the current debate that aid has failed the Pacific Islands by arguing that such a proposition is a function of what a scholar is either 'looking at' or is 'looking for' in discussing the merits and demerits of 'aid-giving' and 'aid-receiving' in the overall scheme of administering aid programs.

Objectives and guiding principles of Japanese ODA

The main objective of the Japanese ODA is to support the self-help efforts of developing countries towards economic take-off, guided by four basic principles as enshrined in the ODA charter adopted by Cabinet on 30 June 1992. Here the Government of Japan takes into account the following criteria to decide its assistance to developing countries:

1. Compatibility between environmental conservation and development;
2. Avoiding the use of Japan's ODA funds for military purposes and for purposes liable

- to aggravate international conflicts;
3. Monitoring of the trends in recipient countries' military expenditures, development and production of weapons of mass destruction and export and import of arms; and
 4. Monitoring of activities for the promotion of democratization and introduction of a market-oriented economy, and for conditions related to basic human rights and freedoms.

Philosophy of Japanese aid

The philosophy of Japanese aid is based on two fundamental principles of humanitarian consideration and the recognition of global interdependence. Moreover, Japanese ODA takes pride in basing its guiding principles on sustainable development, peace, stability of the world and perhaps more important of all, the promotion of market economy and good governance (RIX 1993). These principles operate in tandem with the joint statement on 'Development Cooperation in the 1990s' signed by the Development Assistance Committee (DAC) in 1989. Here the DAC members pledged to strengthen and adopt policies to achieve broad based economic growth; more human resource development (HRD); participatory development; and environmentally sound and sustainable development.

A brief literature review on Japanese aid

A brief literature review is provided on Japanese aid with specific emphasis on its role and main characteristics in international development. Many scholars, academics and practitioners, especially in the fields of development economics and international development studies, which embraces cross-cultural studies, development cooperation and development assistance studies, have studied Japanese aid, as is aptly seen in a whole plethora of studies (e.g. GOTO 1997a, b; GRANT 1997; KAKAZU 1994; MORI 1995; RIX 1993; SCALAPINO 1992; STEVEN 1996; SÖDERBERG *et al.*, 1996; TAKEDA 1993; YAMADA 1998; YANAGITSUBO 1998; YASUTOMO 1986), among others. Many of these researchers, among others, have attempted to explain the intricacies of foreign aid, especially on the management of Japanese ODA; its appropriate roles and reasons and motivations for providing this aid to the developing world, and PNG is no exception and has been a recipient since establishing diplomatic ties with Tokyo back in 1977. It has generally been argued that the role of Japanese aid is to foster economic development, and in principle, to promote 'self-help' efforts in developing countries according to the *Annual ODA Reports* published by the 'Association for the Promotion of International Cooperation'.

There are works on regional impact studies for the Asian and Pacific Island regions. For the former, KAKAZU (1994) investigated the scope and nature of Small Island Economies in the Pacific Island countries by comparing their 'absorptive capacity', while for the latter; YAMADA (1998) examined Japanese ODA in Southeast Asia focusing on Malaysia. A more comprehensive study on Japanese ODA was investigated and reported by SÖDERBERG *et al.*, (1996). They critically analysed Japanese ODA in the Asia region highlighting five case studies covering projects such as the Chonburi-Pattaya New Highway in Thailand, Renun Power Project in Indonesia, among others. This focused study by

SÖDERBERG *et al.*, (1996), critically reviewed the contractual obligations and manner of aid commitment and disbursement, especially yen loan projects in the region and concluded that a rapidly rising share of the 'yen loan' aid projects were taken up by foreign firms, especially from China and South Korea, which was traditionally contracted out to Japanese consultancy, engineering and construction firms. The tactical response and gesture, on the part of Japanese aid administration's contribution to international cooperation and development activities, to a certain extent, has negated other aid donors' widespread opinion that Japanese aid was used to secure LDC markets in the 1980s and early 1990s.

Moreover, MORI (1995); RIX (1993) and SCALAPINO (1992) called for reforms in Japan's aid administration, as it is quite complex in practice because there were bureaucratic struggles and conflicts, involving three Ministries and an a planning agency all involved in aid policy coordination. They were: Ministry of Foreign Affairs (MOFA), Ministry of Finance (MOF), Ministry of International Trade and Industry (MITI) and an agency, the Economic Planning Agency (EPA). According to RIX (1993), bureaucratic struggles and conflicts, stalled the fast implementation of aid projects, let alone blurred the boundaries of responsibility among the Ministries involved. Furthermore, RIX (1993) argues that, the "cause of the problems faced by Japan's aid official lies with the structure of the Japanese aid system and its programs. Administratively complex and politically muddled, aid is greatly understaffed but is one policy area taking more rapidly rising share of the national taxes than others". From hindsight, Japanese aid policy makers recognized those shortcomings in the aid system and in the fall of 1999, made significant changes to that effect, as was seen in the merger of the Export/Import Bank of Japan with the Overseas Economic Cooperation Fund (OECF), which then became the Japan Bank for International Cooperation (JBIC).

With respect to Japan's foreign policy orientation, SCALAPINO (1992) and YASUTOMO (1986) provide a comprehensive account. SCALAPINO (1992: 206) observes that 62.5 % of Japan's ODA of US \$8.96 billion in 1989 went to the Pacific-Asian region because of the doctrine of 'comprehensive security'. In the wisdom of Japanese policy makers, the region's security and stability is crucial for economic growth in the long run. YASUTOMO (1986) in his book, *The Manner of Giving: Strategic Aid and Japanese Foreign Policy* also acknowledges the aid's concentration in the region for the same reason. Arguably then, "Japanese foreign policy is strongly oriented towards using economic instruments on behalf of perceived interests, defined in the broadest terms as helping to promote regional and global stability". A case in point would be that of the *Kuranari Doctrine*, which came to the fore in January 1987 after the then Foreign Minister Kuranari visited the Oceania region after the two coups in Fiji in 1987, was a political gesture and international commitment on the part of Japan to preserve political stability in the Pacific Islands (TAKEDA 1993: 242).

With respect to Japanese aid's main characteristics, it has been argued, that the Japanese aid policy derives much of its character from the country's own experiences; once upon time she was a developing country and currently serves as an 'aid superpower'. Foreign aid is one of Japan's main international activities, but is not widely known or understood, even in Japan. Based on these main characteristics outlined, it can be argued

that Japan's foreign aid reflects important historical and cultural characteristics. As RIX (1993) observes, "the link between aid policy and socio-cultural values is important". RIX (1993) identifies four main characteristics of Japan's foreign aid policy. Firstly, the principle of self-reliance is interwoven into Japan's aid policies for two reasons: The push for economic development in tandem with problems of scarcity and markets in the Meiji Period (1868-1912). Apparently, these factors could be attributed to strong internal leadership seeking deliberate adaptation and learning from the West and the desire for imperial expansion to support domestic economic growth. The second characteristic, RIX (1993) highlights; relates to Japan's strong affinity with Asia historically and in cultural terms. Its racial unity and island consciousness are entrenched in the 1980's *zenhōui gaikōu* or omni-directional diplomacy, which alludes to the 'Comprehensive Security Arrangement'. This supports the argument that security is central to Japan's initiatives for peace, stability and economic development. Thirdly, a hierarchical view promoting its status and influence in international activities and responsibilities is another salient feature of Japan's aid policy. The 'aid doubling plans' and its desire to be an 'aid superpower' support this claim. The fourth characteristic noted by RIX (1993) relates to donors and aid giving. He identifies four main motivations, which are humanitarian considerations, charity, guilt conscience conscious for image enhancement and finally, donors' economic self-interest for the LDC's market resources and aid contracts.

Having briefly discussed Japanese ODA, let us look more closely at the road project, co-financed via a yen loan in PNG, with special reference being made to the Bereina-Malalaua road. From rural development management point of view; especially, weaving the discussion around the fundamental aims of promoting structural transformation of rural agrarian societies to that of rural societies linked to socio-economic influences of market-based economies, the causal link between providing an infrastructure, in terms of a road as an adaptive process, is examined. Modernity projects such as adaptive learning and receiving development assistance (safety net) schemes have transcended on different societies with varying results. Therefore, it would be of interest to see how SUAS in Malalaua district participate in this necessary transformation process, so as to clarify whether the road serves as a central component of rural development or not, owing to its unique adaptive process.

