

Navigating Island Futures in Transport

**A guide to developing national transport strategies
for Small Island Developing States**

1st Edition | November 2021



Part I

**A 21st Century approach
to island transport
systems**



Navigating Island Futures in Transport: A guide to developing national transport strategies for Small Island Developing States | 1st Edition

Executive summary

Part I: A 21st Century approach to island transport systems

Part II: How to design a national transport strategy – a 5-phase process

Part III: Menu of strategies and technologies

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Principal author: Nicole Baker, Hope Road Consulting

Contributing author: Andrew Campbell, Fuel Technology Limited

Editor: Marieke Hilhorst

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Contact: nicole@hope-road.com.au



About the authors

Nicole Baker is a strategy consultant with a focus on long-term thinking and system change, and with particular experience in climate change, energy, and biodiversity conservation. She is the founder of Hope Road Consulting and, prior to that, led Climate Works Australia's international program on long-term strategies. Nicole has worked as a policy advisor for the Australian and New Zealand governments, and has consulted widely to governments, development agencies, business, and NGOs across the Asia-Pacific region. Nicole was the team leader of the *Marshall Islands Long-term Electricity Roadmap*.

Andrew Campbell specialises in energy and its use in the transport sector, working at a national policy level through to field projects where emerging or new technology hits the road, water, or air, in roles ranging from Team Lead on a 3,000 e-trike project to Technical Director on the development of a novel multi-utility heat, power and waste-water system. Andrew holds one patent and several provisional patents. Andrew has a Master of Engineering degree and has worked with 16 different fuel and energy types including hydrogen and battery-based propulsion systems.

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We have not been able to incorporate all the feedback and ideas into this wide-ranging work that looks across modes of land, sea, and air transport, new paradigms of transport planning, and multiple approaches to thinking and talking about the future. Omissions and errors are those of the authors.

We hope that *Navigating Island Futures in Transport* is useful as a practical, user-oriented guide. More than that, we hope that the ideas contained here contribute to a larger conversation about the need for radical planning, for *talking stories* about the kind of world we want to live in, and for making the sometimes-difficult decisions needed, as we journey to a sustainable, vibrant, zero-carbon future.




“No-one can predict the future, yet we all make plans based on our assumptions and desires. Making plans in a changing and complex environment is a little like being the captain of a ship faced with uncertain weather and variable seas. Yet, he still puts to sea in pursuit of his desires. But, despite the daunting prospects and just like the captain, if we know where we want to go, we can chart a course, navigate with our compass, use our lookout’s weather eyes, and trim our sails to make the best of the changing conditions. These methods give us a far better possibility of reaching our destination than trusting in providence.”

–*Dr. Michael Jackson, Founder, Shaping Tomorrow consultants (Jackson, 2013)*

Who is this guide for?

This guide is intended to be useful to:

- Members of national and subnational governments
- Development partner staff
- Consultants working in the transport, economic development, and climate sectors.

	Users	How it may be used
	Country governments	<p>The guide provides an overview of the components of a national transport strategy, the benefits it brings, what such a strategy should consider, the process, time commitment, and expertise needed. It outlines a process that can be used as a term of reference for consultants. It provides a ‘menu’ of possible strategies, policy measures, and technologies. It highlights the need for close collaboration with development partners and can provide a shared framework for these discussions.</p>
	Development partner staff	<p>The guide will help development partners respond to requests from partner countries for transport strategies and provides a framework for agreeing the process to follow and desired outcomes. Where development partners carry out procurement, it will help craft terms of reference for consultants. It provides a catalogue of possible strategies, policy measures, and technologies, and discusses the wrap-around support such approaches will require. It can provide a shared framework for discussions with partner countries and other development partners.</p>
	Consultants	<p>The guide provides consultants and practitioners with a framework for designing and managing a process to create a national transport strategy. It emphasises the need to establish the authorising environment, to secure commitment from government and funding partners, and to ensure the process is focused on involving decision-makers at every step. It provides a framework for ensuring critical issues are considered. The menu of strategy, policy measures, and technology options will support improved design and assessment of appropriate actions and investments.</p>

Structure of the 3-part guide

Navigating Island Futures in Transport comes in three parts (not including the executive summary). It assumes an existing level of knowledge in transport planning and focuses on how best to apply these skills to develop long-term integrated strategies.

Part I: A 21st Century approach to island transport systems

Part I (this document) provides an overview of the current context and transport challenges facing Small Island Developing States (SIDS). It then outlines the emerging global paradigm for sustainable transport systems. Finally, it touches on how developing long-term strategies helps enable the transformation to a sustainable future.

Part II: How to design a transport strategy – a 5-phase process.

This part will help you design and facilitate the process for developing a national transport strategy. The guidance provides ideas and tools for each phase of the process:

- + Phase 1: Prepare
- + Phase 2: Understand the past and present
- + Phase 3: Explore the future
- + Phase 4: Design strategies and pathways
- + Phase 5: Create a roadmap

Each phase reinforces the importance of meaningful discussions between decision-makers – including governments, the private sector, and development partners.

Part III: Menu of strategies and technologies provides a catalogue of strategies, technologies, policies, and other measures that have already been assessed for their suitability for small island countries. It means you won't have to start from scratch in your search for practical and appropriate solutions.

- **Part IIIA: Menu of strategies** – presents a range of strategies and approaches to help islands shift towards sustainable transport systems.
- **Part IIIB: Menu of technologies** – this section presents transport technologies for land, sea, and air transport. These have been assessed for their suitability for small island countries across different time horizons. Note that, given how quickly transport technology is changing, the information in Part IIIB will be reviewed regularly.

While Parts II and III work together to provide practical, user-oriented guidance and tools on how to develop a long-term transport strategy, Part III may also be used to support the improved design of stand-alone transport-related projects.

Abbreviations

ADB	Asian Development Bank
ASI	Avoid–Shift–Improve
GHG	Greenhouse gases
ICT	Information and communication technology
LGBTQI+	Lesbian, gay, bi-sexual, transgender, queer, intersex, plus
LTTG	Long-term temperature goal (of the Paris Agreement, 2015)
NOx	Nitrogen oxides
NCD	Non-communicable diseases
PICTs	Pacific Island Countries and Territories
PNG	Papua New Guinea
RMI	Republic of the Marshall Islands
SDG	Sustainable development goal (United Nations, 2015)
SIDS	Small Island Developing States
SOx	Sulfur oxides
WB	World Bank
WHO	World Health Organisation
UNESCO	United Nations Educational, Scientific, and Cultural Organisation

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What's in Part I

Part I develops the case for a 21st Century approach to transport in Small Island Developing States (SIDS). This new approach is transformational, and it requires big changes in the way we plan and make investments.

