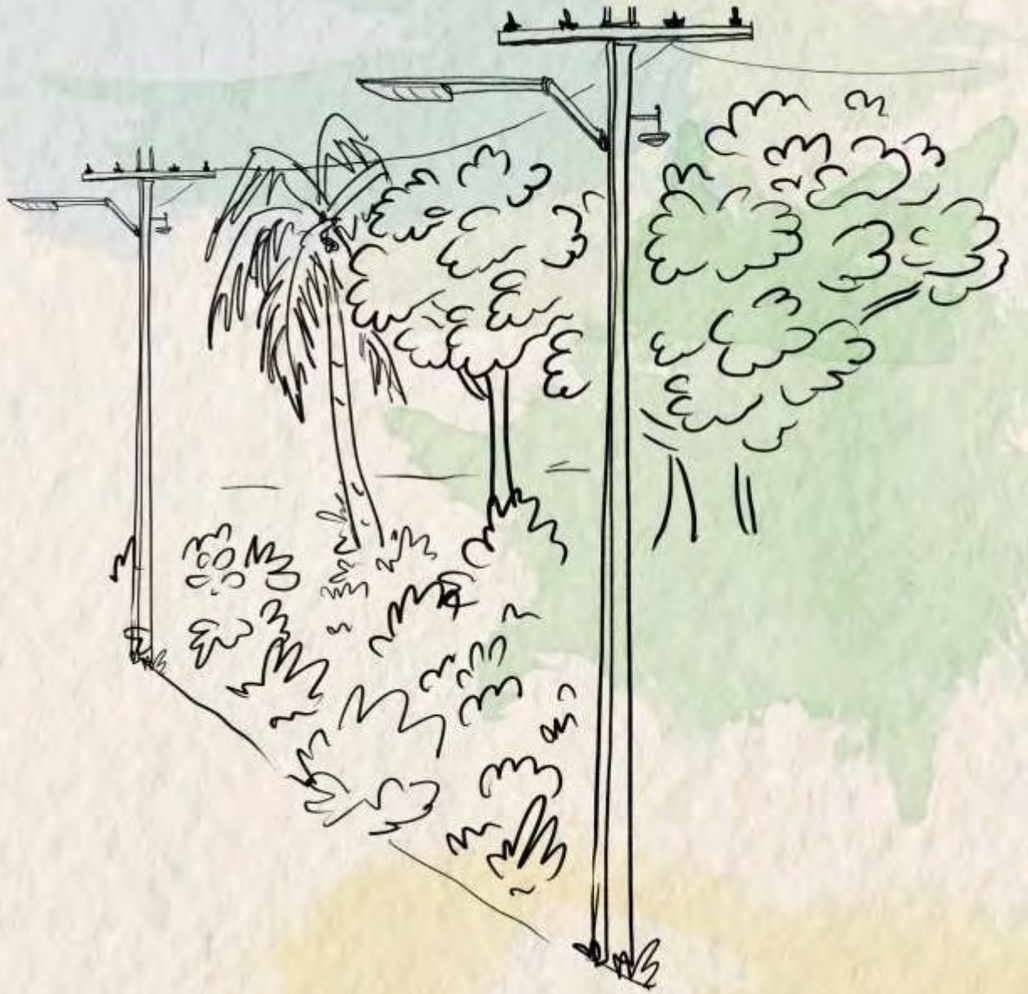
Accompanying the Asian Development Bank - ARUP foresight project on

Reimagining the Future of Transport

across Asia and the Pacific

Three young futurists describe the experience of imagined personas with transport in 2030. These are their stories…



Written by: Virkein Dhar (India)

Who is Rani?

Rani is a young woman who calls one of Delhi's urban villages home. Born into a progressive but humble home, she's found happiness in her dreams of creating a different world.

Having to take on the burden of supporting her family while still in school, she has learnt to transform her fear into courage. Fueled by her curiosity and eagerness to learn, Rani now works on pioneering innovations in transport planning technology that make the daily journeys of women and girls in Delhi, safe and efficient.

A woman's vision of safe, reliable, clean and efficient transport services

On a winter's day in early 2019, 16-year-old Rani was the last passenger to be dropped off in the shared minivan she took from the metro station to get home. The driver ignored her requests to slow down. And in that moment, she had to make a split-second decision, she could either stay in the van and risk possible assault or jump off the moving vehicle and risk injury. She chose to leap off from the open door on the left. She landed on the side of the road with a broken ankle and a deep gash on her left arm. At least her injuries bought her safety from the predations of the driver.

