

The Impact of Rural Access Roads in Sāmoa: The Case of Vaitele Street (Lalovaea-Lepea) and other Selected Roads

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Abstract

Sustainable road infrastructure is a priority development goal to meet land transport demands for rural and urban Sāmoa. It supports inclusive social and economic development through sharing the benefits of economic growth to lessen poverty in rural and urbanized part of the country. Access road projects, for example, are intended to encourage and support village agriculture as prioritised in the Strategy for the Development of Sāmoa 2008–2012 and 2012–2016. Similarly, the drive to meet Sāmoa's obligation towards achieving the Millennium Development Goals by 2015 translates into transport infrastructure priority investment areas for the government. As such, the study explores the impact of selected road infrastructure on the social-economic welfare of households residing near and within the vicinity of these donor funded road projects.

Keywords: Sāmoa, rural, infrastructure, government, development

Introduction

Infrastructure¹ is a long term asset that demands continuous upgrading and maintenance. Transport, energy, water and telecommunications are crucial to household existence and economic production. In the small states of the Pacific, such as Sāmoa, infrastructure plays a critical role in national development. Improvements in road and transport enhance connectivity between Apia and its hinterland and in turn promote access to key services such as health and education. This paper explores the socio-economic impact of upgraded road infrastructure on selected households in urban and rural Sāmoa. The first section outlines the issues and challenges related to road infrastructure development in small island states. The second section discusses the benefits of rural road improvements to rural communities, and the third presents the conceptual framework. The fourth section details the methodology and the fifth discusses the findings.

Issues in Road Infrastructure Development

First, infrastructure provides for the economic base of development in forging connections between islands in the Pacific and their main trading partners, New Zealand and Australia. These connections are in the form of shipping and air travel. For almost fifty years now, this inter-connectivity has proven critical in the movement of goods and people across the region (ESCAP 2011). In addition, in-country connectivity between urban Apia and rural Sāmoa has improved in the last twenty years with access to water and electricity at almost 100 percent. This is higher than its larger wealthier neighbours Papua New Guinea and Solomon Islands (World Bank 2004: 152). Road expansion projects in Sāmoa in the last 10 years have contributed to increasing efficient and effective travel around the islands where people can now commute to work from outside the vicinity of Apia and peri-urban Apia.

Second, the spatial and demographic impact of infrastructure is reflected in the growth of urban populations in and around Apia. The 2006 Census survey highlighted north-west Upolu as the most densely populated region on the island. In the 2011 Census, 62,390 persons or 33 percent of Sāmoa's population resided in north-west Upolu (Sāmoa Bureau of Statistics 2011: 4). This is attributed to high connectivity to the international airport and ferry services to the larger island of Savai'i (Sāmoa Bureau of Statistics 2006:23). As of 2009, the Sāmoa Ports Authority resumed ferry services between Aleipata and Tutuila utilising the Satitua Port located in the south-east. There was a public outcry in terms of extra costs to the travelling public, especially those from Savai'i and western Upolu who are required to travel for over 60 kilometres to Aleipata to be ferried across to Tutuila. The decision was justified on the grounds that it would reduce travel time between American Sāmoa and Sāmoa. Elsewhere in the region, cities are known to drive economic growth where 70 to 80 percent of GDP is being generated (Storey 2006). As urban centers expand, infrastructure needs also to keep up with demand for services to allow cities and urban centers to become competitive. Infrastructure is also linked to spreading the benefits of growth to rural populations to improve their livelihoods. The growth of Apia brings with it a host of infrastructure challenges. These challenges are explored by looking at the impacts of arterial and access roads on those living close to and using these road services.

Third, is the issue of environmental challenges. Roads and road networks have potentially important environmental impacts. Often there are negative impacts, but there are also positive impacts such as in encouraging agriculture in rural regions. For instance, opening up village lands through tar sealing previously existing access roads (*auala galue*) encourages primary production at the village level. The villagers themselves pointed this out as a positive outcome of rural road rejuvenation projects. As stated before, economic growth and urbanisation impact on environmental issues, and infrastructure helps drive economic growth and urbanisation. The challenge in this respect is to manage the environmental impacts of infrastructure at the village-household level.

The fourth factor in infrastructure delivery is the political dimension. Low population densities and challenging topographies in the Pacific countries complicate infrastructure provision and generally are seen as a comparative disadvantage to private sector participation in infrastructure provision (Mellor and Jabes 2004). The government of Sāmoa supported by its development partners is the sole provider and regulator of infrastructure. The implementing agencies are the state-owned enterprises such as the Sāmoa Ports Authority, Sāmoa Water Authority and the Land Transport Authority. This model has often been criticised for failing to create an environment of accountability on the part of implementing agencies (Ahmadu 2005).

Delivering infrastructure services is critical in meeting the Millennium Development goals (MDGs) and alleviating poverty pockets in the Pacific (Asian Development Bank [ADB] 2012; AusAID2009). This requires resources for investment, operation and maintenance. Infrastructure is unlike other key services such as health and education because large scale transport services demand higher capital intensity, carry high risk, and long pay-back periods but enjoy substantial economies of scale (Caldron, Cesar and Serven 2004). Once constructed, infrastructure assets, such as huge pipelines and underground cables, water treatment plants and their extensive water distribution systems, need constant repair, upgrade

and maintenance and in the long run, they define and dictate where and how people live and work. Infrastructure mistakes can return to haunt government and tax payers in the long term. As such, long-term vision and planning is crucial.

Previous studies on rural transport services in Malaysia, India, Philippines, Nigeria and Western Sāmoa concluded that there have been inadequate consultations about the needs and requirements of the rural people (ADB 2012; Barwell et al. 1985). The transport needs of rural people range from plantation-farm transport between farmers' homes and their fields, water sources and the market. In Africa, women spend a lot of time head-loading goods on foot, whereas in other parts of the developing world, carrying devices such as a shoulder pole, back pack frame, wheel barrows, handcarts and bicycles that are appropriate to local level transport are being used. Given there is so much travel by foot in the rural areas, improving the condition of foot paths and footbridges can have a significant impact on the efficiency of rural travel and transport (Barwell et al. 1985). In many villages in Sāmoa, shoulder poles are used to carry coconuts, root crops and firewood from the plantation.

A series of studies have provided much insight into the socio-economic changes related to investment in transport infrastructure in the developing world (Devres 1980; Howe and Richards 1984; World Bank 1994). In Sāmoa, road expansion projects since 2007 are an attempt to build up the country's base infrastructure to precipitate growth. Improved roads are expected to generate market activity and generate economic linkages that boost agricultural productivity, improve land use decision making and stimulate farm diversification. Elsewhere, rural roads arguably are critical in raising living standards in poor rural areas (ADB 2012; Gannon and Liu 1997).

