

**SURVIVAL**

- Aceh, Indonesia
- Zaatar, Jordan
- Louisiana, USA

**FAILURE**

- The Darien Gap, Panama
- Kinshasa, DR Congo
- Glasgow, UK

**FUTURE**

- Akita, Japan
- Tallinn, Estonia
- Santiago, Chile

## RESILIENCE ON THE BEACH

As Suryandi recounts the morning of 26 December 2004, his strongest memories are of the terrifying sounds the tsunami made. It was a Sunday, and he had been busily preparing his restaurant, situated in prime position on the beach at Lampuuk, Aceh, for the coming day's trade. When he heard a petrified fisherman shouting that a thick fog was rising from the ocean on the horizon, he headed down to the water's edge to see what the commotion was about. The reef, usually underwater, was exposed, and out on the edge of the bay two fishing boats had run aground in a spot that was normally a deep channel. He stood and watched until he saw the wave hit a headland a mile to the north. It sounded like a bomb had exploded, and Suryandi knew he was in trouble. He ran for his motorbike and opened the throttle, flying inland up narrow village lanes. By that point the air was full of screams and prayers, he says. There was no time to stop and check on his family and friends as he pushed on for higher ground. Behind him he could hear the wave. It sounded like an aircraft was chasing him.

Tsunami survivors in Aceh remember three waves and say the second was by far the worst. Suryandi watched it from the broadcasting tower of a local television station, which he had climbed up after racing inland. Water from the first wave had engulfed everything, he says, but homes and gardens remained, shops and cattle sheds were still intact. The second wave thundered in like the first, but was accompanied by sharper sounds of demolition – loud snaps and crunches – as trees were uprooted and buildings were destroyed. The third wave was far quieter, its rumble quickly giving way to a deep whooshing as the sea water began to drain back to the ocean. As the water receded, the local mosque appeared, but nothing else did. Every home was gone, every business flattened; all the fishing boats were smashed and the cattle had been swept away. Then, a final

sound fell on Lampuuk, which Suryandi describes as the worst experience of his life – there was complete silence.

Today on Lampuuk beach, Suryandi has a new restaurant. It is called Akun and sits, like the first one, in prime position at the head of the bay. His speciality is fresh fish, cooked over the glowing embers of coconut shells and served with local pickles. Like other Acehnese tsunami survivors, Suryandi ignored advice to relocate away from the coast and instead returned quickly to his village to rebuild his life. He started with nothing, building a shack made from driftwood into a thriving business. His account of that terrible day, on which he lost his mother, fiancée and many of his friends, is one of grief and mourning. But like other Acehnese, he has another story to tell: one of ingenuity, determination and, in a way, triumph. Suryandi faced an extreme challenge, the type of which few people have come up against, yet through resilience and adaptation he bested it. My mission in Aceh was to find out how locals had rebuilt their communities so quickly, what role the economics played in their astonishing resilience, and what the rest of us could learn.

## THREE EXTREMES: SURVIVAL, FAILURE AND FUTURE

The idea that the extremes of life offer important lessons is an idea widely used by scientists. In the field of medicine its founding father is Dr William Harvey, a London-based anatomist working in the seventeenth century. Harvey saw the value in examining odd and rare cases, with the remarkable life story of Hugh Montgomery a fine example. As a child, Hugh suffered a riding injury: the left side of his torso smashed so badly when he fell from his horse that his ribcage fell away, leaving part of his heart and lungs uncovered. Miraculously the boy survived – a metal plate in place of ribs was used to protect his vital organs. By carefully removing the plate, Harvey was

able to examine Hugh, and recorded how the movement of his heart came at the same time as the pulse in his wrist. It gave the doctor a unique window on human anatomy and was evidence for a controversial idea he was seeking to prove – that blood circulated continuously around the human body.

Harvey was mocked by his peers, but as centuries passed, the importance of his most famous finding – blood circulation – became clear and the value of his methods respected. Other medics showed those who survived following bodily damage could offer valuable insight. In 1822 a young Canadian, Alexis St Martin, survived an accidental shooting and lived with a hole in his abdomen; direct observation of how his digestive system worked became an important foundation of gastric physiology. And in 1848 a railroad labourer in Vermont, Phineas Gage, miraculously survived an explosion which propelled a metal rod through his skull; the record of his life following the accident – how his abilities and moods changed – became a groundbreaking study of how the brain works. The miraculous resilience of these extreme patients – all damaged in some way, yet all surviving – offered lessons that could be applied when thinking about how more normal, healthy human bodies functioned.