Is the Bereina-Malalaua Road a central component of rural development in SUAS in Malalaua area?

Whether the Bereina-Malalaua Road now serves as a central component of rural development in SUAS in Malalaua district, is open to question. To be sure, some sort of criteria must be in place to assess an evaluative statement of this kind, of which the aid's noble intentions and some specific characteristics must be taken into consideration. Firstly, it is argued that yen loans used to finance infrastructure projects between 1966 and 1993, which accounted for 52.2 % of the total were used in three main infrastructure categories: electric power and gas, transportation and communications (TSUKUDA 1995: 5). Secondly, TSUKUDA (1995) points out three characteristics, which are inherent in yen loans for

infrastructure projects. First, the gestation period from the commencement of construction to the generation of income is long. Second, large amounts of funds are required, since benefits emerge after the system is complete. Third, the benefits of the project accrue to the community as a whole rather than to specific individuals or enterprises. Against that backdrop, it is also evident that yen loans are being used to construct and upgrade PNG's insufficient network of highways, which will help unify the country, stimulate industries and improve public services in principle. The Bereina-Malalaua road, to an extent, reflectively embraces the three characteristics; therefore, the empirical assessments on the socio-economic effects in SUAS in Malalaua area to be ascertained in the ensuing discussion may justifiably verify or refute this claim.

Overview of road transport development plans in PNG

The Medium Term Development Strategy (MTDS) 1997-2002: A Bridge into the 21st Century, a development blueprint produced by the National Planning Office (NPO) highlights that given good roads, agriculture could link 570,000 rural households in PNG with the rest of the world, providing markets for the entire surplus they produce. Trading their surplus, it is argued, would allow these rural masses to take the first step toward socio-economic transformation from traditional subsistence societies to the modern exchange economy and the chance to more than satisfy basic needs: food, energy, nutrition, clothing and shelter. Thus, the opportunities for those selling their surpluses domestically and internationally depend crucially on access to markets; in the first place on roads being passable and transport costs being at reasonable levels.

These road development views are not new as they were considered as national development priorities towards the late 1980s and even earlier, as air transport of goods and services to many parts of the country were relatively higher and remains so, even today. In general this echoes the calls for building the insufficient network of highways, roads, and feeder roads to connect places, especially rural areas of PNG, which would ease the burden on transport costs. To corroborate this statement, it has been quite clearly expressed that at least any road development plan should serve two main needs, which are: (1) economic considerations and (2) rural welfare. The former attempts to provide farmers, mining resources and industry with access to production sites, while the latter explores the social and political needs to increase access to essential services such as health and education, likewise improve personal mobility.

Based on the foregone discussion, how can one justify building road for underdeveloped SUAS in Malalaua District that the two main prioritized needs, as pointed out, conform to national development programs? Surely, there must be a way to capture the whole essence of determining whether the Bereina-Malalaua road, not only justifies and demonstrates actual achievements for the stated priorities but also serves as a central component of rural development in SUAS at a level of generality.

Methodology

The materials used in this study are based on the author's field surveys on the Bereina-Malalaua road in 1999 and 2002, reflecting a 'without analysis' and 'with analysis' situation respectively. The latter time period provides the main component of data acquisition for this study and has two sets of data for empirical assessment. These data were collected and analyzed from the PMV frequency of trips survey as well as passengers frequency and purpose of trip survey on route 600 from Port Moresby, which passes through the Bereina-Malalaua Highway. The parameters for the empirical assessments on the socio-economic effects of the road on SUAS are briefly described below. The method used to measure the socio-economic effects of the road is adapted after TSUKUDA (1995) general assessments, with reference to three main characteristics of yen loan projects, as was mentioned earlier. A brief summary of the three main characteristics used as criteria for assessing the plausible socio-economic effects of the Bereina-Malalaua road, is provided in Table 1.

Table 1. Using TSUKUDA's three characteristics of yen loan infrastructure projects as criteria for assessing socio-economic effects on the Bereina-Malalaua Highway Road Project (Trans-Island Highway) 1996-2000.

Parameter (Criteria used) ^a	Characteristics of set criteria ^b	Evaluation remarks ^c	Measurement source ^d
I. Gestation period assessment	Gestation period from the commencement of the construction to generation of income is long	Transitional state of affairs. From May 2000 to 2003 at the time of research.	OECF Reports, JICA development Study (D/S) of 1987
II. Very high amount of funds required (Cost factor assessment)	Large amounts of funds are required, since project benefits emerge after system is complete	The Bereina-Malalaua road project cost almost PNG K 144.8 million (JPN yen 10,152 million)	From OECF Reports, NPO ^e and Dept. of Works and Supply
III. Project benefits community (Benefit factor assessment)	The benefits accrue to the community as a whole rather to specific individuals or enterprises	The road built through marshy low-lying swamp is of benefit to commuters, Rural PMV operators as well as sago farmers etc.,	Rural PMV survey 2002 and sago surveys 2000 and 2002

Notes: a, c, d; author's descriptive notes, b; summarized and adapted after TSUKUDA (1995), p. 5.
Source: Modified and tabulated after TSUKUDA (1995).

Parameters for empirical assessments of the socio-economic effects on SUAS

The parameters for assessing the socio-economic effects of the Bereina-Malalaua road on the SUAS in the Malalaua area are categorized into two parts. The first part examines the 'without analysis' of the road during the construction phase, covering some impressions made by potential commuters as per the author's previous survey of 1999. A rapid appraisal of six randomly selected villages in SUAS investigated how a major road infrastructure would not only induce economic activities such as opening up trade links with Port Moresby city, but could also serve as a catalyst for rural development in the broader sense,

with specific reference being made to undertaking a foreseeable joint-venture related investment in the rural sago palm industry, of which SUAS in Malalaua area apparently has the clear comparative advantage for commercialization of the rural sago palm industry. Malalaua has abundant sago stands, mostly occurring in semi-cultivated contexts, but did not have a major road infrastructure then, so as to ably support 'forward links' and 'backward links' from traditional processing to industrial material processing, which technologically advanced Malaysia presently enjoys; meanwhile Indonesia, too, is following suit rigorously in the world sago starch industry (LAUFA 2004).

Of the twenty provinces in PNG, Gulf Province is the second least developed province in the country, albeit having an abundance of seafood resources and plant genetic resources (PGR) such as the sago palm (*Metroxylon* spp.) at her disposal, yet receives cursory glance, or rather scant attention for development needs and priorities from both provincial and national authorities. Topographic features and chronic apathetic tendencies of public officials to effectively address provision of goods and service to people in not only SUAS in Malalaua, but also to the other five districts in the province appear to explain the overall socio-economic situation. In retrospect, the general lack of socio-economic development and poor nutritional status, especially for SUAS in Gulf Province can be equated with non-existence of major infrastructure such as proper road network systems to link districts in the province LAUFA (in press). Against that developmental stage of the province, this study was motivated to capture the essence of how SUAS in Malalaua area stand to gain from the Bereina-Malalaua road after being left out in the mainstream of socio-economic