Sāmoa is being flagged in the Pacific as the socio-economic success story in meeting the MDGs and the yet to be realised accession into the World Trade Organisation (Pacific Island Trade and Investment Commission 2008: 2). However, a review of Sāmoa's progress towards achieving the MDGs by the Commonwealth Foundation (2013) shows a different picture. The country remains vulnerable to global economic shocks and natural disasters such as the 2009 tsunami and 2012 tropical cyclone Evan that caused widespread damage to key infrastructure, particularly roads and water supply. Sāmoa's integration into the fast pace of international competition for capital and resource markets may have spurred the many changes introduced in the last five years such as the change from right- to left-hand driving known as the road switch, time-change, and massive expansion in infrastructure—roads, electricity, and telecommunications. (Sāmoa Bureau of Statistics 2011: 136–142). Having said all that, the challenge for Sāmoa rests in assessing how these infrastructural developments, particularly roads, are impacting on users, that is, the ordinary people in urban and rural Sāmoa.

Sustainable road development is a priority development goal to meet land transport demands for rural and urban Sāmoa. It supports inclusive economic development and sharing the benefits of economic growth to reduce poverty. Access road projects initially were intended to encourage and promote village agriculture (Ministry of Finance [MoF] 2012). At the same time, the need to meet Sāmoa's obligation towards achieving the MDGs meant that road transport infrastructure was also part of a government priority area of investment (Government of Sāmoa 2010). The most immediate poverty-alleviating effect of investing in a road is the local employment created in its improvement and subsequent

maintenance. If suitably targeted, the poor can benefit most directly through earnings. Studies elsewhere in Bangladesh and Sub-Saharan Africa show labour-intensive road works to be 25 to 30 percent cheaper than comparable capital intensive methods, and employ five times more labour which can be wage targeted on the poorest group (Howe and Richards 1984; Keddeman 1997).

While there are no similar data found anywhere in the Pacific, anecdotal evidence suggests similar experiences in Sāmoa. The sub-contraction of road construction and maintenance work in Sāmoa began in the 1990s in response to public sector reforms and restructuring of government ministries where the former Public Works Department became the Ministry of Works, Transport and Infrastructure. Benefits to road users such as farmers, school children, public servants, and village communities need to be quantified to determine whether people are better off, as stipulated in the planning and implementation stages of road construction and rehabilitation. Given the lack of previous work on impact studies of this nature in Sāmoa, this research exercise provides primary data on the benefits accruing to selected urban dwellers living along the Lepea-Lalovaea section of the main Vaitele street and selected rural *auala galue*. The Lepea-Lalovaea street is a section of the main west road connecting Apia Central Business District and the north-west part of Upolu island to the Faleolo international airport (Refer to map in Appendix 1). This study examines the socio-economic impact on households residing within the vicinity of this improved section of the road.

Benefits of Rural Road Improvements to Rural Communities

Similar impact studies conducted in the Asia-Pacific produced some positive results in terms of benefits to rural communities from road upgrading and maintenance (Hughes 2005). For instance in Papua New Guinea, small-scale agricultural sellers, particularly women as the major producers of market produce, were able to gain ready access to markets, and the road doubled as an important element of the marketing network.

Increases in income earned are directly related to improved or upgraded roads. Evidence from rural Asia suggested that upgraded roads increased market-supplier access and temporary employment on road improvement projects, which raised the income of poor rural households enabling them to pay for school fees and a whole range of other consumer goods (ADB 2002). Similar studies in Africa (Lombard and Coetzer 2008) point to a positive correlation between economic growth and improved road networks.

Then there are the benefits to service delivery, such as health, education and agricultural extension services to remote rural villages. Studies from Papua New Guinea pointed to improvements in health and education delivery to remote parts of the country either through road maintenance, or rehabilitation and upgrading (Hughes 2005). The extent of access and the amount/measure of benefit depends upon the level of road improvement. For instance, road maintenance ranges from filling in potholes to re-sealing pre-existing asphalt pavements or re-gravelling. Rehabilitation involves major road works that require reconstruction, removal and replacement of pre-existing asphalt base layers. The quality of road repair works in Sāmoa and elsewhere in the Pacific is tested during the wet season; likewise, accessibility and

frequency of travel is affected where some parts of rural access roads in this study sustain extensive damage due to heavy rains.

Having said that, the construction of new roads and/or rejuvenating existing roads present economic opportunities for residents. As will be demonstrated in this study, the upgrading of road infrastructure facilitates accessibility and ease of population and product movement across space. Populations taking advantage of road improvement to maximise income earning opportunities is an economic response mechanism to the state of being poor whether it is in the Pacific, Africa, or Asia.

Conceptual Framework

Transport geography has received renewed interest among geographers since the 1990s in response to the rapid and increased globalisation of trade, the international division of labour and multinational corporation activities that demand the movement of goods, services, resources and people between different locations (Rodrique et al. 2009). Transport infrastructure (roads), terminals, equipment and networks take up a critical chunk of space which is the basis of a complex spatial system (De Blij et al. 2007: 409). Given that geography seeks to explain spatial relationships, transport infrastructure and networks therefore are important because they facilitate and impact on these interactions.

Two fundamental dimensions of transport geography that are important in this study are accessibility and mobility. Accessibility and access are different concepts. Accessibility, for example, is a relative concept based on space, place and income status (Rodrique et al. 2009). A public motorway can be accessed by everyone from various entry and exit points as long as the user has a car or uses public transport. The moment the government imposes a tax or toll fee, then the question of accessibility emerges. In contrast to accessibility, access implies a universal access to the established transport systems since no particular user can have a competitive advantage over others; in other words, access is the same for everyone—trucking vehicles or individuals and families with small cars.

There are other factors that affect the socio-economic impacts of roads for the people and community. These are the amount of traffic, road condition, speed limits, load restrictions, road width and road maintenance.

The study reported in this paper explores the socio-economic impacts of the newly expanded Lepea-Lalovaea trunk road and selected rural access roads. Relying primarily on classical road assessment tools such as traffic movements, vehicle operating costs and passenger prices to assess impacts would not be sufficient. As such, the socio-cultural, economic, environmental and institutional factors that determine how people respond to a road, and which shape their livelihood constraints and opportunities are examined.

Methodology

The study draws upon themes and concepts from the discipline of social science, economics, transport geography and environmental science. A simple quantitative approach was used in the collection of primary data through structured and semi-structured questionnaires, designed so that optimal information regarding actual and perceived benefits was obtained.