A related tradition exists in engineering. It began in the mid-1800s after a series of tragic industrial and transport accidents. The Industrial Revolution had pushed materials to their limits – in the UK, factories collapsed and boilers exploded; France was shaken by a rail tragedy in which a train derailed due to a snapped axle, claiming 52 lives. These disasters became public scandals, dominating politics and spurring a new branch of scientific investigation as engineers began to conduct in-depth studies of why things were going so wrong. The Scots excelled in this discipline and foremost among them was David Kirkaldy. Trained as an engineer, Kirkaldy devoted much of his life to studying why materials buckled and bent under pressure. He saw such value in the examination of failure that he designed a huge hydraulic machine to push metal samples until they snapped and sheared, and curated a small museum in which to

display the fragments. When Britain suffered its worst disaster of the nineteenth century – the 1879 collapse of the Tay Bridge – it was Kirkaldy who was called in to get to the bottom of what had gone wrong.

David Kirkaldy's idea that we can learn from extreme failure echoes today. Anyone who has crossed London's Hammersmith Bridge, or the Eads Bridge over the Mississippi has relied on his testing machine, which was used to check components for both. Modern scientists evaluating cutting-edge new materials do the same thing, putting samples in contraptions much like Kirkaldy's, testing them to destruction and then picking over the fragments. The core property of a material is known as its 'potential': it could be the ability to bear a load or to withstand pressure; the capacity to bend and stretch; being able to conduct heat or insulate from it. When a material fails, these latent properties are lost – rubber loses its elasticity, metal loses its strength – and the potential is gone. Kirkaldy's big idea was that to understand potential fully – its limits, how it can be lost, how it can be protected – we need to collect and examine fragments of failure.

The final motivation for studying extremes comes from an idea set out in 1928 by the economist John Maynard Keynes. Concerned that society was in the grip of a bout of pessimism about the economy, Keynes set out a largely optimistic long-term vision. Part of his argument was that we can get a glimpse of the future today, if we know where to look. The trick was to identify a sustained trend – a path most people are following – and look at the lives of those experiencing the extremes of that trend. At the time, Keynes thought the sustained trends would be an increase in material wealth and a reduction in the need to work. To zoom forward in time, he said, we need to find those whose lives are like this already: those with the most wealth, and those enjoying lots of leisure. Keynes called people who are living at the extreme limit of the trends shaping the economy 'our advance guard'. They are a useful way to think about the economic future because they are 'spying out the promised land for the rest of us and pitching their camp there'.

## NINE ECONOMIES

The nine places that feature in this book are all societies where these three types of extreme experience – survival, failure and future – play a definitional role in people’s lives. The first part of the book takes its inspiration from William Harvey and features places where people have proved resilient in the face of extreme damage and trauma. Aceh, where I met Suryandi, was the region hit hardest by the tsunami waves of 26 December 2004. The villagers lost everything, yet it was the site of a rapid economic rebound. The Syrian families I met in Zaatari, northern Jordan, had left behind their homes and businesses as they fled their country’s civil war. Yet they too rebuilt, establishing a vibrant new life in this vast and controversial settlement which became the world’s biggest and fastest-growing refugee camp. The prisoners I met in Louisiana left everything behind when they entered their new home, the biggest penitentiary in the US’s most incarcerated state. Even here, there is a kind of economic resilience, as people barter and trade to get by. For these people, natural disaster, war and imprisonment wiped away everything that went before. Yet in all three places people survive and even thrive, often relying on the economy to do so.

Next I visited places I think David Kirkaldy would have investigated had he been an economist – three economies that have failed. The second part of the book starts with the Darien Gap, a site of such enviable location and natural riches that it has been a target for entrepreneurs since the 1500s. Today the territory remains a lawless no-man’s land, has a reputation as one of the most dangerous places on earth, and is the scene of devastating environmental degradation. Kinshasa, capital of the Democratic Republic of the Congo, has such potential that it should be Africa’s best megacity. But it too is a place of failure; home to 10 million people, it is the poorest major city on earth. Glasgow once vied with London for the title of Britain’s leading city, with so many breakthroughs in science, engineering and the

arts that there was no better place to live at the start of the twentieth century. But Glasgow unravelled, losing everything as it became Britain's most troubled city, a dubious honour it retains today. In each of these places vast potential – whether natural, human or industrial – has somehow gone to waste, with economics often at the core of the problem.

Finally, I visited three places John Maynard Keynes would have looked at if he were alive today and following his own advice on how to take a peek at the economic future. As 2020 approaches, it seems the world is again in the grip of economic pessimism. Across the globe, most countries face three trends: ageing populations, the flux caused by new technology, and a rise of inequality. The trends are generally seen as unavoidable and capable of inflicting serious damage on the economy: they will be tests of resilience and may drive some economies to failure. So I followed Keynes's advice and sought out cities that were as old, advanced and unequal as possible. Akita, in northern Japan, is a frontier of ageing; Tallinn, Estonia's capital, is a frontier of technology; Santiago, Chile's capital, is a frontier of inequality. The majority of people in the world will soon live in places that feature a mixture of the stresses and opportunities seen in these three cities today. This means life for the 'advance guard' of these economies is a window on our own likely future. I visited them to understand the economic forces there, compare them to those underlying resilience and failure, and see whether it all added up to grounds for hope about the future, or fear.