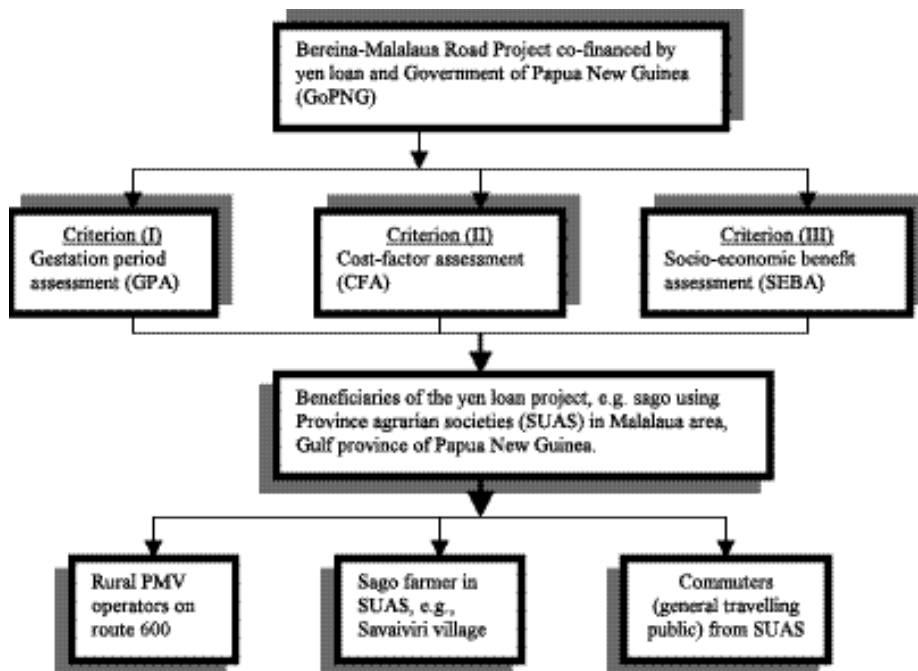


Fig. 2. Analytical Framework for Socio-economic benefit assessments for SUAS.

development for a long period of time, even predating the onset of capitalism as a mode of production, thus revealing the process of transition from a backward rural agrarian society to a market-oriented rural economy. The road, to an extent, justifiably provides the basis for social and economic inclusion of underprivileged people in SUAS into the mainstream of rural development, which is reflective of a societal transformation process, akin to medieval Europe adjusting from feudalism to capitalism.

For SUAS in Malalaua area, this transitional aspect of adjustment to a major infrastructure, such as the road being studied, can be viewed as a 'late comer' development process and phase. Other rural sectors in the province can be further developed, and a lot depends on 'self-help' efforts on the populace to participate in this societal transformation process. The nature of pre-road construction was provided, as per the rural rapid appraisal then. Attention is now devoted to the second category, which forms the main part of the empirical assessment. This is captured under the 'with analysis' of the Bereina-Malalaua road as described. Fig. 2 provides the general framework for these assessments.

'Without analysis' of the Bereina-Malalaua Road Project in brief

A 'without analysis' of the Bereina-Malalaua road project is presented here from the perspective of transport accessibility in the past. Considering criterion (I) as is described in Table 1 and illustrated in Fig. 2, the gestation period of the road project is measured from its construction period right through the generation of income, which is rather transitional in nature, as only four years (2000-2004) have passed after the completion of the project, though a 'with analysis' of the road attempts to measure some income generation activities. With reference to criterion (II), the costs entailed in the detail design (D/D) right through the completion of the project are quite enormous, owing to a thirteen-year-period from 1987 to 2000. In 1987, the JICA-PNG office did the detail design (D/D) for the Bereina-Malalaua road, which formed the basis of a development study (D/S). Other official formalities along the way with respect to Exchange of Notes (E/N) between the Governments of Japan and PNG, right through the four-year (1996-2000) life of the project, took well nigh thirteen years in total. These assessments and analyses apparently satisfy criteria (I) and (II) with respect to a yen loan infrastructure project in principle, and characterize a 'without analysis' situation, though the transitional aspect of criterion (I) makes income measurements, using a time-series or synchronic assessment of the road project's benefits accruing to SUAS in Malalaua area.

In the previous rapid appraisal survey done by the author in 1999, forty questionnaires were administered, which sought qualitative opinions of potential beneficiaries of a yen loan road project, as to how they viewed the road in general. Of the forty questionnaires administered, thirty-two were filled out and returned, while the remainder was not returned. The results showed that 53.1 % (17 out of the 32 respondents) thought that the road project was successful and after it was completed would enhance personal mobility, widen access to health and educational services; likewise, improve market accessibility for primary produce such as sago (*Metroxylon* spp.) starch and betel nuts (*Areca* spp.) for sale in Port Moresby. A further 21.8 % (7 out of 32 respondents) assumed that the project was not so

successful, depending on their needs or personal opinions then. Meanwhile, 15.6 % of the respondents (five people) felt that the road was not satisfactorily built, while three people had no idea at all about the road project.

More specifically on the transport needs assessment of SUAS then, it could well be argued that transport accessibility in the past was a real burden and struggle as travels meandering through the Taure and Lakekamu river basins (Fig. 3) on out-board powered motors took much time. Such factors could provide causal explanations in regard to the general apathetic tendency, which reinforces the lack of socio-economic development in SUAS in Malalaua area of Gulf province. Primordial ties and intimacy with the sago palm; undoubtedly, remained static because of the latter's role as staple food crop and that exploitation of this crop depended mainly on subsistence, rather than on commercial

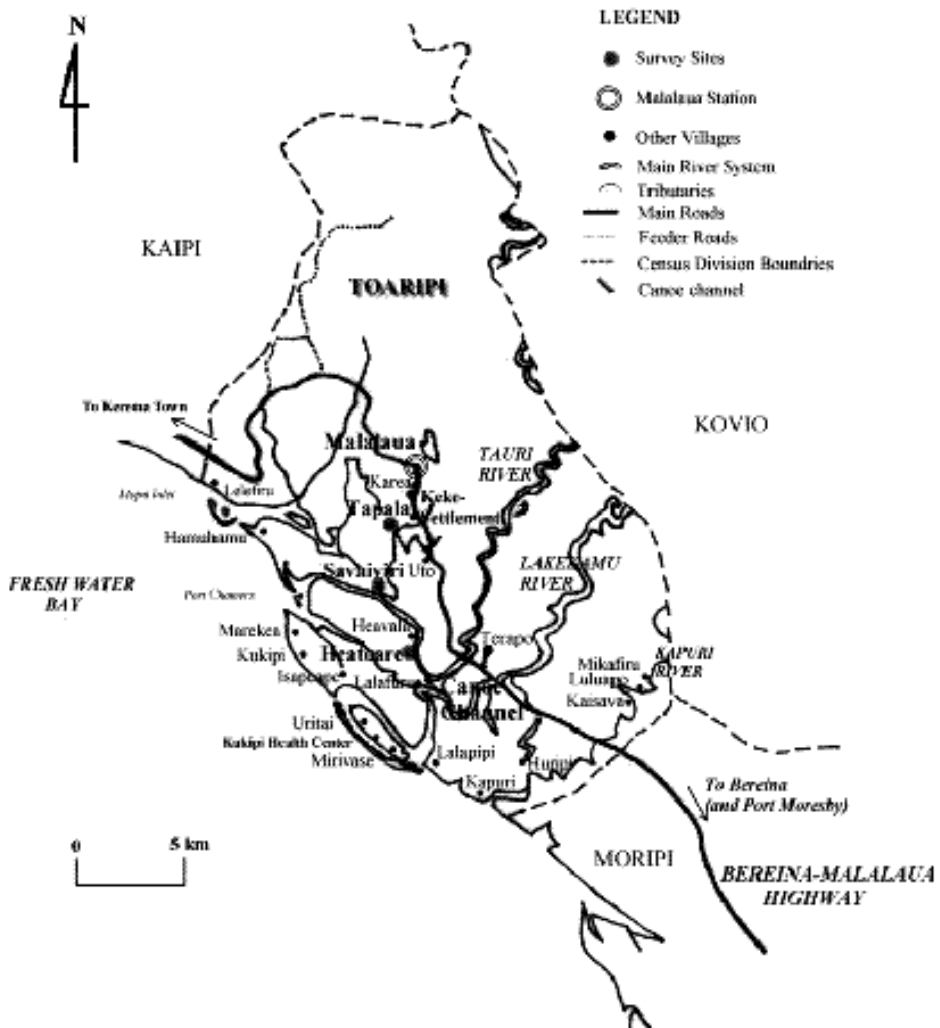


Fig. 3. Map showing sago using agrarian societies (SUAS) along the Bereina-Malalaua Highway, Gulf Province of Papua New Guinea. Source: LAUFA (2004), p.41.

interests (LAUFA 2004). This was because moving the sago starch after traditional methods of processing to the markets in Port Moresby was not only an expensive exercise, but the overall time taken to arrive at the final good for sale, required much energy expended and long manhours. Suffice it to say that, concerted efforts to commercialize sago on a grand scale were beyond the purview of the inhabitants of SUAS in Malalaua area (LAUFA 2004).