Shared rural service vans such as this were the preferred mode of transport to cover the last mile from a bus or train station to home, particularly in the urban villages within Delhi, the sprawling metropolitan area where Rani lived with her father and siblings. While it was well known that the prying eyes of men will fall on a woman traveling alone in these shared minivans, it was the only reliable and affordable option for Rani. The alternatives would have either been a private taxi through a cab hailing service or an autorickshaw, both at double the price, not always available during late evenings, and not necessarily and safer either.

Every day, after school, when Rani returned home from her part time job as a sales executive in a mall and hopped into the shared minivan, she just crossed her fingers while clutching her bag to her side, hoping she wouldn't be the last one to be dropped off.

Rani thought about that winter evening as she caressed the scar on her left hand, sitting in the new e-minibus launched by the city of Delhi's transport department, in partnership with a private e-mobility start-up. The 2022 Clean Fuel Policy for Last Mile Connectivity gave rise to a number of start-ups that began working to support last mile connectivity from mass transit networks such as regional trains, metro lines and buses.

The policy also introduced congestion pricing and high fees for private vehicle parking, which made owning and using a car really expensive. More private investment was encouraged to support public transport and make it more efficient, clean and safe.

It was that fateful night as a 16-year-old that fueled Rani's ambitions to be part of the change: to make affordable public transport safe for women like her. The fear that gripped her that night was immeasurable, but Rani fought hard against it as she recovered from her injuries. At the hospital she chanced upon an article in the newspaper someone left on the bed beside her, that highlighted the immense future need of skilled young people to be employed as data scientists across industries, including transport. This somehow stuck with her, and she continued to investigate what a career in the field might look like.

When she finished school, she enrolled in an integrated graduate course that trained her as a data analyst. It was exciting, she was mesmerized by the world of computing as she was introduced to new programming languages, and the vast potential for the application of data analytics. In just two years Rani had become quite proficient, and instead of the part-time sales job that supported her education and her family, she worked remotely on small data science projects while still finishing her third year of studies.

The scar on her hand was a constant reminder of where she wanted to apply this knowledge. She kept herself up to date with all the developments in the transport sector and as soon as she graduated, she landed a job at the city transport department, on the team leading the execution of the 2022 Clean Fuel Policy for Last Mile Connectivity. Government-led policy incentives in the previous decade had led to substantial reduction in sensor costs and proliferation of Internet of things technology for managing transport routes and real time communication. Her team was liaising between the companies that managed e-rickshaws, e-minibuses and the transport department, to make sure real-time information was accessible on the Integrated Transport App, launched in last year, 2029.

Even when Rani started working with the transport department as a young graduate, her daily commute brought with it that piercing gaze, or the threat of a possible assault. Most colleagues and the department directors were still men who were aware of the issue of safety, but did not particularly prioritize women's safety when designing and reviewing projects and digital applications.

Safe and effective transport systems need alignment between many moving parts, and as Rani began to learn about these intricacies, she used her weekends to explore and build on ideas with Masrat, the founder of an e-rickshaw company.

Masrat's company trained and employed women drivers, and he shared her interest in making public transport accessible and safe, and encouraging women to be active members of the city's workforce, including advocating for more female drivers for electric buses.

These weekend brainstorming sessions were not just full of ideas. They also became a space to develop a community within the transport workers' ecosystem to advocate for a deeper focus on the safety of women and children. The meetings grew to include entrepreneurs, researchers, students who were also interested in finding ways to make city streets safe and accessible to those with disabilities, children and the elderly.

On one such Sunday afternoon in November 2031, Masrat and Rani had a breakthrough. They had been working on a program to analyze women's trip patterns compared to men's and found that women's trips were more complex.

This reflects the greater burden of childcare and household support that typically falls on women. Their trips had multiple stops, such as dropping off or picking up their kids from school on their way to work, running household errands like buying groceries, or taking care of elderly parents living at a distance. This made their journey more expensive, with single fare tickets during a chained trip. It also ate up a lot of time, waiting between one stop and another. They also documented that good lighting and surveillance at platforms, bus stands and rickshaw waiting zones were significant safety factors for women when planning their transport routes.