Qualitative participatory appraisal methodologies, including focus group discussion sessions and key informant interviews, were used to support the quantitative data that was collected. Focus groups are important in stimulating debate and generating interaction in the group, where one group member might remind or validate information that otherwise would have been overlooked by the interviewer. *Talanoa* methods were used because the respondents were Sāmoans and conversing in the vernacular allowed for the free flow of information between researcher and participant (Vaiotei 2006:21). *Talanoa*, situated within a constructivist paradigm allows both the researcher and participant to contribute to the discussion, where both can learn from the experience (Prescott 2008: 131). These research tools are encompassed in the 'case study' approach that is adopted to gather the data required for this study.

The case study approach is used to examine the real life experiences of a selected number of urban and rural households whose livelihoods have been impacted by state-funded road improvements. There are two important reasons for choosing the case study approach. First, the approach involves the application of many tools and techniques in the data-gathering process as suggested earlier. This enables a sound and methodical collection of quantitative and qualitative data from a small study sample. Second, is the constructivist idea that underpins the case study method (Yin 2003). The constructivist paradigm is helpful to the study because it recognizes the importance of the subjective human creation of meaning, but does not reject outright some notion of objectivity (Baxter and Jack 2008: 545). This is ideal for the study population of 15 urban households and 10 rural households, where the participants can describe their realities and experiences in relation to road improvements in their area that may reflect similar experiences of Sāmoans residing in other parts of the country. The objectives of this case study are as follows:

- i. to profile the socio-economic impacts of *auala galue* roads on selected villages in Sava'i and Upolu;
- ii. to gauge the invariable socio-economic impacts of the Lepea-Lalovaea trunk road on selected residents (Vaimoso, Vaimea, Taufusi, Togafuafua) of the Apia township;
- iii. to bring together in one document a comparative analysis of a cross-section of road user experiences, and how public infrastructure (roads) have impacted on their socio-economic well-being; and
- iv. to provide preliminary guidance on strategies and activities that can be used to inform government road expansion plans in the future.

Findings

A total of 21 individuals from 15 urban households participated in the survey, where 47.7 percent (10) were females and 52.3 percent (11) were males. In the rural sample, there were

16 persons interviewed from 10 households with an equal number of females and males. Their ages range from 18 to 71. All respondents were asked to identify the type(s) of income-earning activity the household was engaged in. Only the head of the household and one other household member were interviewed. As shown in Tables 1 and 2, there is a wide range of activities, from formal small businesses to road-side stalls, to formal employment and subsistence production.

Table 1: Demographics of Urban Participants

Household and/or other member of Household	Gender	Age	Type of Activity	Frequency of Road Usage-access
1 [Vaimoso-2] HH +other	M,M	60,28	Taxi operation	Daily,24/7
2 [Vaimoso-1] HH	F	36	Small shop	Daily, except Sundays
3 [Vaimoso-2] HH +other	M,F	52,47	Road stall	Daily
4 [Vaimea-2] HH +other	M,F	56,52	Furniture shop	Daily
5[Vaimea-1] other member	F	35	Furniture shop	Daily
6[Vaimea-1] HH	F	68	Shop	Daily
7 [Taufusi -2] HH +other member	M,M	53,25	BBQ stall	3 days per week
8 [Taufusi-1] HH	F	41	Sewing shop	Daily
9 [Taufusi-1] other	M	24	Taxi operator	Daily
10[Taufusi-2] HH+other	M,F	31,19	Elei printing	Daily
11[Taufusi -1] HH	F	56	Sewing shop	Daily
12 [Taufusi-1] other	M	19	Charcoal making	Daily
13[Togafuafua-1] HH	M	38	Used tyre shop	Daily except Sundays
14[Togafuafua-1] other	F	25	Canteen	Daily
15[Togafuafua-2] HH+other	M,F	36,29	Ice pop making	Daily

HH=Head of Household, Other = one other member of the Household.

Table 2: Demographics of Rural Participants

Household and/or other member of Household	Gender	Age	Type of Activity	Frequency of road usage/access
1[Vailoa(Aleipata)-2] HH +other	F,F	48,21	Fresh produce stall	3–4 times per week
2[Vailoa (Aleipata)-1] other	M	20	Coconuts seller	Weekends
3[Vailoa-2] HH +other	M,F	38,27	Root crop farming	Daily
4[Vailoa-2] HH +other	F,M	69,18	Handicraft and weaving	Daily
5[Satapuala-1] other	M	29	Hotel security	Daily
6[Satapuala-2] HH+ other	M,F	35,33	General farming	Daily
7[Satapuala-2] HH + other	F,F	71,24	Weaving, hotel work	Daily
8[Safotu-1] other	F	22	Hotel work	Daily
9[Safotu-2] HH +other	M,M	52,19	Fishing, farming	Daily
10[Safotu-1] HH	M	59	Shop operator	Daily

The common element that threads these economic activities together is road access and usage. Access to the main road (as in the case of urban respondents) and access roads (rural respondents) plays an important part in the economic opportunities for the identified

respondents. The type and nature of the economic activity demands a certain number of consumers and sufficient traffic movement to facilitate the exchange of goods and services to generate maximum income for sellers. For example, in the case of Household 2 in Table 1, the economic activity is a small shop (estimated stock value SAT\$28,000), and the respondent indicated a significant increase in cash sales after the newly improved four-lane Lepea-Lalovaea main road. She noted that Thursday and Friday takings before the road improvement project were around SAT\$500 and SAT\$700 respectively, but since the road extension, sales on these particular days were around SAT\$900 and SAT\$1000. In addition, there was also a marked increase in the number of customers traveling by car stopping to buy small items like cigarettes, water and alcohol. Improved parking space is another key factor that has allowed for the increase in vehicle travelling customers.