Part I forms the background and context for the tools and guidance in Parts II and III, and is in **four sections**:

- + **Why SIDS need long-term transport strategies**
- + **Transport in SIDS – challenges and opportunities**
- + **Sustainable low-carbon transport – a new global paradigm for the 21st Century**
- + **Building capability for transformative action.**

1 Why Small Island Developing States need long-term transport strategies

Overview

Scattered through the world's oceans are 38 Small Island Developing States (Figure 1). Although they have diverse cultures and histories, their shared characteristics mean they deal with many of the same economic, environmental, and social issues. SIDS are among the countries that will suffer most from the impacts of climate change, even though they collectively produce less than 1 per cent of global greenhouse gas (GHG) emissions.

SIDS have been vocal advocates for enhanced global action to reduce emissions, and most have made very significant commitments to reduce their own. This has increased attention on their transport systems, and to the challenges and opportunities of decarbonising them.

Long-term strategies that align short-term investments with long-term goals are essential for a low-carbon, climate-resilient, and sustainable future. This understanding led to the provision for long-term, low-emission development strategies to be included in the Paris Agreement (United Nations/ Framework Convention on Climate Change, 2015).

But there is a way to go. While development partners are increasingly aware of the considerable benefits of long-term strategies, they are also aware of the systemic barriers to thinking in more long-term and integrated ways (Mukhi, 2020).

In SIDS globally there is a ramping up of investment, largely in the context of climate change – both adaptation and emissions reduction.

For the most part, transport development in SIDS still occurs on a project-by-project basis and in the absence of a comprehensive and integrated sector strategy. Sector plans and infrastructure investment plans do exist but too often they are compiled as prioritised 'wish lists' of projects.

SIDS are also committing to ambitious climate change targets, often without good information on the cost or effort required to achieve those targets.

Long-term, integrated transport planning exercises are important for 'getting to grips' with what the transition to a low-carbon economy will entail. Country-driven sector strategies, when properly conceived and carefully developed, enable the country's leadership and development partners to work together towards a common vision.

This means there is a need for countries to be supported to drive these processes, and for development partners to participate and align their projects, investments, and policy support with these long-term, integrated strategies

This section makes the case for transforming how SIDS invest in transport. Climate change and myriad other challenges make it imperative small island countries step away from the status quo. By working with development partners, sustainable transport futures can be created that both meet today's challenges, and build resilience, support social outcomes, and enable economic development. Guidance on how to do just that is in Parts II and III.



Figure 1: "Map of Small Island Developing States" – used under Creative Commons license (Osiris, 2013)

Make good investments today for good outcomes tomorrow

The long-term life cycle of infrastructure means that investment decisions made today will either enable or constrain the potential to achieve the required deep reductions in emissions, adapt to climate change, and manage ongoing costs. Today's investments will "lock in patterns of development for decades to come" (Hall, et al., 2017).

As discussed in Section 2, globally, transport planning is beginning to challenge the conventional idea that the growth of motorised transport is required for economic development – a new paradigm is transforming how governments think about moving people and goods, and providing services. This applies equally to island countries.

As will be seen in Parts II and III of this guide, there are no simple solutions to decarbonising transport in island countries while trying to maintain transport in essentially the same form – the commitment to zero emissions requires a transformational approach to reduce dependence on motorised transport and rethink development patterns.

We need to lift our gaze to a longer time horizon and imagine a future with integrated, sustainable transport systems. Simply put, transforming our future means making different investment decisions today.

Adapt to climate change

As island communities face existential threats from climate change over the coming decades, there is a need to determine a strategic, long-term approach to adaptation, including the siting and design of transport infrastructure. This is particularly important given the large amount of investment flowing for adaptation at this time, and the current lack of holistic, long-term planning guiding its application.

In the short term, where people live and work is largely stable. Over the longer term, with good planning, people and businesses will shift. In the Pacific, traditional land tenure is sometimes discussed as if it were an insurmountable barrier to land-use planning. In fact, the imperative for better urban and spatial planning to deal with both rising urbanisation and climate change impacts is more important than the complications that traditional land tenure may raise.

Because all these things take time – resolving land tenure, spatial planning, and the actual shift in settlement patterns – it is even more important to start conversations now.

Clarify priorities underpinning government decision-making

Well-considered long-term transport sector strategies offer governments the opportunity to:

- clarify and articulate the objectives – economic, social, and environmental – of the transport system within the overall aspirations of the country
- help ensure that short-term investments align with long-term desired outcomes
- consider and trade-off multiple objectives, including decarbonisation, adapting to climate change, supporting social outcomes, economic development, and other sustainability considerations
- design strategies that are robust and adaptable, avoiding 'locked in' and stranded assets
- consider the management of assets over their life cycle, including maintenance, repair, and rehabilitation
- design enabling framework policies and institutions
- facilitate development partner coordination, reducing duplication and transaction cost burden, and realising synergies between projects
- identify the highest priority projects and activities
- attract further investment by having a clear vision and investment framework.

Improve donor coordination

For a relatively minor investment, support for country-led sector strategies can improve the effectiveness and efficiency of much larger investments.

Although most development partners committed to improved harmonisation of donor activities through the Paris Declaration on Aid Effectiveness (2005), in practice – with notable exceptions – development activities in SIDS remain fragmented. Partners continue to be largely driven by their internal incentives, and investment and administration processes.

For small island countries, with small governments and many development partners, this results in a sense of busyness that can often be overwhelming for those “drinking from the firehose”. It can also result in frustrations for development partners who may feel their stakeholders are not giving their projects enough attention. The congestion and sense of overwhelm can make it difficult to identify and clarify a country’s true transport priorities – especially in the absence of a well-considered national transport strategy.

Better development partner coordination is sorely needed. And one of the best ways to achieve this is to work with SIDS to develop long-term integrated strategies that identify the investments that will deliver a sustainable low-carbon future. Committing to work with small island states to develop and implement a country-driven national transport strategy will provide an excellent foundation for improved donor coordination.

2 Transport in SIDS – challenges and opportunities

2.1 The special circumstances of SIDS

SIDS are undoubtedly diverse, influenced by their island type, geographic location, land area, climate, economic base, access to technology, population size, settlement patterns, culture, land tenure systems, and history.

They also share much in common, including:

- Global leadership on climate change, and their commitment to significant emission reductions at home.
- Geographic remoteness from major markets and outer islands spread over vast distances.
- Low transport and communication volumes from a dispersed population, and relatively high travel, freight, and communication costs.
- Small populations, disproportionately expensive public administration, minimal government services (lacking economies of scale), and a narrow skill base exacerbated by migration to other countries.
- Narrow-based economies and relatively low levels of income per capita (some SIDS are also Least Developed Countries (LDC)).
- High reliance on tourism (for many but not all SIDS) which is critically dependent on transport.
- High dependence on transport-intensive imports for food and energy.
- High vulnerability, relative to other countries, to international macroeconomic shocks.
- Greater vulnerability to environmental degradation.
- Extreme vulnerability to natural disasters (tsunamis, earthquakes, volcanos) and the impacts of climate change (sea-level rise, increased frequency and intensity of storms, temperature increase, and changes in precipitation).
- Increasing urbanisation.