Situational assessment presently indicates that transport accessibility for personal and rural agricultural product mobility in SUAS generally has been enhanced; owing to increase in the number of rural PMV transport businesses. The Bereina-Malalaua road has made this possible after it was completed in May 2000, as Malalaua District dwellers are now using the road to transport their produce such as dried sago starch to markets in Port Moresby city, which can fetch higher returns because of the high and unmet demand in the city (LAUFA 2004).

'With analysis' of the Bereina-Malalaua Road Project

To ascertain whether the Bereina-Malalaua road is a central component of rural development in SUAS, a 'with analysis' of the road is provided, so as to estimate its plausible socio-economic effects on people in Malalaua District. The 'with analysis' measurements ascribe to criterion (III), on benefits accruing not only to specific enterprises, groups, but also to the whole community. The two specific parameters for examining these socio-economic effects on SUAS are: (I) socio-economic effects on local economy with respect to rural transport business and (II) socio-economic effects on SUAS, bordering on mobility of people and sago starch to market outlets.

Socio-economic effects on local economy with respect to rural transport business

The local rural economy of Malalaua District, in particular, after the construction of the Bereina-Malalaua road was structurally transformed taken from a spatiotemporal context, to a certain extent, as was evidenced in the number of local entrepreneurs moving into PMV operator firms commuting along the Bereina-Malalaua road on route 600, which travels from Malalaua government station, the district headquarters all the way to Port Moresby city. The flourishing rural transport service industry within SUAS is a direct result of the construction of the Bereina-Malalaua road, and thus the post-construction era of the road thereby serves as a parameter for assessing a transformational trend in every respect.

Equally important to observe, is the empirical evidence that the road has physically linked many villages in eastern Gulf with the provincial capital, Kerema, which was impassable prior to the pre-road construction era, though only Malalaua government station was linked by an unsealed trunk road as far as Kerema then. Travel for other villages in eastern Gulf to the provincial capital, was only made by sea transport, along Toaripi and Kaipri coastline. The Kerema-Malalaua road is being upgraded and is planned for sealing so as to link the province with Port Moresby and nearby Central Province, though the Bereina-Malalaua Highway has linked Gulf with Central Province with the main Hiritano Highway, of which the two provinces continually access for travel to Port Moresby.

The Bereina-Malalaua road, under the auspices of a NRIP, is just a phase of the

program, as further linking and consolidation works have been planned for linking Aseki in Menyama District, Morobe Province with a trunk road linking Keremahau in Kovio census division area in Malalaua District. The road will link Putei with Aseki, which are coffee and tea growing areas. Moreover Putei and Keremahau in Kovio, though have fertile land up in the highlands of Gulf Province, yet often find difficulties in transporting fresh vegetables such as bananas (*Musa spp.*), taro (*Colocasia esculenta*), yams (*Dioscorea spp.*), sweet potatoes (*Ipomea batatas*), and rural cash crop such as betel nuts (*Areca spp.*) because of the rugged terrain, will be linked with other parts of Gulf and Morobe Provinces, if road up-grading and other planned public works see the light of eventual implementation.

The road networking of districts and provinces under the NRIP, in time, would hopefully promote 'intra' and 'inter' provincial trade of agricultural products, thereby offering hopes for negating the myth surrounding underdeveloped backward rural agrarian societies. Low-lying marshy land dwellers in SUAS have been trading dried sago starch for betel nuts, let alone other garden produce with horticulturalists from the hilly areas of Putei and nearby villages in Kaintiba District for sometime now. Lack of proper road networks, however, often hinder or rather discourage trade networks, which are being carried out on a relatively small scale and perhaps in time, the NRIP could provide a useful link for enhanced trading of goods and services for both the highland and lowland dwellers in Gulf Province.

Betel nut sellers from Kaintiba District are now increasingly opting to sell their produce themselves to 'middlemen' in Port Moresby city. These highland dwellers often come down to Malalaua station, or are picked up by PMV trucks along Meaporo area, which is more like a junction onto the main Bereina-Malalaua road. The travel may be treacherous in the unsealed sections of the Kerema-Malalaua road, owing to deep pot holes created during the annual peak wet season from December to March, however, this does not preclude 'self-help' efforts on the part of different actors (PMV operators, betel nut sellers, dried sago starch sellers, public servants) mingling with travel discomforts to pay for a service to sell a product or access other services in the urban areas. Given the 'mushroom effect' of network of rural transport service providers and its cliental base, as is reflected in the number and frequency of users, it would be interesting for a piece of research to develop an input-output correlation matrix, which could be quite a useful indicator for analysing rural income-generation activities so as to determine its distributive aspects from rural welfare point of view.

Socio-economic effects on SUAS

The socio-economic effects on SUAS with respect to the surveyed villages: namely, Heatoare, Keke/Tapala and Savaiviri are assessed from the viewpoint of enhanced personal and sago starch mobility to Port Moresby. As medical services are made accessible too, it goes further to suggest that rural welfare has slightly improved. The recent signing of a MOU between Gulf Provincial Government and the Port Moresby General Hospital to provide trainee student doctors to undertake 'problem-based learning' in a rural hospital attests to this point. Four trainee doctors are now serving in Malalaua station Health Centre.

PMV commuters, especially rural dwellers, and increasingly for traditionally processed and dried sago starch sellers are now accessing the Bereina-Malalaua road. The two basic policy initiatives of any road development plans in PNG, appears to be fulfilled in light of economic considerations and rural welfare, even for rural SUAS in Malalaua area.

Economic considerations such as creating and enhancing linkages for the interplay between people, rural institutions and markets are key requirements that provide the basis for determining whether rural welfare has been either achieved or underachieved. The critical issue at hand is that the character, the nature and the aesthetics of describing rural welfare, is largely a function of economic considerations, through state-sponsored initiatives in the initial stages. Thereafter, it is a matter of subjective choice for motivated individuals to recreate an environment that is compatible with their own rational expectations. Self-help efforts towards rural community assets building, which underscores the main development philosophy of Japanese ODA is implicitly put across to SUAS. Therefore individuals, acting upon their own self-interests through explicitly identifying with themselves what is best for them, is in itself a voluntary matter, considering the number of alternatives or choices, say, sago farmers can make, so as to improve their lot.

Public financing of modernity projects, therefore, with respect to public works programs, such as a road by governments (e.g. GoPNG) in counter-part funding arrangements with donor agencies (e.g. JBIC), are interventionist schemes, let alone policy initiatives designed to create an impact on the socio-cultural and physical milieu, so as to achieve rural development through change. A physical change in the natural environment for people in SUAS occurred, resulting in transformed landscapes and ecosystems of the marshy lands between Bereina and Malalaua after the road was built. From the project's point of view, two further questions can be asked. Firstly, how are people in these localities responding to this change psychologically? Secondly, are there any clear motivations to adapt to this change? The underlying issue is that does the road have any significance at all for the marshy land dwellers, or is it a project that they seldom associate with for benefit sharing? Empirical results of this study could possibly show the character and rate of transformation of this rural agrarian society, though based on criterion (III), as per (Fig. 2); implicitly, also applies to the basic fundamental aims of any road development plans in PNG.

Results and Discussion

Socio-economic effects on local economy with respect to rural transport business

Rural transport businesses operated and owned by local entrepreneurs flourished after the construction of the road. During the author's rural PMV interview survey of 2002, it was reported that there were about 36 PMVs operating on route 600 from Port Moresby travelling via the sealed Bereina-Malalaua road. Of the total number of PMVs then, 27 were interviewed and asked specifically about the frequency of trips made per week, which constitutes the main source of income for PMV owners. The survey results clearly indicated

that demand for rural transport services by sago farmers, betel nut sellers, local trade storeowners, zoom outboard motor, diesel, and petrol retailers led to a sharp increase in the number of PMVs.