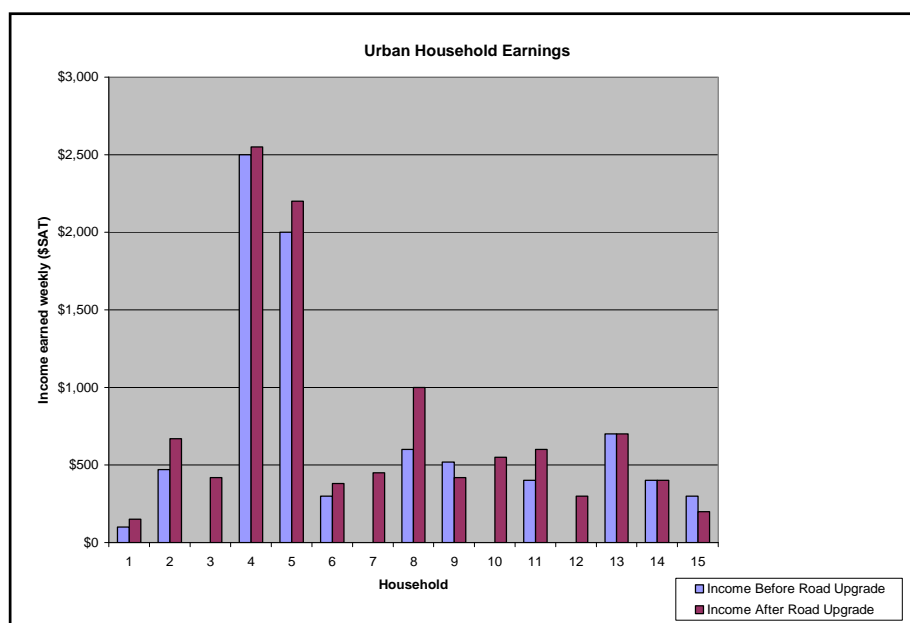
Road side operations (see Table 1, Households 3, 7, 10 and 12) were new small-scale ventures set up after the road expansion project. According to the respondents, the opportunity to earn extra income and cut back on costs of transporting vegetables, charcoal, firewood and other items to the Fugalei market presented itself as the newly upgraded road began to take shape. They observed that the travelling public would stop and buy these basic items, if they were available, to avoid going into the congested Fugalei area, and to benefit from cheaper prices and fresher vegetables and barbecue (BBQ) food compared to the main market.

Similarly, other small businesses (see Table 1, Households 1, 4, 5, 6, 8, 9, 11, 13) existed before the road improvement project, but since the road expansion, these businesses have also made some improvements and extensions in line with the increased volume of traffic and potential customer base the upgraded road would bring. The second-hand (used tyre) tyre shop operator, for instance, invested in expanding parking and workshop floor space in response to potential demand for tyre services given the increased number of vehicles as a result of the road change in 2009 and the number of taxi operations. (There are six taxi stands along the study area, but only two were included in this study). A survey of cash earnings was the variable used to measure any correlation between the road expansion upgrade and household-individual income. In relation to income, the respondents were asked a question about their earnings in the 4–5 months before and after the road upgrade. Figures 1 and 2 show the respondents' earnings on a weekly basis before and after the road upgrade.

There is a significant difference in income earned before and after the road upgrade; 47 percent (7 out of 15) of urban households indicated some significant improvement in earnings as a result of the road upgrade (see Figure 1 Households 1, 2, 4, 5, 6, 8, 11). Other factors that may impact on the respondents' earnings as indicated during the focus group discussion include firstly, the type of activity. For instance, the taxi operation (Household 1) recorded a slight increase in the period of the survey, but according to the owner, income fluctuates primarily due to the fact that there are too many taxi businesses on this stretch of road. His sentiments were reiterated by Respondent 9, also a taxi operator, who reported a drop in his income during the study period. The second factor that affects income other than the road

upgrade is the time of day in which the economic activity takes place. Respondents 8 and 11 operate sewing-tailoring micro-enterprises from home. The hours of operation are flexible, and clients prefer after work hours or during low peak traffic hours, such as mid-morning (11am) and early evening (6pm) after the work rush hour.

Figure 1: Urban Household Earnings



Households 3 (road stall), 7 (BBQ stall), 10 (elei printing), and 12 (charcoal making) in Figure 1, are new ventures that started operations after the road upgrade. The respondents are rural migrants living with family in the area, and these informal ventures were intended to utilise the opportunity to earn a living while awaiting formal employment in Apia. Similarly Respondents 14 and 15 operate street food stalls or canteens selling ice-pops and snacks to school children, and income varies depending on the number of informal operators and the existence of school-operated canteens.

Table 2 and Figure 2 show the demographics and earnings for rural participants. The study indicated that economic activities involve self-employment among both men and women such as general farming, trading, fishing and weaving. Alternative economic activity in the form of formal employment in hotels and beach *fale* operations provides some form of regular income (Households 5, 7, 8). The respondents were queried about the ‘significance’ of and the ‘need’ for an improved access-feeder road in their villages. The responses are summarised in Table 3.

Figure 2: Rural Household Earnings

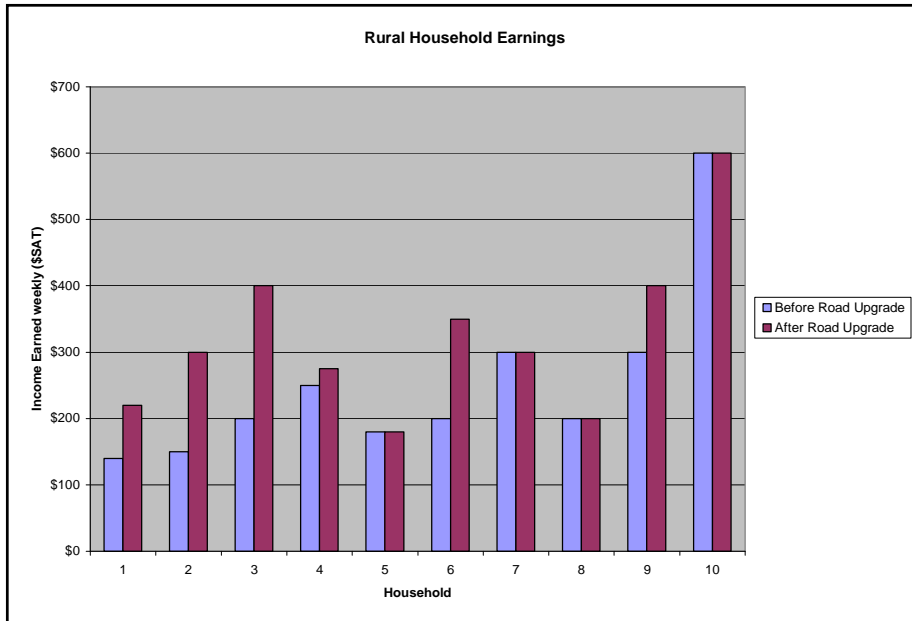


Table 3: Rural Responses to Questions on the Importance of, and need for access roads.