(Moon, 2013) (Baker & Week, 2012) (UNCTAD Secretariat, 2014)

The importance of transport in a globalised world

Crucial to the economic and social well-being of all SIDS is the ability to move people and goods around reliably, affordably, and safely. Globalisation has significantly increased small island states' reliance on transport.

Transport brings people together; it brings food, healthcare, and goods; it provides economic and education opportunities, and it shapes urban and rural places. The ability to grow, manufacture, and export products, or to run a tourism business, relies on effective, affordable, and efficient transport. Transport underpins emergency responses and determines the viability of life on outer islands. Transport is fundamental to these countries achieving the Sustainable Development Goals (SDGs).

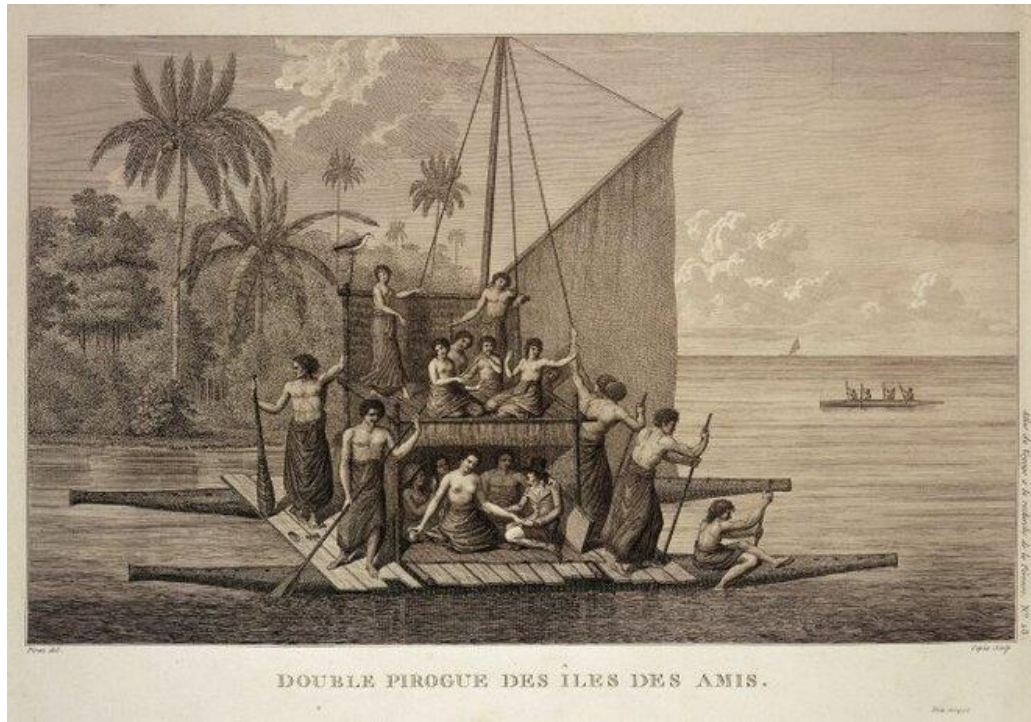


Figure 2: Tongan proa in the late 18th Century. Image: Piron c. 1791-94. Alexander Turnbull Library. (Piron, 1791-1794)

Explanation 1: A brief history of transport in the Pacific

Pacific Islanders have thousands of years of experience voyaging across vast oceans. These islands were settled between 1000 and 3500 years ago by master navigators sailing from Southeast Asia and other parts of the Pacific. Having crossed vast oceans, the distances between islands were no barrier, and populations settled and grew across archipelagos. During this time, regular voyages occurred between islands within cultural groups, and across the region – for trade, intermarriage, and occasionally for war (Figure 2). This heritage of sophisticated wayfinding practices and maritime technologies, passed from master to apprentice, is woven into the fabric of island life and culture.

European colonisers arrived in the 19th century and established missions and trading posts throughout the islands – at first with sailing ships, and, by the turn of the 20th Century, with steamships. Ports developed, and urban areas grew up around them.

Militarisation of the Pacific in WWII brought even greater changes. Larger ports were developed, and roads and airfields constructed, bringing road traffic, motorised shipping, and air travel to the islands. In the late 20th century, tourism brought with it regular transport routes, while development aid contributed to the displacement of traditional sailing vessels.

By the early 21st Century, the ongoing development of roads and increasing urbanisation has resulted in a major increase in the use of cars and taxis. A few places have developed public transport systems. Many transport systems on SIDS, which developed organically and unplanned, now have unsustainable costs and GHG emissions.

2.2 Transport challenges for Small Island Developing States

Overview

Transport to and within SIDS is usually characterised by long distances and low volumes, giving rise to a number of challenges. SIDS are heavily dependent on imported oil and economically vulnerable to oil price increases. On land, transport distances are smaller but other challenges arise, such as high cost of roading and road maintenance, and increasing urbanisation.

Many outer islands and other remote communities depend on transport for economic opportunities, yet high costs make it difficult to operate a dynamic, connected economy.

Transport systems are subject to natural hazards, many of which will increase in frequency and severity with climate change. At the same time, transport systems can have significant negative impacts on the environment.

Poverty, on a national scale and as a consequence of inequality, is an exacerbating factor, meaning that often people cannot afford quality transport services.

Development partners play an important role in shaping economic development, including transport systems. For governments that are small and capacity-constrained, managing funding from donors and coordinating their projects is both important and difficult – and the same holds for long-term strategic planning.

This section outlines some of these challenges, including:

- + **dependence on imported fuel and vulnerability to oil prices**
- + **land transport challenges**
 - increasing urbanisation, the rise of informal urban settlements, poverty
 - public transport is undersupplied
 - increase in cheap, aged vehicle imports
- + **domestic maritime transport challenges**
 - a vital but costly service
 - maritime safety issues
- + **transport infrastructure**
 - natural hazards and climate change impacts
 - poor quality design, construction, and maintenance
- + **negative environmental impacts**
- + **health and accessibility**
 - high incidence of non-communicable disease
 - poor accessibility
- + **policy, planning and financing challenges**
 - development partners and financing
 - lack of long-term, strategic investment planning
 - lack of data and information to support better decision-making.