The research concluded that increasing the frequency and accessibility of public transport can enhance women's productivity in unpaid work, so that the time saved in transit can be utilized to engage in paid work. In addition, they found speed and flexible timings to be a decisive factor for women when choosing a mode of transport. At the same time, affordability, personal security and protection from harassment were key concerns.

To counter this economic and time gap, and to incentivize more women to engage in paid work that is independent of location and free from the fear of violence during transit, Masrat and Rani proposed an app for women to plan and pre-book chained trips to make their public transport journeys comfortable, time-efficient and affordable. The app consolidates data from all the women-driven mobility services and uses real-time data from the government transport app providing the most time- and cost-effective options to women for their planned trips. It's designed to reduce wait time and take into account the factor of safety ratings from users. They also introduced an integrated fare, an in-app marketplace for groceries delivered to their doorstep at a specified time, and an alert messaging option that works on a voice command in case of an emergency.

The program ran a series of pilot runs in the months to follow and was an instant hit with women. In the meantime, Rani and Masrat sold the Delhi transport minister on the idea, and even secured funding to launch the app by March the following year. Rani left her job at the transport department and set up a company to lead the project implementation. Today, it's been only a year into launch, but with the cycle of feedback from women using the service and some of the best women in the industry working with Rani, traveling through the city is no longer a labyrinth of threats for women. Instead, it's become an opportunity to do more, and reclaim the public spaces that are equally theirs to inhabit.

Written by: Idris Azim (Malaysia)

Who is Mohd Hakim?

Born and raised in the poorer parts of the Malaysian state of Selangor, Mohd Hakim is an older adult. He is also disabled and has spent most of his life fighting discrimination. He worked hard to graduate with a degree in engineering and secure a job as a drone pilot. Now, in 2040, he's a senior remote autonomous operations and repairs specialist at the National Railway Agency. Mohd Hakim pilots drones and uses them to remotely repair railway transport.

He's busy: Malaysia's mass rapid transit and light rail transit systems are being retrofitted to be in line with the government public transport plans. Mohd Hakim's two children are both in higher education and paying for that means he has to stay hard at work, even at the age of 61. He doesn't mind though: working helps keep his mind remain sharp, and he is a digital native. He currently lives in Melaka, a state which isn't as heavily developed as the neighbouring Selangor and the Federal Territory of Kuala Lumpur.

How I begin a day in my life

6.45am

They say that to live a long and healthy life, you must start your day with gratitude. I, for one, am very grateful that I get to push a button for the curtains to open to a radiant, orange sunrise. I am also extremely grateful that instead of having a phone violently disturb my rest with a screeching alarm, I am gently roused from my slumber by the soft vibration of the smart watch on my wrist. It wakes me up when the sun rises, which is an absolute blessing.

The curtains are drawn back, and I hear how quiet it is here in Melaka, save for a few birds chirping. Both my children are studying overseas, and my wife's still asleep, since she's working from home today, so the house is quiet too. On my phone are three key pieces of critical information I need to start my day; the number of days left until my next birthday, the number of hours until my preferred high-speed magnetic levitation powered train departs, and the number of minutes until my bus to the railway station arrives.

It's a painfully long minute as I wait for the lift to reach the second floor of our two-storey house. Work alerts already started flowing in. Now I've got inspections at 8am, as if going into the city to train some new staff wasn't bad enough. Solar energy output dropped 15% at a station in Putrajaya this morning, and as Senior Remote Autonomous Operations and Repairs Specialist, it's my job to assess the situation. That's a problem for later. Right now, I need to eat my breakfast and take my multivitamins.

7.40am

I like waiting for the bus. It's a luxury younger people take for granted. Where I used to live, to take a bus my whole family had to drive for 15 minutes, then you could be waiting, sometimes for an hour, with no way of knowing if one was ever going to arrive. Taking the train was no better. At either end of the journey, it was the same problems of walking on noisy streets, sweating while you waited in the hot sun, and sitting on a broken bench. It's not like that these days. Now I look at my phone and I can see the bus is about two minutes away. And if it's delayed, then I know that too.

7.51am

So, my bus to the high-speed rail station was a little late today. Normally, the hands-free ticketing system is as smooth as butter: using Bluetooth technology, built-in sensors on the bus detect the fare card on your phone and deduct the fare. What makes it even more convenient is that the fare card is also directly linked to your preferred bank account, so you'll never have to top it up. Of course, problems will arise if you change your phone and forget to reinstall the bus pass. This is exactly what some kid in a rush did today, so we had to wait for her to get that sorted.