Question	Response: Yes	Response: No	Not Sure - No Response
Is the access road important?	13	-	3
Is there a need for an access road in your village?	14	-	2

The majority of rural respondents (81.3 percent) believed that access roads are very important and that there was a need (87.5 percent) for paved access roads in their villages. The reasons underpinning the need for access roads are reflected in the following comments during the focus group ‘*talanoa*’ session:

... we have moved inland, because the government said it is safer from the tsunami ... so we need good roads to link up with the main road. (Rural Respondent 2)

... our plantation is 100 or so meters from the main road, we have a pick-up from my older brother in Hawaii, as you can see, now we can take the pick-up to the plantation, transport our family, to and from ... 100 plus acres of our family land going up to the mountain range, so I am thankful to our MP and the government, for these two new roads ... yes. (Rural Respondent 3)

... more than half of our village lands are inland, so we definitely need good tar sealed access roads, and we have three, well, we have a big village anyway, and I work at Aggies resort, but I live inland, so, for me and other people of my village, we don't have to walk all the way to the main road to catch the bus, we are serviced regularly by two buses ... (Rural Respondent 7)

... I'm grateful to our MP for voicing our need to government, this has been a long standing issue, the old access road was a dirt road, during the wet season, it is completely useless, but, as you can see, we can come to the hotel and sell our produce, come to church, go fishing ... it is much easier and cheaper now with our tar sealed access road connecting the coastal and inland parts of our village ... (Rural Respondent 9)

The few who did not respond to the question elected other members of the study group to speak on their behalf out of cultural respect for the views of older or senior persons within the study sample.

Impact on life patterns

Respondents reported that the improvement of main roads and rural access roads made life easier for them, in addition to the impetus given to people living in the vicinity to set up businesses (see Table 1: Households 3, 7, 10, 12 and Table 2: Households 1, 10). For the rural respondents, the access roads provided the impetus for road-side economic activities such as road-side fresh produce stalls and a small general store. Investment in rural access roads has indeed translated into income generating opportunities for the respondents. The benefits of paving rural roads extend beyond making traffic (by foot and vehicle travel) easier and less costly. 31 percent (5/16) of rural respondents support the view that paved access roads translated into improved access to schools and district health centres as well as improved social interaction and mobility, which are important for social and economic development. For instance, 19 percent (3/16) of rural respondents belonged to church and village youth groups and village social organisations (*'autalavou* [youth], *'aufaipese* [church choir], *aualuma* [women's group], and *taulele'a* [untitled men social organisations]). They indicated how the road has facilitated ease of travel to fulfill their social obligations to the church and the village. Likewise, those respondents employed in the hotel and hospitality industries find commuting to and from work much easier with paved access roads (see Table 2: Respondents 5, 7, 8). 19 percent (3/16) were satisfied that the paved roads meant that they do not have to put up with the dust from the unsealed road anymore, while the other 13 percent (2/16) were only too happy that the sealed road adds to the aesthetics of their village. The repetitive activities associated with daily living in the village are somehow easier to cope with given the newly improved village access roads.

Travel time to Apia has been reduced significantly compared to the 1970s. As is to be expected, the intensity of communications and information exchange is much greater and improved with regular bus and taxi operators within the neighbouring villages providing an alternative to travelling by bus. Upgrading rural access roads has impacted on the travelling population's behavioral responses in terms of the frequency and timing of trips. This is evident across the country where the number of registered buses and taxis doubled since the road change in 2009. This increase is attributed to several reasons. First, vehicle prices dropped significantly, and many relatives in New Zealand and Australia purchased cars for their families in Sāmoa. Second, the 2009 road switch indirectly influenced the increase in the number of registered taxis and buses for public transport from 245 buses and 1778 taxis before 2009 to 621 buses and 4742 taxis in the years 2010 to 2014 (Land Transport Authority 2015). Rural households residing inland can travel up to three times per day with regular bus services connecting the inland and coastal parts of the rural areas. This was confirmed by three rural respondents from Households 1, 4, and 6, who reported that prior to the improvements to

their village access roads, it took two hours or more for people to walk inland to their plantations, but since the road upgrade, families with vehicles (see Table 2, 6/10 rural households have cars) can reduce travel time to the plantations by 50 percent.

During the rural focus group discussion sessions, respondents indicated some indirect benefits where a couple of households not included in the study have set up small businesses, such as a small village store, to make the most of the rehabilitated access road. Indeed, the road was reported to be a factor in their decision to start the business.

Problems associated with road usage

On the question of problems that may have emerged as a result of the road upgrade, the responses were mixed. 80 percent (17/21) of urban respondents agreed there had been an increase in road traffic noise levels since the two-lane road was upgraded to a four-lane road. The focus group discussion raised the question of acceptable noise thresholds for residences in and around the Lepea-Lalovaea main road. Comparing before and after experiences showed that before the road expansion project, the noise levels and amount of traffic were tolerable. Since then, there has been a significant increase in both noise and traffic volume along this stretch of road. Given the Lepea-Lalovaea road connects the north-west part of Upolu, where 33 percent of the population are concentrated, with the international airport and Apia central business district, it is expected to generate a higher volume of traffic particularly in the morning, lunch and after work peak hours.

Tasks such as crossing the road have also become quite difficult and problematic according to 29 percent (6/21) of the urban respondents. While every effort to put in place pedestrian crossings where schools and churches are located, the public seem to think that the 10 pedestrian crossings built along the 700 metre Lepea-Lalovaea stretch is inadequate. The increase in the volume of vehicles using the Lepea-Lalovaea main road raises the potential for pedestrian road fatalities given that road users have very bad or careless habits when crossing the road.³

The use of non-motorised means of transport such as bicycles and wheel barrows for local movements in and around the villages has increased due to improved access roads and walking tracks along rural roads in general. 31 percent (5/16) of rural respondents either own a bicycle, wheel barrow, infant pram, or another member of the household uses one of these non-motorised means of transport. Bicycles, widely owned in rural areas, especially among young men, offer greatly increased mobility compared with walking and can be used to carry a passenger or a significant quantity of goods. The problem arises when bicycle users are not careful on the roads; accidents are more likely to happen, and one fatality was recorded in the beginning of March 2012, when a young man was run off the main road in one of the rural areas in the south-west of Upolu.