Dependence on imported fuel and vulnerability to oil prices

Among all Pacific Island countries, only Papua New Guinea (PNG) has its own fossil fuel resources. All SIDS depend heavily on imported oil for the vast bulk of their primary energy supply for transport, electricity, and industry. High oil prices and price volatility sorely test the economic resilience of SIDS. The Asian Development Bank (ADB) has found that Pacific Island countries dominate the category of countries most vulnerable to oil prices (Asian Development Bank, 2009). For example, after oil prices hit a record high in July 2008, the Marshall Islands declared an economic state of emergency and several other countries encountered serious economic challenges.

While there are poor data on transport fuel use and emissions, land transport is likely to be the largest user of imported fuel in many SIDS. The next highest users are likely to be electricity generation, and maritime transport (not including commercial fishing, where fuel is largely bunkered offshore on the high seas). A smaller proportion will be used for domestic aviation (Twomey, Nath, & Kumar, 2019). This is likely to vary from country to country – for example, a recent study carried out for the Marshall Islands estimated that domestic road, sea, and air transport (excluding commercial fishing and international bunkers) uses around half the amount of fuel used in electricity generation (Curd & Baker, 2019).

The heavy reliance on imported fossil fuel for transport, coupled with often vast distances between islands, means transport services are particularly vulnerable to disruption from oil prices. Basic transport, health services, and fishing often grind to a halt when people cannot afford fuel.

Land transport challenges

Increasing urbanisation, rise of informal urban settlements, poverty

A clear trend in SIDS is growth in urban populations exceeding the overall population growth – people are moving to towns and cities (Jones, 2016) (UN Habitat, 2015). In some countries, the overall population is decreasing due to emigration. These trends lead to several significant considerations relevant to long-term planning for transport systems, and to infrastructure and service provision more generally.

Urbanisation is often taking place as the result of migration from outer islands and other remote areas, where opportunities are lacking. One aspect of the increase in urbanisation is the growth of informal urban settlements, which are characterised by “self-organisation in housing, subdivision, land tenure and livelihoods”, and lack of access to/ exclusion from formal government services (Jones, 2016). Informal settlements are generally poorly served by transport services.

The growing urban population also affects transport systems in different ways: one example is in Majuro, Marshall Islands, where there is an increased number of taxi drivers engaged in precarious and very low-paid income generation using end-of-life cars rented for the day, which in turn leads to significant traffic congestion, excessive emissions, and waste problems.

Public transport is undersupplied

While many larger and more populous islands in the Pacific have some form of bus service, most transport is provided by private vehicles and taxis. Where there are bus services, timetables can be hard to come by and services are often irregular. Bus services are privately owned, and some operate without any government support.

Increase in cheap, aged vehicle imports

SIDS are increasingly importing cheap second-hand vehicles from Japan, Korea, and China. While some countries have import controls – such as Fiji, where vehicles must be less than 5-years old and higher import duties apply to vehicles with large engines – most others have no restrictions at all.

In many cases, when these cars arrive, they are near the end of their useful life and within a year or two are no longer in service. Older vehicles also tend to be less efficient than newer vehicles. In places such as Majuro, the proliferation of cheap, old vehicles leads to serious congestion problems on the roads. The results are an increase in fuel use, air pollution, and number of abandoned vehicles, and a decrease in economic activity.

Domestic maritime transport challenges

A vital but costly service

“Many domestic inter-island voyages would represent a major international voyage in other parts of the world and some inter-island voyages in the Pacific region are longer and potentially more hazardous than many intercontinental voyages.”

Williams & Hoppe (quoted in (Moon, 2013))

Because island populations are dispersed across often vast ocean distances, inter-island shipping is a lifeline for many. The viability of life on outer islands depends on access to imported goods and access to markets for selling local products.

Across the Pacific, there are approximately 2000 registered passenger and cargo ships. Domestic shipping in the Pacific can be characterised by low-volume, irregular schedules, poor reliability, and uncomfortably long voyage distances. Inter-island routes are rarely profitable and the business model for operators is not sustainable. Maritime transport is vulnerable to oil prices and local dynamics (Weinstein, 2015). The often infrequent and unreliable outer island service has severe impacts on the quality and viability of outer island life.

There is a reinforcing feedback loop between economic production on outer islands and the provision of transport – regular, reliable transport means fresh produce from activities such as artisanal fishing and horticulture can get to markets, bringing in income and enabling islanders to pay for regular transport services. If transport becomes erratic, income and economic activity are impacted.

Further, the ability for government to deliver services to outer islands, including healthcare and education, is constrained, and the participation of these communities in civil society is limited. Prices of essential goods often become very expensive (Moon, 2013) (UNCTAD Secretariat, 2014). It is expected that these factors are contributing to the observed trend of outer island depopulation.

Maritime transport has significant safety issues

The lack of access to capital means operators usually purchase the cheapest vessels, often at or near the end of their operating life. These may not be fit for purpose and, due to age and condition, will have high maintenance and repair requirements, and are less fuel-efficient than newer vessels.

Weaknesses in maritime regulation and enforcement, a lack of repair facilities, difficulty accessing spare parts, and poor standards in workmanship mean these will often be poorly maintained, increasing operating costs and breakdowns, and posing a serious safety risk (Weinstein, 2015) (Secretariat of the Pacific Community, 2015). The poor condition of equipment and poor oversight of the sector has led to disasters, including the deaths of 95 people when the MV Butiraoi sank in Kiribati in 2018, the loss of almost 200 lives when the MV Rabaul Queen sank in PNG in 2012, and the loss of 74 lives when the ferry MV Princess Ashika sank in Tonga in 2009.

Transport infrastructure challenges

Transport infrastructure in SIDS is often in poor condition and is challenged by multiple issues, including geography and natural hazards, design and construction quality, and lack of adequate maintenance. In disaster situations “damage to transport systems typically makes up a large share of overall losses and is often one of the main obstacles to recovery” (The World Bank, 2019).

Natural hazards and climate change impacts

Island transport infrastructure (roads and bridges, docks and ports, airports, and airstrips) is at high risk of damage from natural hazards (such as king tides, storms, storm surge, cyclones, earthquakes, erosion) due to several factors (Baker & Week, 2012):

- Climate change is increasing natural hazards through sea-level rise and changes in the frequency and severity of storms.
- Often the asset is built around the coast of islands and at or near sea level, which means it is exposed to sea-level rise and hazards due to waves, high winds, and storm surge.
- Often the structure is not robust due to inappropriate design, poor construction, and poor maintenance (see below).