As the rail station comes into view, I break into a smile. We used to have to drive or take much slower trains into the megacity, but today this train will get me there in about 15 minutes. This mechanical marvel is precisely why I didn't mind moving so far out to Melaka, where it is still quiet, and the air quality is fresh, thanks to all the conservation projects. It's just as fast as driving, with the added bonus that I don't need to circle around for five minutes to find parking outside a no-car zone or get ripped off by ridiculous parking fees. As soon as I'm out, I rush for the elevator, but there's already a queue, and a nice lady my age politely greets me and invites me to wait. And, of course, this elevator's painfully slow too.

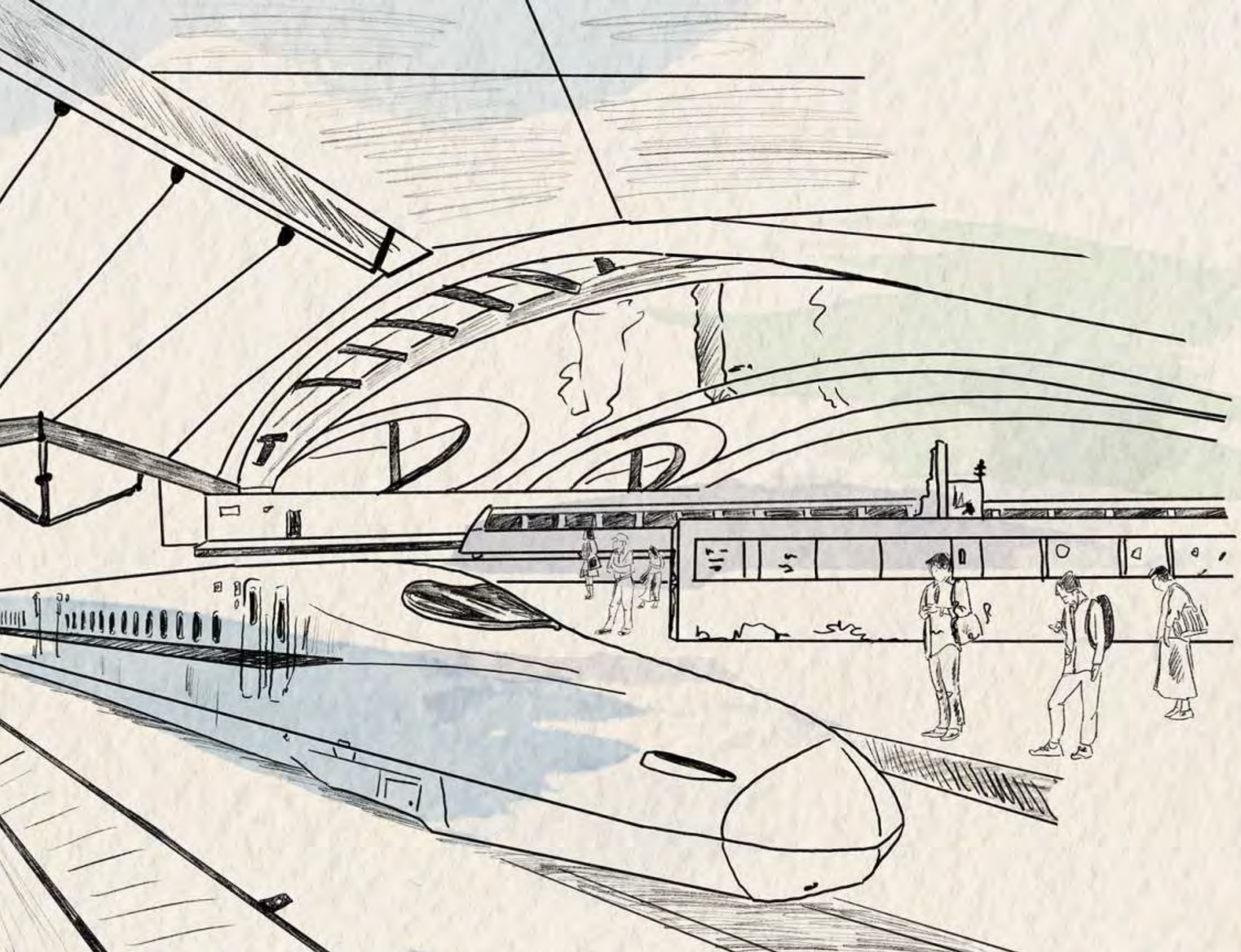
When I reach the station concourse, it's crowded and noisy, as usual. The advertisements used to drive me crazy, but less so now. Partial hearing loss has its upside, I guess. Nobody buys rail tickets from booths anymore. You either buy in advance, go to the website, or scan a QR code on your phone and buy them on the spot. You'd think they'd have implemented a similar cash-free system such as the ones they use for the bus, but there was a lot of resistance.