In terms of vehicle operating costs, both urban and rural respondents reported the increased price of fuel as a major concern, particularly among the urban taxi operators. Even though rehabilitated roads facilitate efficient transport, the price of fuel and vehicle maintenance costs can pose constraints to road users. The two taxi operators in the study commented that travel between Apia and the rest of Upolu has greatly improved in the last 10 years. However, they were critical that passenger fare prices have remained the same for the

last 10 years despite the fourfold increase in the price of fuel. For instance, travel by taxi from Taufusi, Lalovaea, Vaimoso (see map in Appendix 1) to Apia central business district costs SAT\$3.00 to SAT\$4.00, and the current price of unleaded petrol is SAT\$3.02 per litre. From one taxi operator's perspective:

I have to make 50 to 60 trips per day to earn any significant monies to pay for the petrol, feed the family and other living expenses ... sometimes it pays to take a passenger to the airport which costs SAT\$60.00 one-way, provided I find a passenger from the airport into Apia, then that should cover my expenses. (Taxi Operator Household 1: Table 1)

Similar concerns about costs were expressed by the rural respondents (Table 2: Households 6 and 10) who acquired second-hand vehicles from families overseas. Improved rural access roads and rural main roads supported the extensive ownership and usage of second-hand private vehicles especially after the road switch, but the rising cost of fuel and car maintenance may impact on any direct economic gains derived from vehicle ownership in the rural context. One rural bus operator who was not part of the sample survey, but expressed his interest in participating in the rural focus group session commented on how income from his shop and remittances from his children overseas are earmarked for vehicle registration costs, and servicing given the 'marginal' earnings from the Aleipata to Apia route.

Road impact on gender

One of the issues that emerged in the focus group session related to whether there were different impacts of road improvement according to gender. Studies elsewhere have identified some major gender issues where women experience constraints on their mobility due to their reproductive work, cultural restrictions, and different travel needs from men (Mandel 2004; Porter 1995, 2000). The rural sample seem to agree that the reproductive role of women tended to dictate their mobility in terms of how far and how long they can travel from the home. Improved rural access roads required women to exercise more caution in looking after children, fearing that without their constant supervision children would run onto the road. Similarly women in the urban sample commented on how they are required to take extra care when taking young children to school during the morning rush hour along the newly upgraded four-lane road.

The study sample indicated a gender balance in the use of roads both in the urban and rural settings. There were no significant differences in 'access', 'mobility' and 'accessibility' between men and women in utilising the road network. In the urban sample, it is the type of economic activity, rather than gender that determines access and mobility along the Lepea-Lalovaea main road. Taxi operators reported a fluctuation in their income due to several factors, such as the increased number of taxi businesses along this stretch of road competing for the same amount of business (the travelling public). They were unwilling to cooperate amongst themselves to share the business in such a way as to minimise income fluctuations. This is a main determinant of access, mobility and accessibility rather than gender relations.

General welfare impacts of roads

Roads are promoted by governments and donor agencies as crucial to development and economic growth. Rural access roads for example, lead to higher land values for village customary lands. In this case those with a greater share of the village lands will be better able

to take advantage of the changes. While this study has found some positive impacts of rural roads in terms of improved access to services and markets, there is less evidence of the poverty reduction effects of rural roads. There are other variables besides road improvement, such as remittances and employment in the formal economy that may have a direct impact on poverty reduction. There is inconclusive evidence of poverty reduction as an outcome of rural access road improvement. Rural access roads can be likened to ‘a tide that lifts all boats’ rather than a highly effective means of reducing income inequality.

Improved rural access roads reinforce men’s responsibility for crop production. 50 percent of the rural households found the major household tasks of collecting firewood and fetching taro, giant yam and other root crop staples, requiring travel within the village boundaries much more bearable with improved rural access roads. Similarly, water collection, predominantly by women and children, has also been made easier with tar-sealed access roads. Tasks that require the participation of every member of the household were made more bearable.

In relation to increased agricultural productivity, evidence was scattered and inconclusive. When the Sāmoa government undertook some major upgrading of rural access roads, the idea was to facilitate ease of travel to and from village lands in the hope of revamping village agriculture. The ‘*talomua*’⁴ programme became very popular with some of the villages with upgraded access roads, but it cannot be sustained across rural Sāmoa for two reasons. Firstly, it takes more than an improved access road to boost agriculture production; other variables such as market availability and product price guarantees are crucial. Secondly, the programme is premised on competition among individual rural farmers, and not all farmers are equipped with the means and resources to undertake the demands of the ‘*talomua*’ programme. Given that the practice entails ‘giving away’ the first harvest of staple crops, from a commercial perspective, this can be a discouraging factor.

When the 2009 tsunami struck the eastern and southern parts of Upolu island, road infrastructure as well as many other utilities and lives were lost. The importance of accessibility and connectivity between the urban and rural areas was highlighted by this natural disaster. In fact, road reconstruction was one of the priority areas for development to enable the delivery of other services such as water, electricity and food supplies.

Conclusion

This study looked at selected rural access road sites and the Lepea-Lalovaea main road to discern what the impact of road improvement has been on the socio-economic well-being and development of those households residing in and around this public transport infrastructure. Urban household respondents reported marked increases in income after the main road upgrade, particularly for those with small to medium-sized businesses. This is an indirect benefit for the respondents that lends support to Goal 5: improved economic and social well-being in the *Strategy for the Development of Sāmoa 2008–2012* (Ministry of Finance 2008: 41). While urban and rural households reported significant benefits, urban households appear better off in terms of total economic returns which is expected given that urban Sāmoa generates more than 80 percent of the country’s gross domestic product and the quality of road infrastructure is far superior in the urban areas compared to rural Sāmoa.

Nonetheless, upgraded roads reaffirmed the spatial relationships between users and various services, such as health and education that produced some positive results as reported by the respondents. Improved personal transport and greater social mobility that is linked to better quality rural roads helps to facilitate knowledge and opportunity for new businesses. Above all, better access increases income which is a major social impact.

Road infrastructure is important hardware for socio-economic development, and in some cases for political bargaining. For some households in the urban sample, the road upgrade urged them to make improvements to their small businesses upon realising the potential to yield higher income earnings. The ruling Human Rights Protection Party slogan of ‘what is good for Apia is also good for the rural areas’, seems to have underpinned Sāmoa’s strategy for development in the last thirty years. Improved quality of life for all is the vision that permeates through all the seven *Strategy for the Development of Sāmoa* (SDS) documents including the current one for 2012–2016 with the theme of ‘boosting productivity for sustainable development’. For the respondents in this study, improved roads have a direct bearing on making life just a little bit better for them, and are a welcomed change that has the potential to boost their productivity and quality of life.

Notes

1. Infrastructure generally refers to roads, bridges, power supply, telecommunications connectivity that provides basic services to a community. See World Bank Publications on Interurban Transport <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTTRANSPORT/EXTURBANTRANSPORT/0,,contentMDK:20251033~menuPK:610879~pagePK:210058~piPK:210062~theSitePK:341449,00.html>.

2. *Talanoa* is a formal and/or informal conversation, exchange of ideas, knowledge, information or stories between two people or within a group (Vaioleti 2006).