Prior to the road construction, there were only about 12 PMVs serving rural residents from SUAS in Malalaua area, therefore the twenty-four fold increase in number of PMVs, as per 2002 rural road transport survey, reflects a significant increase in the number of PMVs. This partly explains a demand function, which could be attributed to 'inter' and 'intra' sectoral cooperation, based largely on market mechanisms. The mean of the frequency of the trips made by a PMV is 3.4 roundtrips (combining forward leg and return leg trips) per week. Both the forward leg trips (Port Moresby to SUAS) and the return leg trips from the latter to the former fetch different income levels for PMV operators. The incomes are contingent upon the carriage of goods (freight charges) and more critically on passenger disembarkation points (passenger fares) on the specified route.

The forward leg trip, from revenue raising point of view earns meagre incomes for PMV operators, as much of it is spent on diesel fuel in Port Moresby prior to the trip being made, which means that almost half the receipts of the revenue collected from passenger fares are absorbed by fuel costs. Many PMV operators interviewed during the survey reported that the PMV fares charged for passengers for different destinations on route 600 from Port Moresby, passing through the Bereina-Malalaua road, stopping along the way for passengers disembarking at Mekeo villages in Bereina District of neighboring Central Province such as Eboa, Apanaiipi, before reaching SUAS in the Malalaua area, determined their net incomes. Table 2 shows the disembarkation points and passenger fares charged per person. The forward leg revenue only increases whenever there are freight charges levied on items such as tradable goods for rural trade stores and 44-gallon (176 liters) of fuel drums of kerosine, petrol, diesel, or zoom for outboard motor for small-scale retail purposes within SUAS. This source of income is quite irregular, though is quite appealing to PMV operators, who compete for a slice of this extra income derived from freight charges, as is reflected in Table 3.

About 22 of the PMV operators are Port Moresby based, though are from other SUAS such as Heavala, Miaru, Popo Mikafiru, Terapo, Lese Oalai, apart from Savaiviri, Keke/Tapala, and Heatoare villages (LAUFA, M., 2002, pers. comm.). The rest of the PMV operators are permanent residents in SUAS in Malalaua area. Higher returns to PMV operators are usually made on return leg trips because of freight charges levied on mainly agricultural products such as dried sago starch and betel nuts, serving as rural exports to markets in Port Moresby city. Income derived from freight-related agricultural products for PMV operators is a regular source, as there are many sago starch and betel nut sellers that constantly supply the city markets, of which other 'middlemen' buy in bulk and sell to city residents, especially, for betel nuts.

The growing numbers of 'middlemen' are self-employed migrants from different parts of the country, and increasingly from indigenous people of the city, who eke out a living from agricultural products such as betel nuts. Betel nut sellers because of quick bargaining and selling often return the same day or return a few days later on available PMV trucks

after purchasing basic necessities such as kerosene, rice, or canned food items in Port Moresby for mainly rural family household consumption in SUAS. For the traditionally processed sago starch, without the 'middlemen', the producer sells at their own discretion at different market outlets in the city. Table 4 shows the freight charges levied on agricultural products such as sago starch and betel nuts, the two main income sources for SUAS in Malalaua area.

For many indigenous people, betel nut chewing constitutes an important socio-cultural activity whereby friendships are forged, renewed or maintained through sharing a betel nut, which is mixed with lime and mustard and chewed in a peculiar Melanesian society. Heavy betel nut chewing has been medically proven to trigger mouth cancer, but that does not stop habitual chewers from practicing an age-old Melanesian custom and tradition passed down from a generation to the next. Betel nut is not a food source, but because of its 'stimulant factor' and the manner in which it is sold very quickly, it has been elevated to the status on par with that of an 'inelastic product', almost equal to cigarettes or even alcoholic beverages and is annually computed for consumer price index (CPI), relative to prevailing inflationary trends from macroeconomic perspective by the National Statistical Office (NSO), drawing from official statistics through the Central Bank of PNG (BPNG)'s publication called, *Quarterly Economic Bulletin*. Traditionally processed sago starch, unfortunately, does not

Table 2. PMV Route 600 passenger fares as at October 2002.

(Disembarkation point from Port Moresby)	Destination		Passenger fares	
	District	Province	PNG kina (K)	Japanese yen (¥)
Port Moresby to Mekeo Villages	Bereina	Central	10.00	360
Port Moresby to Bereina	Bereina	Central	13.00	468
Port Moresby to Apanaipi	Bereina	Central	17.00	612
Port Moresby to Miaru	Malalaua	Gulf	17.00	612
Port Moresby to Lese Oalai	Malalaua	Gulf	17.00	612
Port Moresby to Popo	Malalaua	Gulf	17.00	612
Port Moresby to Eopoe	Malalaua	Gulf	20.00	720
Port Moresby to Iosipi	Malalaua	Gulf	20.00	720
Port Moresby to Malalaua	Malalaua	Gulf	20.00	720
Port Moresby to Kerema	Kerema	Gulf	50.00	1,800

Notes: Amounts in Japanese yen were calculated using the buying rate of the yen at 36 yen is to 1 PNG kina. Thus the amounts were in PNG kina were multiplied by 36. Source: From author's PMV survey (2002).

Table 3. General freight charges for forward leg trips for route 600 PMVs.

Type of freight charge	Particulars	Freight charges
Forward leg trip	Trade store goods (includes 10kg or 25kg rice or wheat flour bags and timed meat/fish etc.,)	10% charge on all on tradable after inspection of invoice from wholesale etc.,
	Full 44 gallon drum of either outboard zoom fuel or diesel fuel for automobiles	K50.00 (1800)

Notes: A full-44 gallon drum is equivalent to 176 litres. In parenthesis is the Japanese yen equivalent. Source: From author's PMV survey (2002).

enjoy the privilege of being statistically computed, as is presently enjoyed by betel nut and perhaps in time, attitudinal change in improving sago starch quality in SUAS may alter that. The functional difference of the two agricultural products from SUAS in the Malalaua area, be it for food or taken as a stimulant, and their rate of sales, has made PMV operators charge more for betel nut bags, than for dried sago starch (LAUFA 2004).

Table 4. Return leg freight charges levied on agricultural products from SUAS.

Item	Packed in empty roots rice bag 10 kg size		Packed in empty roots rice bag 25 kg size		Packed in empty wheat flour farm set bag 50 kg size	
	PNG (K)	Yen (¥)	PNG (K)	Yen (¥)	PNG (K)	Yen (¥)
	Betel nuts	5.00	180	10.00	360	12.00
Sago starch	2.00	72	5.00	180	N/A	N/A

Notes: Amounts in Japanese Yen were calculated using the buying rate of the yen at 36 yen is to 1 PNG kina. Thus the amounts in PNG kina were multiplied by 36. Source: From author's PMV survey (2002).

Table 5. Revenue projections of rural PMV transport operating on Route 600 passing through Bereina-Malalaua (in PNG kina).

PMV truck	Forward leg revenue per trip	Return leg revenue per trip	Trips per week	Weekly revenue	Total revenue per month	Projected annual revenue
Truck A	300	600	3	2,700	10,800	129,600
Truck B	300	600	4	3,600	14,400	172,800
Truck C	300	300	3	1,800	7,200	86,400
Truck D	360	600	3	2,800	11,520	138,240
Truck E	300	600	3	2,700	10,800	129,600
Truck F	300	600	3	2,700	10,800	129,600
Truck G	350	400	3	2,250	9,000	108,000
Truck H	300	500	3	2,400	9,600	115,200
Truck I	800	1,000	3	5,400	21,600	259,200
Truck J	400	800	3	3,600	14,400	172,800
Truck K	250	700	3	2,850	11,400	136,800
Truck L	300	500	3	2,400	9,600	115,200
Truck M	400	600	3	3,000	12,000	144,000
Truck N	300	500	3	2,400	9,600	115,200
Truck O	200	400	4	2,400	9,600	115,200
Truck P	200	400	4	2,400	9,600	115,200
Truck Q	300	800	5	5,500	22,000	264,000
Truck R	900	2,000	4	12,400	49,600	595,200
Truck S	400	500	3	2,700	10,800	129,600
Truck T	600	600	3	3,600	14,400	172,800
Truck U	400	900	5	6,500	26,000	312,000
Truck V	500	600	4	4,400	17,600	211,200
Truck W	700	1,200	5	9,500	38,000	456,000
Truck X	400	800	4	4,800	19,200	230,400
Truck Y	400	500	3	2,700	10,800	129,600
Truck Z	400	500	3	2,700	10,800	129,600
Truck A ₁	300	400	3	2,100	8,400	100,800
Total	10,660	17,900	93	102,300	409,520	4,914,240
Mean	392.59	662.96	3.4	3,788	15,167	182,088

Notes: PMV = public motor vehicles, N = 36 (total no. of PMVs operating on route 600 passing via (Bereina-Malalaua Highway). N = 27 (size of the sample); 3 PMVs voluntarily refused to participate in the survey; 3 PMVs were off the road for major repairs or overhaul and were not included at the time of the survey. Source: From author's PMV survey (2002).