Even this early in the morning there are busloads of people coming in from all over the state. I avoid the rapidly forming queue, take a left, and plump for the more expensive premium coach.

It's double the price of a regular ticket, but that comes with its own perks, like no distracting TV ads while I'm on the train.

Now I've got a nice spot on the train, I can get started on my day's work. I log in on my laptop, and begin assessing the situation, remotely boot up the repair drone, watch it hovering above the ground, and activate its automated subroutines. It begins scanning the sensors of the solar panels above the Putrajaya rail station. By the time my train reaches my stop, it's already obvious to me what the issues are. These solar panels are aging and filthy and they've haven't been properly maintained. It doesn't help that the station itself is at least 40 years old, and of course the retrofits were sloppy. I'd hazard a guess that someone decided to cut corners on cleaning the solar panels, or hasn't followed protocol with bimonthly inspections, but that's not my area. I just fix whatever they break. Some panels will need replacements, others I can repair.

By the time I reach my stop in central Kuala Lumpur, I am notified that repair parts are being sent on the way from our warehouse and will be on site in two hours. That leaves me enough time for the rest of today's business, and there's plenty of that to keep me busy.



8.15am

As I exit the train and enter KL Sentral station to change lines to my work place, I am overwhelmed by the crowds and blinding advertisements within the station. This station is a monstrous, Frankenstein-esque combination of old and new. Every year, another line or part of the station comes under renovation to comply with new environmental regulations.

Every year another part of the station ages horribly, collecting rust, losing flakes of paint, scarred by scuff marks and stains from rain. Station staff are positioned every few hundred meters to help direct the hordes of disgruntled commuters.

There's no way I'd be able to navigate this alone, so I turn to my right and press the HELP button located at the side. Of course, that's broken too. At least I can go to a staff member and request help. At the service desk, the digital display says the current wait time is five minutes, so I use the time to pop open my laptop and check on the drone again. It's still carrying out some automated cleaning procedures, polishing the solar panels, and at the same time collecting data on the output of each cell. It also tells me which solar cells need the components that had been ordered while I was on the train. I close my laptop as I catch someone waving at me, some assistance for this poor old man has arrived at last.

It's a straight path to my light rail line which will take me to Pasar Seni station and this time the lifts are faster. Thanks to my radio frequency identification, I just walk up to the gateway which lets me through.

8.25am

Pasar Seni station is even older, and more dilapidated than KL Sentral. Its dirty walls contrast sharply with the beautiful green spaces just right next to the station. As usual, I'm stuck waiting for the lift. Also undergoing renovations, this lift has been the slowest one yet.

I book a rickshaw to bring me to my workplace, since this area, and other parts of Kuala Lumpur, are now car-free zones.
Of course, if one has sufficient influence or if the situation calls for it, a fleet of electric vehicles may be brought in, and they are for official government events. There are no regulations against using helicopters either. The sidewalks here are older and narrower than my son, so I need someone from the station to come and assist me. I don't even bother with the emergency button this time; I'm going to find another human for assistance.

I finally arrive at my office. It's in an eco-friendly gilded obelisk, with reflective paint shining in the glaring daylight. One of the building's security personnel assists me to the lift, which–blessed relief–isn't ridiculously slow this time.

8.35am

Thirty floors up, the new Remote Autonomous Operations and Repairs Specialists who have just joined today have been waiting for me in the boardroom for about five minutes, which I apologize for. They stand up to wish me good morning, as is customary when greeting a senior. I, unfortunately, can't stand up as well, seeing as how I'm (in case you haven't realized) wheelchair bound.

I notice some of the trainees, with their fresh faces and bright eyes begin to look at the left leg of my suit, as it is not as filled as the right. This is nothing out of the ordinary. I look out at the bright Kuala Lumpur skyline, press a button and darken the room as I plug in my laptop and begin their training session.