3. This view emerged out of the focus group discussion where 50 percent of the group believe that pedestrians do not seem to fully grasp the potential danger of not using the designated pedestrian crossings. Road safety awareness programmes by the Ministry of Police on radio and television continuously remind the public about road safety and use of pedestrian crossings is always emphasised. Weekly Road Safety Awareness Programme on Radio 2AP.

4. *Talomua* is a tradition of presenting the first harvest of *talo* staples to the chiefs of the village. The government of Sāmoa through the Ministry of Agriculture Forestry and Fisheries and the Ministry of Women and Social Development are the responsible ministries providing technical support to the villages. See Ministry of Agriculture Forestry and Fisheries (<http://www.maf.gov.ws/>).

References

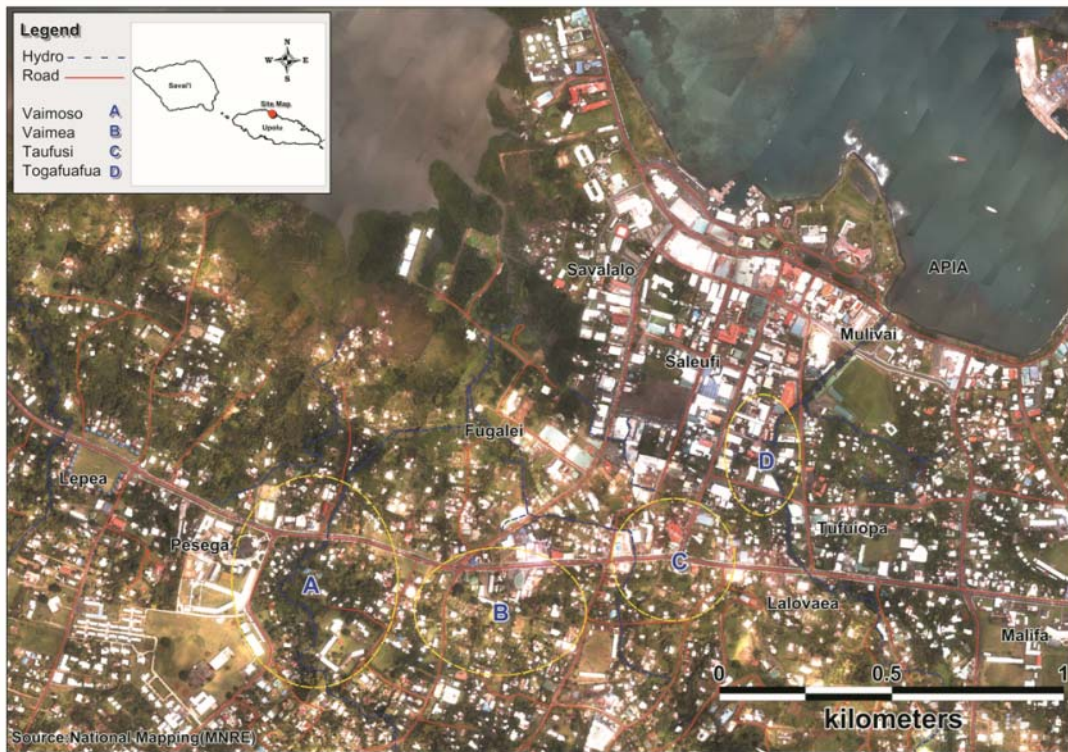
- Ahmadu, M. L. 2005. “Evaluating Public Procurement Regimes in the South Pacific: Perspectives on Fiji, Sāmoa and Vanuatu.” *Journal of South Pacific Law* 9 (1): 23–34.
- Asian Development Bank. 2002. *Impact of Rural Roads on Poverty Reduction: A Case Study Based Analysis*. <http://www.adb.org/sites/default/files/evaluation-document/35049/files/rural-roads.pdf> IES:REG 2002-15 October 2002.
- Asian Development Bank. 2012. *Infrastructure for Supporting Inclusive Growth and Poverty Reduction in Asia*. Manila: Asian Development Bank. <http://www.adb.org/sites/files/publications/29823> (accessed 10 April 2015).
- AusAID 2009. *Annual Report 2008–2009*. <http://www.ausaid.gov.au/publications> (accessed 10 December 2012).

- Barwell, I. G., Edmonds, A., Howe, J. D. G. F. and de Veen, J. 1985. *Rural transport in Developing Countries*. London: Intermediate Technology Publications.
- Baxter, P. and Jack, S. 2008. "Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers." *The Qualitative Report*. 13(4): 544–559. <http://www.nova.edu/ssss/QR/QR13-4/baxter.pdf> (accessed 13 April 2015).
- Caldron, Cesar A. and Serven, L. 2004. *The Effects of Infrastructure Development on Growth and Income Distribution*. (Policy Research Paper 3400). Washington, D.C.: World Bank.
- Commonwealth Foundation 2013. *A Civil Society Review of Progress towards the Millennium Development Goals in Commonwealth countries: National Report for Sāmoa* Commonwealth Foundation. London: Marlborough House.
- Devres Inc. 1980. *Socio-economic and environmental impacts of low volume rural roads, a review of the literature*. (AID Program Discussion Paper No. 7). Washington D.C.: Agency for International Development.
- De Blij, H.J., Murphy, A.B. and Foubert, E.A. 2007. *Human Geography: People, Place, and Culture*. (8th edn.) Hoboken, New Jersey: John Wiley and Sons, Inc.
- Economic and Social Commission for Asia and Pacific (ESCAP). 2011. *Asia-Pacific Trade and Investment Report*. http://www.unescap.org/tid/ti_report2011/download/Asia-Pacific-Trade-and-Investment-Report-2011-Update-March-2012.pdf (accessed 16 August 2012).
- Gannon, C and Zhi Liu. 1997. *Poverty and Transport*. (TWU Discussion Papers). <http://siteresources.worldbank.org/INTURBANTRANSPORT/Resources/twu-30.pdf> (accessed 12 July 2012).
- Government of Sāmoa. 2010. *Millennium Development Goals: Second Progress Report 2010*. http://www.undp.org/content/dam/undp/library/MDG/english/MDG%20Country%20Reports/Sāmoa/Sāmoa%20mdg_report2010.pdf (accessed 13 November 2012).
- Howe, J and Richards, P. 1984. *Rural Roads and Poverty Alleviation*. London: Intermediate Technology Publications Ltd.
- Human Rights Protection Party. Web page: <http://hrpp.org.ws> (accessed 10 June 2012).
- Hughes, P. 2005. *The Difficult Problem of Measuring the Village-Level Socio-Economic Benefits of Road Rehabilitation Projects in Rural Asia and Papua New Guinea. Resource Management in Asia-Pacific*. (Working Paper No. 28). Canberra: Australian National University.
- Keddeman, W. 1997. *Of Nets and Assets: Effects and Impacts of Employment Intensive Program: A Review of ILO Experience*. Geneva: International Labour Office.
- Land Transport Authority 2015. *Registered Vehicles for Public Transport 2009–2014*. Vaitele.
- Lombard, P and Coetzer, L. 2008. *The Estimation of the Impact of Rural Road Investments on Socio-Economic Development*. <http://www.roadfundtz.org/web/pdf/session%203/Estimating%20the%20Impact%20of%20Road%20Inv%20on%20SocioEcon%20%20%20%20%20%20%20%20Development.pdf> (accessed 1 March 2012).
- Mandel, J.L. 2004. "Mobility Matters: Women's Livelihood Strategies in Porto Novo, Benin." *Gender, Place and Culture*. 11(2): 257–258.
- Mellor, T. and Jak, J. 2004. *Governance in the Pacific: Focus for Action 2005–2009*. Manila: Asian Development Bank.
- Ministry of Finance. 2008. *Strategy for the Development of Sāmoa 2008–2012: Ensuring Sustainable, Economic and Social Progress*. Apia: Ministry of Finance, Economic Policy and Planning Division.
- Ministry of Finance. 2012. *Strategy for the Development of Samoa 2012–2016*. Apia: Ministry of Finance, Economic Policy and Planning Division.
- Pacific Islands Trade and Investment Commission. 2008. "Doing Business in Sāmoa." <http://www.pitic.org.au/pdfs/bigs/Sāmoa.pdf> (accessed 10 December 2012).
- Porter, G. 1995. "The Impact of Road Construction on Women's Trade in Rural Nigeria." *Journal of Transport Geography*. 3(1): 314–333.