Poor quality design, construction, and maintenance

The prevailing approach to infrastructure in Pacific SIDS is often characterised as the 'build-neglect-rebuild' paradigm. This term encapsulates a range of constraints and failures across the lifecycle of the asset, including (Baker & Week, 2012):

- Access to construction materials, equipment, parts, etc, is difficult and equipment is usually not locally supported.
- Poor design – too often, foreign design expertise is unfamiliar with particular limitations imposed by the local environment.
- Poor construction quality – due to a lack of deep skills in construction, poor construction standards, old equipment, poor regulations, and governance of standards.
- Limited financial resources (outside of donor-funded projects or large-scale private tourism development) and inadequate budgeting for repairs and maintenance, lead to low-cost solutions being chosen. This contrasts with developed economies, where choices are more often made on the basis of value over the life cycle of the asset.
- Poor maintenance and operation practices, including the failure to set aside funds for maintenance and rehabilitation. Sectoral governance and management mean there is often a fragmentation of responsibilities and limited resources.

Negative environmental impacts

Most means of transport pollute and contribute to environmental degradation. Fossil fuel-powered engines produce exhaust gases containing both local air quality pollutants such as particulates, SO_x and NO_x, and greenhouse gases (most notably carbon dioxide). Outboard motors – in particular 2-stroke engines – emit pollutants directly into the ocean. Large individual spills from ship accidents, as when ships run aground and leak, also pose an environmental risk.

As noted above, vehicle numbers are increasing, leading to problems with congestion, air pollution, and abandoned vehicles. Some countries have schemes for exporting and recycling waste vehicles, but for the most part, increasing numbers of abandoned vehicles in SIDS are an eyesore, provide habitat for vectors of disease, and release waste chemicals, fuel, and lubricants into the environment. In many small island locations, the clash between the natural beauty of islands and discarded transport equipment is stark (James, 2020).

Health and accessibility

High incidence of non-communicable disease (NCDs)

The arrival of motorised transport, sedentary work, and a resulting reduction in physical activity – along with the displacement of traditional diets – has contributed to SIDS having amongst the highest rates of obesity and diabetes in the world. Non-communicable diseases (NCDs) are the leading cause of death in the Pacific and Caribbean islands, accounting for approximately 75 per cent of mortality (Tin, Vivili, Na'ati, Bertrand, & Kubuabola, 2020) (Razzaghi, et al., 2019).

Approximately one-third of the adult population in the Federated States of Micronesia, Marshall Islands, Tokelau, and Kiribati have diabetes (Tin, Vivili, Na'ati, Bertrand, & Kubuabola, 2020). For most Pacific countries – with PNG, Vanuatu, and the Solomons being less affected – 60 per cent or more of the adult population are overweight. In some cases, up to 75 per cent of the adult population is clinically obese (World Health Organisation, 2020).

Obesity and being overweight occur at young ages: in Tonga, around 60 per cent of children aged 13–15 are overweight, and nearly one in four boys and

one in five girls are obese. Similar trends can be seen in the Caribbean where more than 60 per cent of adults are overweight or obese, with prevalence exceeding 80 per cent in some countries (Foster, Thow, Unwin, Alvarado, & Samuels, 2018).

Poor accessibility

In many Pacific countries, footpaths and roads do not offer reasonable access for people with physical disabilities. They may be uneven and in disrepair, not fully connected, and there may be obstacles such as trees, parked cars, and lamp posts. This makes it exceedingly difficult for people with physical disabilities to move around the community. “Consequently, people with disabilities tend to stay at home and are rarely seen outside” (Babinard, McMahon, & Wee, 2020).

Given the high rates of NCDs and resulting disability, this is an increasingly important issue for SIDS. Further, the accessibility and safety of streets are experienced differently by women and girls, along with other vulnerable groups such as LGBTQI+ individuals. These groups may be subject to gender-based discrimination and violence on public streets, on buses, or in taxis, including sexual harassment, assault, and rape.

Policy, planning and financing challenges

Development partners and financing

Transport infrastructure in SIDS is expensive to build due to geographic dispersion and low traffic volumes. At the same time, national and local budgets are relatively small, not helped by small populations with a disproportionately expensive public administration, minimal government services (lacking economies of scale), and a narrow skill base to draw on, exacerbated by migration to other countries. SIDS, therefore, depend greatly on funding and technical assistance from the donor community.

Key issues related to development partners’ role in providing finance include the following:

- Investment in the critical maritime transport sector has been “largely invisible within the policy and donor strategy space” (Newell, Nuttall,

Prasad, & Veitayaki, 2016). Only in recent years has it appeared on the agenda, thanks to more active advocacy from around the Pacific.

- Governments can tend to “leave infrastructure to the donors and fail to invest in proper planning or asset management” (Baker & Week, 2012).
- Despite the ‘build-neglect-rebuild’ paradigm being well recognised, most infrastructure projects still focus on the construction phase with less sustained effort to strengthen institutions and ensure consistent access to appropriate expertise and workforce.
- Donor support for ongoing maintenance and repair is often very limited – it is usual for capital costs and project management to be covered by the development partner, while the ongoing responsibility for operation and maintenance sits with the recipient. The maintenance of road assets can account for two-thirds of the lifecycle cost. Some development partners, including the World Bank and the Asian Development Bank, are moving to more support for ongoing asset management.
- There is sometimes not enough attention given to appropriate design of infrastructure and equipment and the constraints particular to the small island context.

The proliferation of projects and organisations operating in SIDS creates a sense of busyness, often at the expense of meaningful progress. It is also distracting, bringing high transaction costs to countries with limited personnel to absorb this level of activity. When these issues are combined with SIDS’ high levels of ambition on climate change, it highlights a need for:

- better development partner coordination
- country-driven strategies for transport and energy investments and GHG reductions
- targeted, well-designed projects to address each country’s needs, avoid duplication, and ensure the ongoing viability of assets.

The return from improving coordination between development partners is likely to be high by improving the effectiveness of partner funds and the achievement of outcomes.

Lack of long-term, strategic investment planning

As in other sectors, most transport activities supported by donors are conceived and implemented as discrete stand-alone projects, without the benefit of strategic sector planning to give them context. Projects are designed for current demand and travel patterns – not future needs – and are often based on rehabilitating or rebuilding existing assets.

When considering transport system needs and challenges, it becomes clear that long-term, systemic planning is crucial. Transport infrastructure has long lifetimes. Risks and hazards may change over time – coastal roads may not be fit for purpose as the sea level rises. Purchasing of equipment in SIDS is biased towards the cheapest purchase prices, while the greatest costs are likely to be with operation and maintenance over time. When transport equipment comes to the end of its life it may add to a growing problem of waste.

This focus on a limited range of short-term objectives comes at the expense of creating a strategic portfolio of transport services and assets that will help future-proof small island countries.

Where sector plans or national infrastructure plans do exist, countries and development partners often express frustration at a lack of local buy-in, leading to a lack of implementation. Even when plans do have strong buy-in from the country, there is often a lack of local capacity for implementation.