Written by: Amerita Ravuvu (Fiji)

Who is Vili?

Vili, 42, lives in his rural birthplace in the highlands of Naitasiri, Fiji. His family has lived here for decades. He grew up in a farming community, which nurtured his passion to work the land. Vili has been a smallholder farmer for over 20 years and makes regular trips to sell his surplus in the Suva market, one of the largest markets in Fiji, catering to thousands of families from the Suva to Nausori corridor.

With the recently increased government investment into the country's ailing agricultural sector, Vili hopes to grow more food, improve his business skills and be in a better position to engage with markets in Fiji in the future.

Road to heaven for Vili the market vendor!

Traversing the highlands of Viti-Levu, Fiji's biggest and main island (more commonly known as Colo) has always been likened to going to heaven, because one is going up. Vili vividly recalls his late paternal grandfather's stories about the difficulties of traveling from his village in the provincial highlands and how much still remains unchanged. In the 1930s, when his grandfather was a boy, going from Vili's village from the capital Suva meant traveling 97 km by bamboo raft or outboard motor punt along the winding and cascading river. By the 1970s, there was some progress: 89 km by dirt road plus another 8 km by outboard motor punt, and it stayed that way until 2005.

In those days, the journey was about three and a half hours, but it wasn't always smooth sailing on the outboard motor punt, and sometimes it wasn't possible at all. When there were floods, it was dangerous to attempt the trip by river craft, and well-nigh impossible to walk along the muddy overland tracks, wade through flooded creeks and struggle through tall grass and reeds. During dry weather, the river was so low that it became difficult to travel upstream. At many points, passengers had to alight and walk along the bank while the boatman pushed his punt up the rapids.

Thus, boatmen were reluctant to carry heavy loads and preferred to travel only during the day. Deciding the appropriate time to travel to reach the village was an important consideration if the journey was not to be costly, unsafe and difficult.

Over the years, various politicians have promised to build all-weather feeder roads to remote and isolated areas such as Vili's village, but this never happened. In 2005, more than eight general elections and half a century of broken promises later, the long treacherous walks and boat rides to Suva came to an end as the road finally reached Vili's village. Fast-forward into 2021, the traveling time has been greatly reduced: just two hours now from Suva to the village by road. For market vendors like Vili, their trips to the Suva market to sell their produce are so much easier.

That said, even this "all-weather" feeder road has its challenges. When there is a natural disaster or heavy rain, the bridges and crossings that connect these roads are inaccessible. Moreover, the roads are not tar-sealed right up to the village. There's 30 minutes of travel on dusty gravel roads. Road conditions deteriorate every time there is flooding; then it's back to river transportation, although dangerous. Overland tracks once again become the major connections between Vili's village and the administrative centers of Vunidawa and Suva. Other neighboring villages fare even worse. They still don't have any motor-road access, because beyond the alluvial flats are bush and forest-covered hills and valleys.

Now, for Vili, traveling to Suva in good weather takes two hours in the village truck carrier to bring his produce to the Suva market. The public bus that services the route to Vili's village once in the early morning and once in late afternoon, takes three hours. Vili spends the whole day at the market selling what he can and returns to his village in the evening in the village truck carrier.

Sometimes, when he's all sold out by midday, he can return on the bus that leaves the Suva bus stand at 1pm and arrives back at the village at 4pm.This connection to centers of trade like Suva have become an important part of life for Vili's fellow villagers. While they can be almost self-sufficient life thanks to locally available resources, people have developed a liking for goods and services rendered in urban areas. A reliable transport system that connects them in an affordable way has become a must-have.

However, major transport advancements to help improve access to income opportunities for rural dwellers still feels like light-years away, along with the associated better social outcomes. Despite all the progress, when it comes to transport, time appears to have stood still for so many years. A significant change to transport systems linking remote and isolated areas such as the highlands of Viti Levu would be transformative for Vili and his community.

Written By : Amerita Ravuvu (Fiji)

Who is Repeka?

Repeka was born and raised in Fiji's capital, Suva, but she has maternal links to the island of Kadavu. She had never engaged in any interisland passenger travel until she was 14, when he grandmother passed away and had to be laid to rest in Kadavu. Now at the age of 35, Repeka is a rural development enthusiast, working as a rural and maritime policy officer. She is keen on raising the standards of rural and interisland transport services and ensuring that these are an integral part of Fiji's national and rural development plans.