- Porter, G. 2002. "Living in a Walking World: Rural Mobility and Social Equity Issues in Sub-Saharan Africa." *World Development*. 30(2): 285–300.
- Prescott, S.M. 2008. "Using Talanoa in Pacific Business Research in New Zealand: Experiences with Tongan Entrepreneurs." *ALTERNATIVE Special Edition/Special Issue 2008*: 126–148.
- Rodrique, J.P., Comtois, C. and Slack, B. 2009. *The Geography of Transport Systems*. (2nd edn.) New York: Routledge.
- Sāmoa Bureau of Statistics. 2006. *Report of the Population and Housing Census, Apia*. Apia: Samoa Bureau of Statistics.
- Sāmoa Bureau of Statistics. 2011. *Population and Housing Census 2011*. Tabulation Report v.1. Apia: Sāmoa Bureau of Statistics.
- Sāmoa Bureau of Statistics. 2012. *Population and Housing Census 2011 Analytical Report*. Apia: Sāmoa Bureau of Statistics.
- Storey, D. 2006. *Urbanisation in the Pacific*. Targeted Research Paper for AusAID. State, Society and Governance in Melanesia Project. Canberra: Australian National University.
- Vaiolati, T, M. 2006. "Talanoa Research Methodology: A Developing Position on Pacific Research." *Waikato Journal of Education* 12: 21–35.
- World Bank. 1994. *Infrastructure for Development: World Development Report 1994*. Washington D C: World Bank.
- World Bank. 2004. *Making Services Work for Poor People: World Development Report 2004*. Washington D.C. World Bank.
- Yin, R. K. 2003. *Case Study Research: Design and Methods* (3rd edn). Thousand Oaks, CA: Sage.

Appendix 1: Map of Study Area

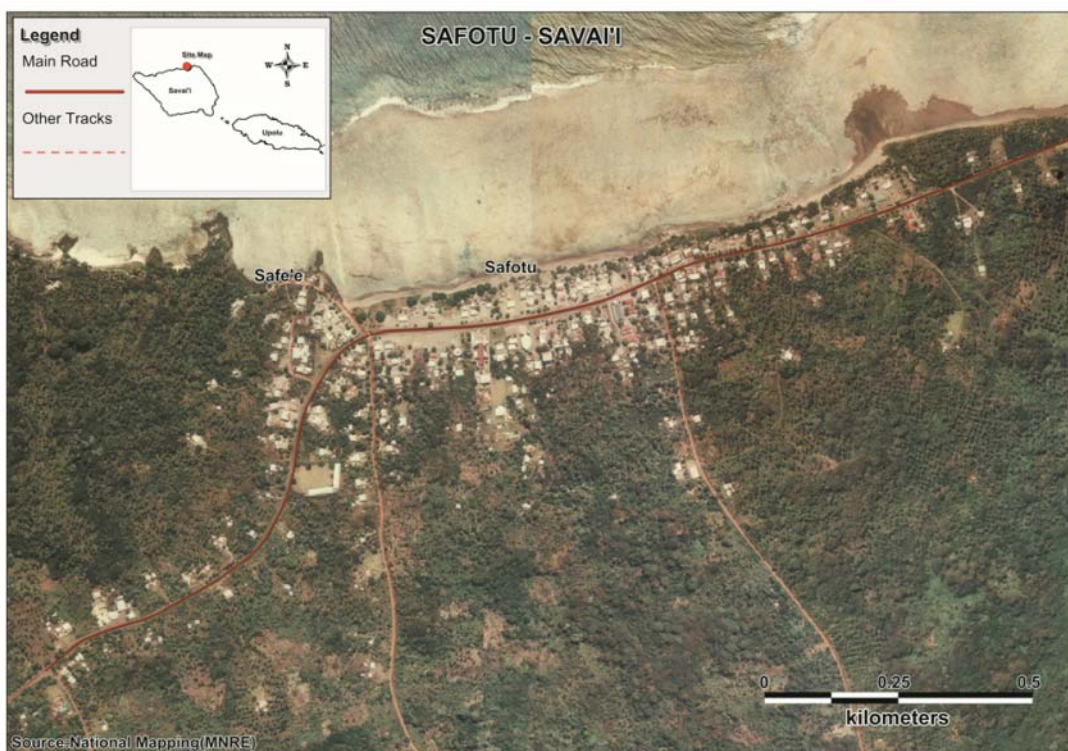
Main Apia Urban Area and Selected Urban villages
Source: Ministry of Natural Resources and Environment



Map 2: Rural Study Sites

Safotu, Savai'i

Source: Ministry of Natural Resources and Environment Mapping Section



Satapuala

Source: Ministry of Natural Resources and Environment mapping Section.



Vailoa-Aleipata

Source: Ministry of Natural Resources and Environment Mapping Section