Whatever the case may be for rural agrarian products, it demonstrates, on the whole, that this interactive buying and selling taken from rural-urban contextual dimensions aptly reflects a 'win-win relationship' (benevolence), taking into account the gains made by agricultural product sellers, middlemen in the city and PMV operators. Socio-economic benefits sharing, arguably, has made lower income groups better off, who appear to be adept and apt at adapting to the logic of the market. This in itself explains a structural transformation process of societies. Moreover it signifies Adam Smith's abstract notion of the much-acclaimed 'invisible hand' (*laissez faire*) of the market, justifying its determined logic that people acting through their own 'self-interests', indirectly results in creating public goods, whereby benefit sharing through carriage of people and goods, through their relative modes of production underscores theoretically the creation and distribution of wealth in societies. A case in point is that of the forward leg and return leg incomes

Table 6. Forecasted total expenditure of rural PMV transport operating on Route 600 passing through Bereina-Malalaua Road (in PNG kina).

PMV truck	License fees	Labour wages	Spare parts	Fuel costs	Monthly costs	Total costs per annum
Truck A	400	1,458	1,998	3,024	6,480	78,160
Truck B	158	1,944	2,664	2,880	7,488	90,014
Truck C	134	972	1,332	2,640	4,944	59,462
Truck D	160	1,555	2,131	3,672	7,358	88,460
Truck E	158	1,458	1,998	2,160	5,616	67,550
Truck F	158	1,458	1,998	1,800	5,256	63,230
Truck G	158	1,215	1,665	2,040	4,920	59,198
Truck H	158	1,296	1,776	2,160	5,232	62,942
Truck I	140	2,916	3,996	3,840	10,752	129,164
Truck J	160	1,944	2,664	2,400	7,008	84,256
Truck K	120	1,539	2,109	2,520	6,168	74,136
Truck L	138	1,296	1,776	2,424	5,496	66,090
Truck M	138	1,620	2,220	1,200	5,040	60,618
Truck N	158	1,296	1,776	2,280	5,352	64,382
Truck O	260	1,296	1,776	3,520	6,592	79,364
Truck P	260	1,296	1,776	3,360	6,432	77,444
Truck Q	300	2,970	4,070	4,200	11,240	135,180
Truck R	446	6,696	9,176	5,040	20,912	251,390
Truck S	206	1,458	1,998	2,760	6,216	74,798
Truck T	300	1,944	2,664	3,240	7,848	94,476
Truck U	500	3,510	4,810	6,000	14,320	172,340
Truck V	*	2,376	3,256	4,800	10,432	125,184
Truck W	260	5,130	7,030	6,000	18,160	218,180
Truck X	400	2,592	3,552	3,840	9,984	120,208
Truck Y	400	1,458	1,998	3,000	6,456	77,872
Truck Z	400	1,458	1,998	2,160	5,616	67,792
Truck A	400	1,134	1,554	2,160	4,848	58,576
Total	6,470	55,285	75,761	85,120	216,166	2,600,466
Mean	239	2,047	2,805	3,152	8,006	96,313

Notes: Monthly expenditure = labor wages + spare parts + fuel costs, Annual expenditure = license fees + (labor wages + fuel costs) × 12 months, * on two-month temporary permit. PMV = Public Motor Vehicles, N = 36 (total no. of PMVs operating on route 600 passing via (Bereina-Malalaua Highway), n = 27 (size of the sample); 3 PMVs voluntarily refused to participate in the survey; 3 PMVs were off the road for major repairs or overhaul and were not included at the time of the survey. Source: From author's PMV survey (2002).

generated for PMV operators as presented in Table 5. For all PMVs interviewed, the return leg fetches higher income as compared to the forward leg; quite precarious, owing to irregularity in freight-related charges, not to mention, fuel costs appears to drastically reduce PMV operators' income.

Return leg trips are quite profitable for PMV operators; meanwhile, agricultural producers in SUAS in Malalaua area gain from forward leg assessments, after their rural agricultural products are sold in urban markets in Port Moresby. This network of trade relationship between PMV operators (tertiary rural service industry) and that of sago starch processors (primary industry) aptly underscores the nature of 'zero-sum proposition' wherein a loss somewhere, be it for the PMV operators or for the sago starch sellers, is implicitly a gain somewhere in the whole scheme of commercial transactions, with respect to a whole plethora of trading networks, as regards, middlemen from the urban area for agricultural products from SUAS in Malalaua area, service station operators, tyre repair workshops, among others.

From specific assessments for revenue gains to rural transport sector, it can be argued, for instance that, truck A makes three return trips per week and each return trips earns PNG kina 900, thus its weekly revenue is projected at PNG kina 2,700 and its monthly income is set at PNG kina 10,800. Table 7 shows the net incomes for PMV operators, after considering the main expenditures presented in Table 6. It will be demonstrated that the net incomes for PMV operators are dependent on the passenger capacity, which ranges between 25 to 60 passengers, assuming that these trucks were filled to the required licensed capacity. This means that larger trucks rake in more profit compared to smaller trucks operating on route 600.

Table 6 shows the forecasted total expenditure of rural PMV transport service providers operating on route 600 passing through the Bereina-Malalaua road. Operational costs with respect to labor wages paid to drivers and crewmembers, spare parts or general repairs made to air filter, oil filter, shock absorbers, spring bushes, and tyres for wear and tear, adds a significant burden to PMV operators. During the rural PMV survey, it was reported that the wear and tear made on tires and shock absorbers is made severe and quite frequent by an unsealed section of the road between Agevairu in Kairuku District, Central Province and the Mekeo villages, along the main Hiritano Highway, which is then linked to the Bereina-Malalaua Highway. The eventual upgrading and sealing of this section of the road along the main Hiritano Highway may not only reduce travel discomforts for passengers, but could also reduce the wear and tear on PMV trucks operated by people from SUAS, thereby improving the net incomes for rural PMV operators.

This study critically examined the Japanese yen loan co-financed Bereina-Malalaua road project in retrospect and prospect. Socio-economic effects of the road were assessed through small-scale rural PMV surveys. A total of 36 PMVs operate on the Bereina-Malalaua road, of which 27 were interviewed. It was established that a return leg trip between SUAS and Port Moresby City fetches on average about PNG kina 662.96; whilst a forward leg trip from Port Moresby City to SUAS earns about PNG kina 392.59, which critically depend on carriage (freight-related charges) of perishable goods such as sago

(*Metroxylon* spp.) and betel nuts (*Areca* spp.) and, more critically on the receipt of passenger fares forward-bound or return-bound. The study shows that the net income earned by a rural PMV operator represents 42.7 % of the total revenue, whilst the other 57.3 % is absorbed by operational costs (labour wages, fuel costs, repair and maintenance). Based on these indices, a rural PMV operator on average makes weekly total revenue of PNG kina 3,788 and a net income of PNG kina 1,617 after operational costs. Therefore, the rural PMV operator on average earns a monthly net income of about PNG kina 6,469. Likewise the net income per annum for a rural PMV operator is projected at about PNG kina 77,628, assuming that the PMV trucks are in operational condition throughout the year. It is also critical to observe that for rural PMV operators, the operational costs represent a significant risk, which ultimately decides their net incomes.

From national and regional development perspective, the road provides a vital link for rural masses in the two provinces within the southern region of the country connected by

Table 7. Net income of rural PMV transport operating on Route 600 passing through Bereina-Malalaua per annum (in PNG kina and Japanese yen).