“[I]mplementation of these strategies requires certain capacities among the ‘actors’ involved in each country: government funders, implementing agencies and the research communities. It also requires that they act together in a coordinated way, in order to build systemic capacity in the face of uncertainties about the extent and impact of climate change and improve the effectiveness and cost benefit of various adaptation strategies.”

Baker & Week (2012)

Lack of data and information to support better decision-making

Good data on energy and transport in SIDS is scarce. Improving the quality of data and information will better enable SIDS to formulate decarbonisation targets and strategies, report GHG emissions, make decisions on transport systems, and monitor and evaluate projects and their progress.

However, there are limited resources available to SIDS to assist with this, and it is therefore not viable to make sound data a prerequisite to action. While good data is extremely helpful, good analysis and decision-making based on a strategic and well-contextualised understanding of the issues and opportunities will allow progress to be made, even in the absence of data. Of course, finding ways to quantify the status quo and to monitor progress as developments are undertaken is a necessary, though not trivial, undertaking.

2.3 Opportunities to develop 21st Century transport systems in SIDS

Overview

Developing a long-term, integrated transport strategy offers a way to consider and address the myriad transport challenges described in 2.2. And, because it offers a way to think about the interdependence of transport systems, such a strategy will also enable small island countries to invest in people and assets in holistic ways that better meet their future needs.

This section of the paper outlines some of these high-level opportunities to:

- + **adapt to climate change and improve disaster resilience**
- + **advance SIDS' climate leadership and reduce emissions**
- + **integrate transport planning with spatial planning and rural development**
- + **build infrastructure with multiple functions**
- + **integrate planning of electricity supply with the electrification of transport**
- + **replace some transport activities with information and communication technology (ICT)**
- + **strengthen and revive local and traditional practices and culture**
- + **improve health outcomes and social inclusion.**

Adapt to climate change and improve resilience

Assessing the vulnerability and building the resilience of island transport systems and infrastructure should take a long-term systemic view, which means looking at:

- direct risks to infrastructure from the impacts of climate change – including increased temperature, changes in rainfall, increasing intensity of tropical storms, storm surges, and sea-level rise
- the interdependencies of transport infrastructure with other systems – electricity, water, and settlements
- how the transport systems support economic activities and communities.

Taking a resilience approach to thinking about climate change and transport means focusing on reducing the vulnerability of the population, economy, and communities – ‘ultimately it is the population, not the infrastructure that needs to be protected’ (Baker & Week, 2012).

Advance SIDS' climate leadership and reduce GHG emissions

All SIDS combined produce less than 1 per cent of the world's GHG emissions (World Resources Institute, 2021), and yet they will be among the first to experience the most severe impacts of climate change. SIDS are therefore amongst the most vocal leaders for ambitious global action on climate change. Many SIDS see that part of this role is to demonstrate ambitious action to reduce emissions within their own economies.

The transport sector, along with electricity, offer the main opportunities to reduce GHG emissions, therefore decarbonisation needs to be an integral driver of any national transport strategy.

Integrate transport into spatial planning and rural development

There is an urgent need for SIDS to develop long-term integrated spatial plans that explicitly consider the long-term hazards and risks from climate change, the process of urbanisation, and the changing profile of island economies.

Transport infrastructure and services both respond to, and drive, land use patterns, economic activities, and the location and design of settlements. The viability of rural and outer island communities depends on access to regular and safe transport services, and the availability of these services can reduce rural-to-urban migration.

Build infrastructure with multiple functions

When infrastructure is designed with interdependencies in mind, the potential exists to use scarce resources for multiple purposes. For example, using roads or airport runways as water catchments.

Integrate planning of electricity supply with the electrification of transport

With increasing investment in renewable energy in SIDS, the electrification of transport starts to make good sense. However, because this can substantially increase the demand for power, it needs to be considered in the long-term design of renewable electricity systems.

As the contribution of renewable energy sources increases, there is potential to complement the integration of intermittent renewables, such as solar and wind, and help balance load by managing when charging occurs.

Replace some transport activities with information and communication technology (ICT)

COVID-19 has meant a dramatic reduction in international, regional, and local travel. During the height of the pandemic many SIDS have been largely cut off, their tourism industries all but halted. International travel has been replaced with virtual meetings, enabled by improvements in information and communication technology (ICT) and internet facilities in SIDS. One example of this is the recent connection of Tokelau by undersea fibre optic cable. Tokelau is particularly remote, with the only access by a fortnightly boat service from Samoa. Increasing access to ICT, even on outer islands, may provide ways to stay socially and economically connected.

As the world finds its way out of this pandemic, COVID-19 offers islands an opportunity to rethink how they connect to the globe – especially given their need for a zero-carbon future, and the high emissions costs of international air travel.

Strengthen and revive local and traditional practices and culture

Traditional watercraft were used widely across the Pacific and in other island countries, both for collecting food locally and for inter-island journeys. While still used in many places, they have largely been replaced by motorised small boats, with some unintended consequences. When fuel supply is disrupted, or becomes too expensive, motorboats cannot be taken out for subsistence or small-scale commercial fishing. As both traditional boats and the know-how associated with building and operating them is being lost, there are limited options for local fishing, and communities then buy and eat canned foods. This displacement of traditional boats is a shift that has occurred mostly over the last two or three decades.

The use of traditional canoes reduces islanders' dependence on imported fuel, can increase communities' self-determination, can support livelihoods (eg, through the manufacture of boats or increased local trade), and improve health by increasing physical activity and the consumption of local foods.

While the promise of the technology fix for sustainability can be seductive, SIDS should consider how to support locally appropriate solutions and, at the very least, avoid crowding out these activities.

Improve health outcomes and social inclusion

Motorisation of transport in island communities has led to less physical activity and contributed to very high rates of obesity and NCDs. This is a self-reinforcing feedback loop where being overweight and out of physical condition creates barriers to engaging in exercise, which leads to more health issues.

The current form of many streets and sidewalks can also act as barriers for pedestrians and people living with disabilities. Streets designed for cars first can be unfriendly and unsafe places for pedestrians and cyclists, and restrict those valuable, incidental interactions that create community cohesion.

By taking a longer-term view, strategies can be imagined that help transform the health of islanders and enhance social cohesion. A long-term strategy that looks at the whole transport system, within its broader social and cultural context, can help relieve the health crisis by facilitating car-less options that include active transport – walking, cycling, scooting, paddling, and sailing. And it can help build social inclusion by recognising the importance of safe, well-lit, well designed and built roads and sidewalks, and safe, affordable public transport.

3 Sustainable low-carbon transport – a new global paradigm for the 21st Century

Overview

Globally, thinking about and planning for transport systems is undergoing major changes. For many decades the focus on the use of the private car has produced towns and cities adapted and designed around roads. The push to decarbonise transport, to improve the liveability of our urban environments, and the opportunities afforded by new technology is driving a paradigm shift, and already transforming how governments think about moving people and goods.