A sea story: Repeka's journey to Kadavu

Kadavu Island lies only 88 km across the sea from Suva, but its proximity to Fiji's capital belies its isolation. An island of high mountains and precipitous cliffs, its population of around 10,000 lives in small villages of 100 to 150 people, spread out along the beaches and rivers. Kadavu Island is nicknamed 'little New Zealand', due to its likeness when viewed from a little way offshore, but it has few roads, no electricity grid and no public water system. The transport of choice for this rugged island is fiberglass outboard punts as water taxis. Its 'capital', Vunisea, comprises the airport, a government station, a health center and some shops. Like most pristine places in the world, getting to Kadavu or can be quite a mission, especially if one takes the ferry. Most of the resorts on Kadavu are far from the airstrip and you must be met and ferried, sometimes for an hour or more by water taxi to your destination.

Repeka's first introduction to Kadavu, her mother's hometown, was in 2000 when she went there to lay her maternal grandmother to rest. For her, an urbanite from the main island, this was an unforgettable experience. For the first time in her life, she experienced traveling in a vessel that was dangerously overcrowded. The waiting area was uncomfortable, thanks to the humidity, high winds and rain.

Life jackets were hard to find, and there weren't enough to go round. There were no safety announcements at all.

Boarding alone took six hours, and when the boat finally set sail at midnight, it took over eight hours to arrive at the bay in front of her mother's village. Then there was an additional 10-minute transfer on an outboard boat to get to the village. Fortunately, Repeka managed to sleep for most of her 8-hour voyage, and was spared motion sickness, and a visit to the overcrowded toilets. She didn't notice how overcrowded the vessel was and the creative ways people found to sit or stand, with little regard for comfort.

Although it was a novelty for Repeka, this scenario of dangerous and uncomfortable domestic travel is all too familiar to islanders who regularly do maritime travel in Fiji or elsewhere in Oceania. While regional shipping services provided by well-established liner services are generally adequate with reasonably modern and well-maintained fleets, the domestic shipping fleets that are the essential to connectivity within archipelagic nations are often in very poor repair. Although maritime transport services have become more regular, the traveling conditions have stayed the same: unsafe, expensive, and riddled with systemic issues that require urgent attention.

These systemic issues include financing and lack of economies of scale on long maritime routes. This perpetuates a vicious cycle of old, poorly maintained vessels being replaced by only marginally better ones. The biggest operational cost is diesel fuel, an import that is crippling national budgets across the region.
Unsurprisingly, it is the smallest, most remote and vulnerable Pacific communities on outer islands such as Kadavu that are the most disadvantaged.