PMV truck	Passenger capacity	Total revenue		Total expenditure		Net income	
		PNG kina	Japanese yen	PNG kina	Japanese yen	PNG kina	Japanese yen
Truck A	25	129,600	4,665,600	78,160	2,813,760	51,440	1,851,840
Truck B	30	172,800	6,220,800	90,014	3,240,504	82,786	2,980,296
Truck C	25	86,400	2,764,800	59,462	2,140,632	26,938	969,768
Truck D	30	138,240	4,976,640	88,460	3,184,588	49,779	1,792,051
Truck E	30	129,600	4,665,600	67,550	2,431,800	62,050	2,233,800
Truck F	30	129,600	4,665,600	63,230	2,276,280	66,370	2,389,320
Truck G	25	108,000	3,888,000	59,198	2,131,128	48,802	1,756,872
Truck H	25	115,200	4,147,200	62,942	2,265,912	52,258	1,881,288
Truck I	50	259,200	9,331,200	129,164	4,649,904	130,036	4,681,296
Truck J	30	172,800	6,220,800	84,256	3,033,216	88,544	3,187,584
Truck K	30	136,800	4,924,800	74,136	2,668,896	62,664	2,255,904
Truck L	25	115,200	4,147,200	66,090	2,379,240	49,110	1,767,960
Truck M	25	144,000	5,184,000	60,618	2,182,248	83,382	3,001,752
Truck N	30	115,200	4,147,200	64,382	2,317,752	50,818	1,829,448
Truck O	25	115,200	4,147,200	79,364	2,857,104	35,836	1,290,096
Truck P	25	115,200	4,147,200	77,444	2,787,984	37,756	1,359,216
Truck Q	30	264,000	9,504,000	135,180	4,866,480	128,820	4,637,520
Truck R	64	595,200	21,427,200	251,390	9,050,040	343,810	12,377,160
Truck S	40	129,600	4,665,600	74,798	2,692,728	54,802	1,972,872
Truck T	50	172,800	6,220,800	94,476	3,401,136	78,324	2,819,664
Truck U	25	312,000	11,232,000	172,340	6,204,240	139,660	5,027,760
Truck V	50	211,200	7,603,200	125,184	4,506,624	86,016	3,096,576
Truck W	30	456,000	16,416,000	218,180	7,854,480	237,820	8,561,520
Truck X	25	230,400	8,294,400	120,208	4,327,488	110,192	3,966,912
Truck Y	45	129,600	4,665,600	77,872	2,803,392	51,728	1,862,208
Truck Z	25	129,600	4,665,600	67,792	2,440,512	61,808	2,225,088
Truck A ₁	30	100,800	3,888,000	58,576	2,108,736	42,224	1,520,064
Total	704	11,727,360	422,184,960	6,721,808	241,985,088	5,005,552	180,199,872
Mean	26	434,346	15,636,480	248,955	8,962,410	185,390	6,674,069

Notes: PMV = public motor vehicles, N = 36 (total no. of PMVs operating on route 600 passing via (Bereina-Malalaua Highway), n = 27 (size of the sample); 3 PMVs voluntarily refused to participate in the survey; 3 PMVs were off the road for major repairs or overhaul and were not included at the time of the survey. Source: From author's PMV survey (2002).

the main Hiritano Highway to effectively participate in socio-economic activities. This ensures a steady flow of goods and services between rural and urban areas; however, such initiatives are often thwarted by bureaucratic red tape, hampering rural development where bulk of the population lives. While SUAS in Gulf Province appear to be the immediate beneficiaries of the recently constructed Bereina-Malalaua road, commuters in nearby Central Province, though were connected to Port Moresby well before, appear to be stagnating in real benefits distribution and sharing because of the unsealed sections of the road, which requires resurfacing and bitumen tar sealing, if the pitiful situations afflicting people of the western part of Central province is to be collectively addressed.

Based on the assessment made with respect to criterion III, the main beneficiaries of the road project appears to be the rural PMV transport businesses operating on route 600 serving the SUAS. More specifically, general commuters and sago farmers, the other two beneficiaries of the road utilize these transport services, which have been quite regularly facilitated, owing to frequent trips, on at least three return trips per week on average. The net incomes for PMV operators, as shown in Table 7 attempt to provide how this vital rural transport service industry is gaining from the post-road construction era, whilst moving people and rural agrarian products from SUAS in Malalaua area to Port Moresby and vice versa.

Socio-economic effects on SUAS with respect to transport accessibility in the past

Transport accessibility in the past is not a difficult parameter to measure as where the road now meanders through was really a pool of marshy peat soils and that travel between other hamlets and villages within the province was only made possible through river transport, using motorized dinghies or canoes. To travel to Port Moresby before the construction of the Bereina-Malalaua road, sago farmers had to travel via waterways to *Lavare*, an embarkation and disembarkation point for commuters to Port Moresby. *Lavare* was extensively used in the past by PMV operators, but is no longer used as transit point for moving in and around a maritime province like Gulf nowadays. The road from *Lavare* in Iokea village (Moripi census division) used to be another trunk road from the main Hiritano Highway and many Gulf people relied on it for their transportation needs before. To illustrate the case here, people from, for instance, Heatoare, Savaiviri, or the Lese and Popo villages travelled by river and sea to get to *Lavare* to further their journey to Port Moresby during the pre-Bereina-Malalaua road construction period. Transport accessibility in the past for marshy land dwellers in SUAS was epitomized by waterway transport system and indicated quite clearly that moving sago starch, using waterway transport to other transit points for transporting by road transport was both a deterrent because of unpredictable weather patterns, causing travels to be hazardous and the movement itself absorbed so much time, to the dismay of SUAS before.

Socio-economic effects on SUAS with respect to transport accessibility at present

Transport accessibility at present has generally improved for SUAS in Malalaua District, owing to the fact that Port Moresby is now only five hours away, unlike the past

meandering river systems to get there. The ratios on sago palm utilization, be it for self-consumption, or for sale, in a ratio of 3:7, alludes to the probability that more sago would be sold, then to be kept for self-consumption because it is fairly convenient to transport traditionally processed sago starch to city markets through the road transport system nowadays (LAUFA 2004). The notion of trade promotion between SUAS in Malalaua District and that of Port Moresby city has experienced a new threshold of supply-demand situation, only made possible through the road, which undoubtedly is the causal link for explaining this production and consumption behaviour of rural and urban dwellers.

One way of ascertaining transport accessibility of people in SUAS in Malalaua area is to gauge commuters' purpose of travel, let alone, determine their present perception of the Bereina-Malalaua road. Of the 38 respondents (Table 8), who voluntarily participated in the rural PMV survey conducted by the author in 2002, about 44.7 % of the respondents generally expressed that the road was well constructed, while a further 52.6 % observed that the road was not so well constructed. A very small portion (2.6 %) of the respondents actually only one person thinks that the road was poorly constructed. Equally important from the viewpoint of the purpose of travel to Port Moresby, can be judged from the responses made in Table 9, whereby, about 78 % of the respondents have an economic reason for travel, while the remainder, could be just general commuters using the rural

Table 8. Commuter's perception of the Bereina-Malalaua Road (passing through Route 600).

	Parameters	No. of respondents	Percentage (%)
I.	Well-constructed	17	44.7
II.	Not so well constructed	20	52.6
III.	Poorly Constructed	1	2.6
Total		38	100

Notes: Total no. of respondents were 38. Source: From author's PMV survey (2002).

Table 9. Commuter's reason for travel to Port Moresby (passing through route 600).

	Parameters	No. of respondents	Percentage (%)
I.	Sell sago and betel nuts	27	71.1
II.	Buy goods for trade store	3	7.9
III.	Other reasons	8	21.0
Total		38	100

Notes: Total no. of respondents were 38. Source: From author's PMV survey (2002).

Table 10. Summary of socio-economic effects on SUAS showing change factor induced by post-construction era of the road from May 2000 to present time.