This section describes key conceptual shifts we need to make for sustainable, low carbon transport futures including:

- + **from organic/incremental to planned/ transformative**
- + **from predict and provide' to vision-led 'decide and provide'**
- + **from fossil fuels to zero emissions**
- + **from mobility to accessibility**
- + **from cars first to pedestrians first**
- + **from asset-based to service-based**
- + **from single components to integrated systems**
- + **from imported ideas to locally appropriate, context-specific solutions.**

From 'organic' to planned, from incremental to transformative

SIDS can no longer afford unplanned organic urban growth combined with unplanned transport systems, not least because sea-level rise will heavily impact much of the coastal and low-lying infrastructure. Further, achieving the long-term temperature goal (LTTG) of the Paris Agreement means net zero emissions by 2050 – which means transforming the transport sector.

Strategies that make only incremental 'improvement' risk locking SIDS into systems that will continue to be extremely vulnerable and produce emissions well into the future.

Transformative pathways to net-zero, sustainable, resilient island transport futures require careful long-term planning of the transport system and the location and form of settlements and urban areas.

From ‘predict and provide’ to vision-led ‘decide and provide’

‘Predict and provide’ characterises the last several decades of transport planning. Up until now, future travel demand has been *predicted* by extrapolating past demand and travel behaviours, and this determines what infrastructure is *provided*. For several decades that has largely meant building more and bigger roads.

More recently, the failure of ‘predict and provide’ to address traffic congestion, along with the need to reduce transport emissions and create more liveable urban areas, has seen the emergence of a vision-led approach. That is, instead of looking backwards to predict future demand, the first step is to describe what a desirable, sustainable future looks like. Only then are plans laid to achieve that future. First, *decide* the preferred future, and then *provide* the means to work towards it.

‘Decide and provide’ is better suited to planning amid increasing rates of change and deep uncertainty (Lyons & Davidson, 2016) – including the rise of digital technologies, changes in demographics, and the need to find ways to reduce transport emissions to zero by 2050.

From fossil fuels to zero emissions

With the invention of coal-powered steamships and trains in the 19th century, and the release of the first mass-produced motor vehicle – the Ford Model T in 1908 – the world’s transport systems shifted rapidly to rely almost entirely on cheap, plentiful, fossil fuels. Now, it is clear, we need to shift to mostly zero-emissions transport before mid-century, with a great need for rapid technological innovation and development across all modes of transport. Planning for reliable and known transport technologies must be replaced with planning for an uncertain future where it is not yet clear which technologies will prevail – for example, will heavy transport use electric batteries, hydrogen, or biofuels? The need to shift is clear, but how best to do that is not.

Explanation 2: Avoid – Shift – Improve

The Avoid-Shift-Improve (ASI) framework (see, for example, Bongart, Stiller, Swart & Wager (2019) incorporates some of the sustainable transport paradigm shifts outlined in this section. It provides a way to classify actions and policies to decarbonise the transport sector, reduce energy use, and reduce traffic congestion.

Under the ASI framework:

The best and most efficient way to reduce GHG emissions from transport is to *Avoid* or reduce the amount of travel activity – something that can be achieved through better urban planning, and by replacing travel with telecommuting.

The second-best approach to reducing emissions is to *Shift* to a less carbon-intensive mode – for example from private cars to public transport or bicycles, or from road freight to sea freight.

The final approach is to *Improve* the GHG emissions from vehicles and vessels – by improving the energy efficiency of engines or switching from petroleum to lower emissions fuels such as green hydrogen or electricity.

From mobility to accessibility

Transport systems are a means of providing access – but not the only means. For example, the response to the COVID-19 pandemic shows that people can rapidly adapt from travelling each day to work in a centralised office to using digital technology to work from home.

Lyons and Davidson propose the *Triple Access System* (Figure 3) of “spatial proximity, physical mobility and digital connectivity as a framework for policy and investment decisions that can harness flexibility and resilience” (2016). Triple access thinking in turn forms the basis for *Triple Access Planning* (Lyons, 2021). *Part III* of this guide provides strategies and technologies that draw on this model.

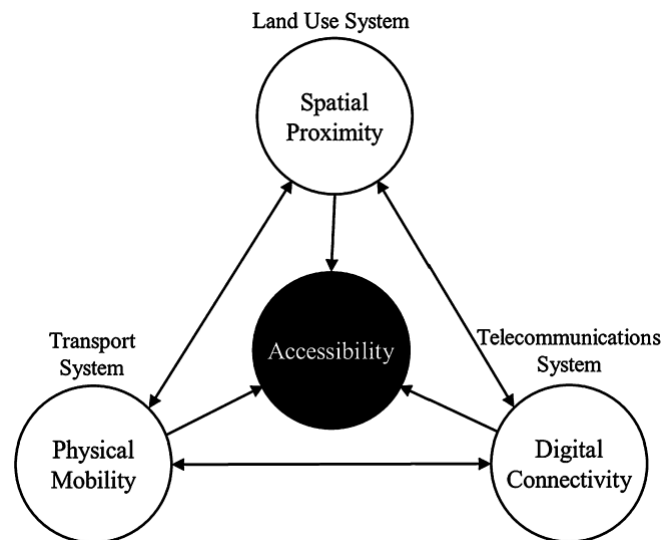


Figure 3: “Triple Access System” – used with permission (Lyons & Davidson, *Guidance for transport planning and policymaking in the face of an uncertain future*, 2016)

From cars first to pedestrians first

Private cars have dominated transport planning in cities and urban areas over the last century, leading to streetscapes designed primarily for cars and trucks, and few safe or comfortable places for pedestrians, people with limited mobility, or cyclists. The sustainable transport paradigm flips the *'cars first'* approach on its head. Instead, the hierarchy places *'pedestrians first'*, followed by bicycles and micromobility, public transport, commerce and freight, and shared vehicles. In this paradigm, private cars come last Figure 4.