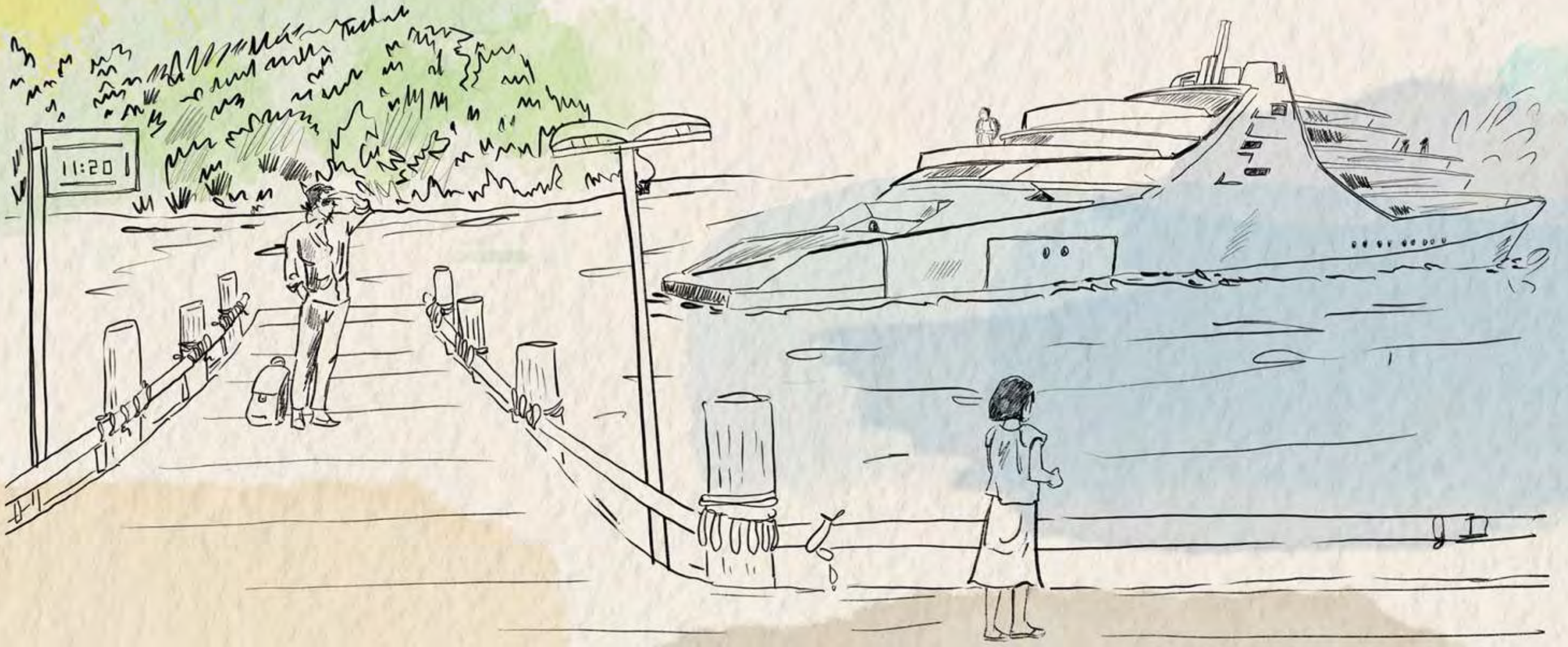
For these people, shipping services are infrequent and often erratic, and the most expensive per capita. The cost and strain of maintaining essential connectivity to outer islands with few resources to trade at small-scale has seen an escalating migration to urban centers, creating yet another vicious cycle. The bottom line is that like rural roads access, the importance of shipping as the essential economic, social, and government service link of maritime communities has never been given the priority it deserves.

When Fiji went to the polls in May 2022, a new government was elected on a manifesto of promoting rural and maritime development. Improving the infrastructure and transport services that provide an essential connectivity to Fiji's island archipelagos was made an operational priority.

This government remained in office for two four-year terms, and in that time, there were unprecedented funding allocations to massively expand access and provide far greater mobility to the Fijian people. Substantial investments have been made to upgrade and replace the bridges and crossings that are easily flooded during the wet season.

In 2030, for rural dwellers like Vili, they no longer fret about missed opportunities due to the weather to go to urban centers and sell their produce. The tar-sealed roads to Vili's village have regular bus services, as well as taxis, servicing the one-and-a-half-hour route to his village. Now he can take a 15-minute bus ride to Vunidawa, the closest administrative center. There have also been big investments in community programs in rural and maritime areas to improve the quality of roads and enhance pedestrian safety. Footpaths and cycle paths, well-lit roads even in rural areas have been a key part of the government's efforts to improve quality of life for people living in these settings. Thanks to improvements such a cycle paths, rural dwellers like Vili now have more transport options to choose from to reach Vunidawa's grocery shops, post office, and hospital.

For maritime travelers and dwellers, the strengthening of enforcement of existing laws (the Maritime Safety Authority of Fiji Act 2009, Maritime Transport Act 2013 and Ship Registration Act 2013) has been transformational. Since 2026, all shipping vessel owners are required by law to implement and maintain a safety management system and all domestic commercial vessels must have one, even those that are exempt from a certificate of operation. Through stringent enforcement, the specific risks and conditions of domestic vessels are all captured to ensure the safety of both passengers and crew.



Inspections and random checks on board vessels are done quarterly by Maritime Enforcement Officers to ensure that domestic shipping vessels comply. During these inspections, the master and crew of vessels are asked to demonstrate that they have considered the risks and hazards in their operation and have taken steps to eliminate or minimize them.

Another key development that has taken place is the rehabilitation of jetties in maritime areas. Given that a number of jetties throughout maritime islands are built on the coastal fringes slightly above the mean high tide line, these have been subjected to more frequent inundation from tides and storms. Climate change has now been factored into the maintenance and upgrading of current landing sites. This includes beach stabilization works, construction of haul-out ramps for small boats, and the completion of a feasibility study and detailed design of construction of breakwaters in three key jetties servicing inter-maritime travel around Fiji.

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See also:
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