	Actors in SUAS (Parameters)	Sector of society	Benefits to actors in SUAS in Malaua area
(I)	Sago farmers	Agriculture	Personal and sago starch mobility to markets in urban area
(II)	Betel nut sellers	Agriculture	Personal and betel nuts mobility to markets in urban area
(III)	General commuters	Social	Personal mobility to urban area
(IV)	Trainee doctors/Nurse	Health	Personal mobility and pharmaceutical drugs to SUAS
(V)	PMV operators	Transport	Deriving profit from rural transport services
(VI)	PMV crewmembers	Transport	Employment in rural transport sector
(VII)	PMV drivers	Transport	Employment in rural transport sector
(VIII)	Fuel drum retailers	Merchandise	Deriving profit from zoom, diesel, kerosene, petrol etc.,
(IX)	Trade store operators	Merchandise	Deriving profit from villagers in SUAS from sale of tradable food items such as rice, flour and tinned meat or fish.
(X)	Teachers and students	Education	Personal mobility and access to urban area facilities.

Notes: General commuters could be simple villagers in SUAS, school-age children, other district support services staff within Malalaua District or even as far as Ihu Raimuru and Kikori

transport service for sightseeing in Port Moresby. Of the total number of the respondents, 27 people at any one time, which represents 71 % of the commuters, are either selling sago starch or betel nuts in Port Moresby city markets.

Net socio-economic effects of the Bereina-Malalaua Road on SUAS in Malalaua area

Based on criterion (III), this study tentatively summarizes the combination of the net socio-economic benefits accruing to SUAS in the Malalaua area, considering different actor-participant situational analysis, capturing the change factors inherent in a societal transformation process within spatiotemporal conditions. The road now ultimately serves an important rural welfare function, in that, it serves as a central component of rural development whereby several key functions of a particularistic society, that of SUAS in the Malalaua area are now experiencing enhanced relations between market institutions in both rural and urban areas with regards to personal and agricultural product mobility, covering space and time. Table 10 provides a summary of these net socio-economic effects accruing to SUAS, reflecting societal viewpoint of how the road appears to be linking rural-urban actors with markets and other services within the district and elsewhere in the province.

Social philosophy of the Bereina-Malalaua Road

Social philosophy of the Bereina-Malalaua road for SUAS in Malalaua area attempts to explain the livelihood of the people and their social and physical milieu in a state of transition. The 'backward linkages' and 'forward linkages' of the Bereina-Malalaua road, showcased against the HIRSCHMAN's Circular Model (1958), reflectively show the character and rate of societal transformation in SUAS. Micro-scale traditional sago processors in Malalaua area can now conveniently sell their dried sago starch at urban markets and it is entirely up to the sago starch purchaser to either process for self-consumption or re-sells with other additives for local food markets in the city. The once idle-lying marginal marshy land with poor nutritional status in the past, which experienced very low levels of socio-economic development then, is undergoing a societal adjustment, which is an evolutionary process; quite slow, but has the potential for further development in agribusiness enterprises such as vanilla farming, cane furniture production, or even eel farming, thereby strengthening the diversity and pace of economic development. Distribution channels of rural income, courtesy of the road, for SUAS through local entrepreneurial activities as supported by different actors and mutually reinforced by rural-urban economic interactions, somewhat reflects the diversity and pace of rural development from socio-economic considerations.

Spatiotemporal attributes of the road

At least two critical change factors inherent in SUAS transformation process, which aptly describes the nature of its political economy of development, could be attributed to the following key elements. Firstly, without the road and even predating capitalism, backward rural SUAS had an elaborate barter trade, the *Hiri Trade*, with the Motuans in Central Province. Movement of sago starch from Malalaua people to Motuan people was undertaken on sea voyages, utilizing the north-westerly trade winds called, *Lahara*, (in Motu

language), whilst clay pots were imported into the Malalaua society, utilizing the south-westerly trade winds called, *Laurabada* (in Motu language). This changed after the late 1950s. After the Hiritano highway was constructed during the late 1970s, only a few sago farmers brought sago starch to Port Moresby from *Lavare* transit point to other villages in Gulf Province then. As of May 2000 and up till now, time lag and the transition from sea voyage barter trade to a relatively small-scale supply of sago starch to Port Moresby markets through the Bereina-Malalaua road represents a significant socio-economic change, though the motivation to trade surplus dried sago starch, was quite evident and continues to be so, even today. This was ultimately undermined by lack of proper road network system in place prior to the period May 2000.

Secondly, a key spatiotemporal attribute of the Bereina-Malalaua road relates to land use change after it was completed. Vacant parcels of traditionally-owned lands along the road, interestingly enough, are now the sites of traditionally built houses and more are being planned to be built in the coming years, as many people want to be closer to the road and access transport and other vital services regularly. This is an attitudinal change, somewhat induced by the post-road construction era and may eventually lead to increased economic activities of smaller scale timber processing. The economic geography of SUAS in Malalaua area, to an extent, with the road has transformed and is poised for more socio-economic changes to its land use functions, whereby those who were not too keen on land use management for cash crop farming, or for establishing poultry or piggery projects, will now face social and resource pressures, as those 'city returnees' such as retired or re-trenched public servants also have equal stake in traditionally owned natural resources, which includes land. It means that once hunting grounds for game and horticultural land for growing bananas, cassava may well be transformed into house resettlement schemes, which is now an on-going trend within SUAS in the Malalaua area. New settled communities will emerge from within SUAS, which may have different needs, say, more commercially oriented in scope. Land use management, therefore, will also accompany changes to the physical and social structure with regards to the exercise and controlling rights of land. This depends on the nature of rights as afforded to an individual, or a particular clan possess in the Malalaua area.

Conclusions

Having a road is not a luxury; it is an essential need, if it serves the transportation needs of the people who rely on it for transporting goods, links to other vital services such as health and education facilities, let alone providing means to market sources for cash income. Depending on spatial and population distribution within a locality, it is quite an essential requirement for having good roads in the first place. For the SUAS in Malalaua, it was a virtual impossibility to enhance personal and product mobility for agricultural products such as dried sago starch, betel nuts and other produce prior to the completion of the road project in May 2000, owing to topographic nature, which physically limited

opportunities for economic development in the area. Science and technology (S and T) application through a yen loan infrastructure project made the transition from backward rural SUAS to societies that possess the capability to improve further in time. Socio-economic importance of the Bereina-Malalaua road, therefore, cannot be overemphasized, but should be seen as entry points for developing other vital life-sustenance activities so as to support rural-based small-scale industries, that may otherwise be difficult to reach, considering time and its other concomitant discomforts.

This paper provided analyses and syntheses of how Japanese ODA has made an impact on PNG micro-economy, of which an attempt was made to clarify how SUAS reflectively adopts to proactively planned and implemented infrastructure projects in Malalaua district in Gulf Province of PNG. This study critically examined the Japanese yen loan co-financed Bereina-Malalaua road project in retrospect and prospect. Socio-economic effects of the road were assessed through small-scale rural PMV surveys. A total of 36 PMVs operate on the Bereina-Malalaua road, of which 27 were interviewed. It was established that a return leg trip between SUAS and Port Moresby City fetches on average about PNG kina 662.96; whilst a forward leg trip from Port Moresby City to SUAS earns about PNG kina 392.59, which critically depend on carriage (freight-related charges) of perishable goods such as sago (*Metroxylon* spp.) and betel nuts (*Areca* spp.) and, more critically on the receipt of passenger fares to and fro. On the whole, the net income earned by a rural PMV operator represents 42.7 % of the total revenue, whilst the other 57.3 % is absorbed by operational costs (labor wages, fuel costs, repair and maintenance).

Finally, it can be concluded that the Bereina-Malalaua road serves to negate the disenchantment of fragmented societies, owing to natural limits imposed by the physical environment, wherein a vast area is covered in marshy, marginal swampy lands, which typifies the situation for SUAS in Malalaua area. The results of this socio-economic study show that the three immediate observable beneficiaries of the road project in SUAS can be easily identified with PMV operators, rural agricultural producers and the general travelling public. These beneficiaries of the road project ascribe to criterion (III) of the yen loan projects, therefore, justifiably suggests that the Bereina-Malalaua road project serves as a central component of sustainable rural development prospects in SUAS in the Malalaua area of PNG.

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