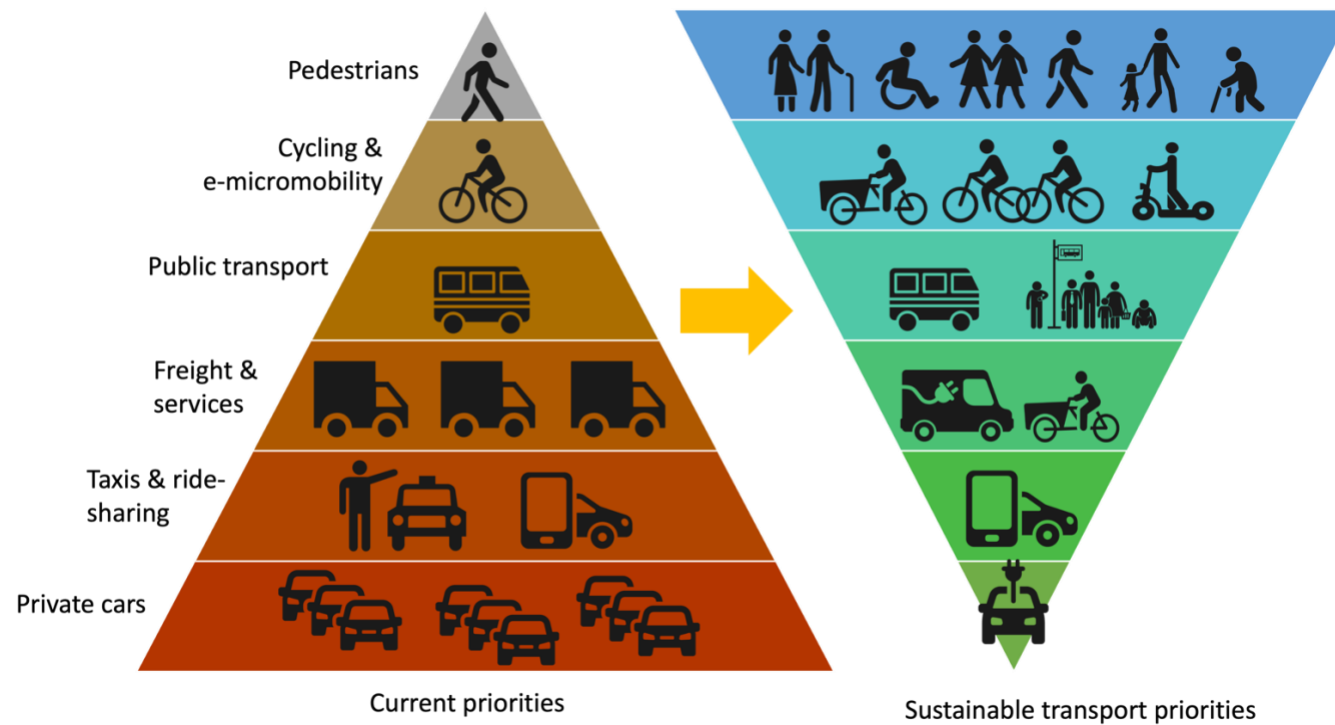


Figure 4: The inverted pyramid showing the shift from the *'cars first'* paradigm to a *'people first'* paradigm

From asset-based to service-based

Often transport sector projects in SIDS are focused on the construction or rehabilitation of major assets such as roads, ports, or ships. A sustainable transport paradigm involves a shift from this focus on *assets* to considering the *services* provided to people in terms of accessibility and mobility – for example, to providing support for an effective public transport system. This way of thinking also gives rise to ride-sharing schemes (such as Uber or Lyft) which have challenged assumptions around private car ownership vs car ‘usership’, as well as shared e-scooter schemes.

From single component to integrated systems

Conventional transport planning often looks at the need for a single component without properly considering the role that component plays in facilitating access and mobility in the context of the broader multimodal system. For example, this might look like buying a ship to meet one need, and finding it is not suitable for all routes, or existing dock infrastructure, and so it will be partially utilised while other needs go unmet. Or it may mean rebuilding a rarely used road when the actual need would be better served by improving coastal shipping. Or it may mean buying a new fleet of government vehicles, without looking at existing issues of road congestion and a lack of parking. An integrated approach will consider more opportunities for efficiency, and to build in redundancy – making the whole system more resilient.

From imported ideas to locally appropriate, context-specific solutions

Centuries of colonialism and decades of international development assistance in SIDS have brought unintended consequences – many to do with the application of technologies and ways of doing things that do not fit well within the SIDS context. In the transport sector, these unintended consequences can be seen in many ways, including:

- Networks of roads, damaged to the point they can hardly be travelled, with no real processes to address the damage.
- The displacement of traditional sailing craft on outer islands by motorboats ‘gifted’ to fisherman, creating dependence on the cash economy and on the vagaries of supply ship schedules to bring expensive imported fuel and food.
- The provision of ships that are the wrong size or draft to provide services where they are most needed, or that cannot be maintained locally.
- The construction of hard seawalls in cases where this has increased erosion and created further threats to coastal communities.

It is critically important that the context of small island states be well understood before activities are undertaken – including the local geography, climate, supply chains, and building materials, and the capacity for ongoing management and governance. Local technologies, many of which have been optimised for island environments over thousands of years, need to be given due respect by outside consultants and development partners, as these may well form a substantial and important part of island sustainable transport solutions.

4 Building capability for transformative action

Futures literacy is necessary for the 21st Century

A key premise of this guide is that ‘futures literacy’ or ‘futures consciousness’ is needed to develop appropriate long-term strategies. The United Nations Educational, Scientific, and Cultural Organisation (UNESCO) calls futures literacy an ‘essential competency for the 21st Century’ (UNESCO, n.d.).

“It is the skill that allows people to better understand the role of the future in what they see and do. Being futures literate empowers the imagination, enhances our ability to prepare, recover, and invent as changes occur. The term Futures Literacy mimics the idea of reading and writing literacy because it is a skill that everyone can and should acquire. And it is a skill that is within everyone’s reach.”

UNESCO(n.d.)

Futures literacy is about going beyond old tools of forecasting the future based on what happened in the past. It is the capability to step away from traditional mindsets, look at the future in different ways, and apply that understanding to decisions made today.

It is about using imagination to understand the big changes that are happening in the world and the different futures that might result. It is about how, amid great uncertainty and constant change, to create a desirable future. Engaging in futures thinking helps create the conditions for the necessary paradigm shifts (Inayatullah, 2008).

Shared understanding, shared vision, joint action

A high-quality, long-term sector strategy process occurs as a strategic dialogue between decision-makers, supported by analysis and advice. While it is often somewhat useful to do a technical report, most people working in SIDS have seen multitudes of consultant reports that have had little impact.

In the end, the aim is to have country decision-makers and development partners make high-quality decisions about policies and investments in the transport system. It is also important to take the time to create something durable that transcends political election cycles and has cross-party support, wherever possible. This process of joint exploration, deliberation, and decision-making creates a shared vision for the future, and a shared understanding of the choices and trade-offs facing the country.

Developing a process involving all key players not only provides the necessary diversity of thinking to create robust pathways but also (and more importantly) creates alignment and collective agency to enable transformational action to be taken. The process can also ‘build the muscle’ of strategic thinking and decision-making, which can then benefit other areas of governance.

Key actors need to personally experience the process to see their own role in enabling transformational change (Sharpe, Hodgson, Leicester, Lyob, & Fazey, 2016).

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