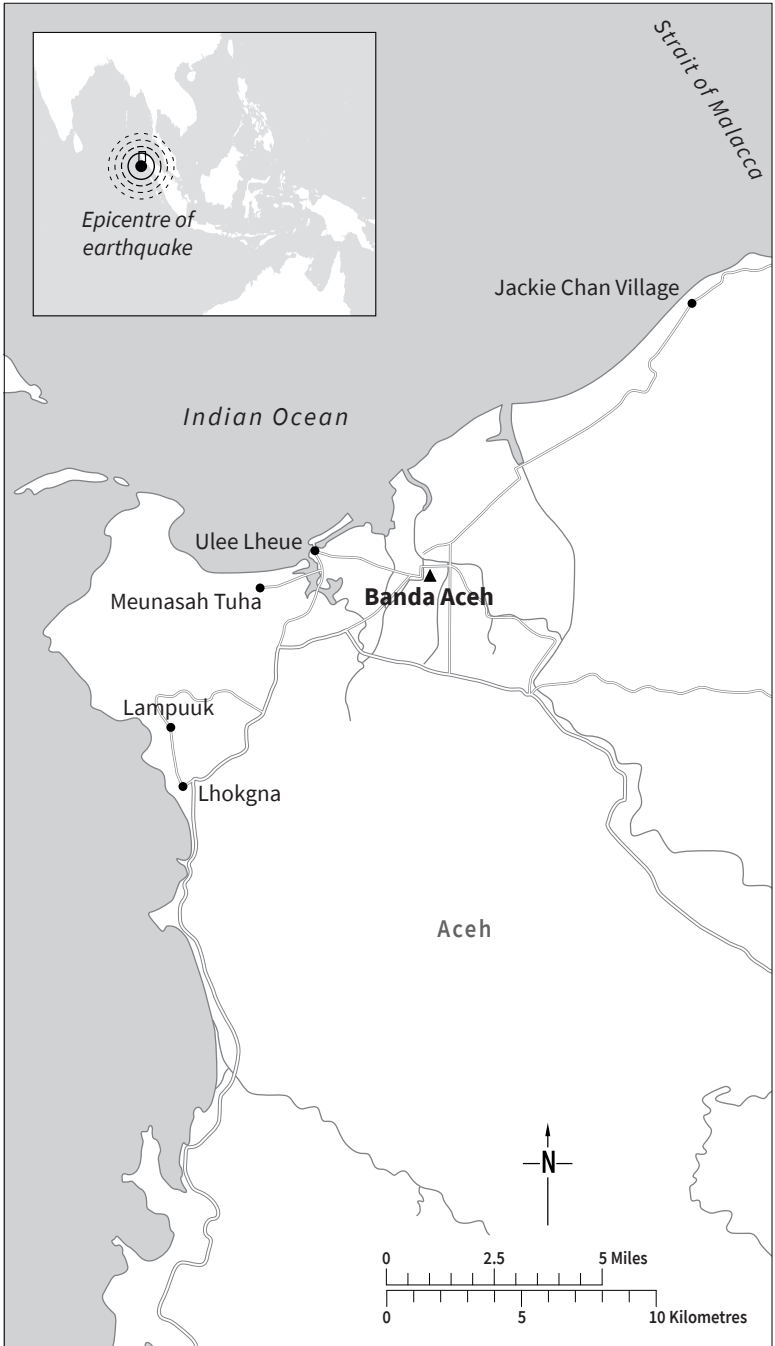


## A Note on Data

Since the challenge was to find and visit global extremes, the places I travelled to were picked in as quantitative and objective a way as possible to ensure they were the most striking examples of their kind. More details, facts and figures on each economy and how it was selected are given in each chapter. Wherever possible I have used data downloaded from official national statistical agencies or international institutions. My notes, together with references to research and further reading, are at the end of the book. A selection of interactive graphs, notes and data sources is available at the book's website: [www.extremeeconomies.com](http://www.extremeeconomies.com).

# **SURVIVAL**

**THE ECONOMICS OF RESILIENCE**



1

# Aceh

An enemy lays waste a country by fire and sword,  
and destroys or carries away nearly all the moveable wealth  
existing in it: all the inhabitants are ruined, and yet in a few years  
after, everything is much as it was before.

**John Stuart Mill,**  
*Principles of Political Economy, 1848*

# DEVASTATION

## THROW THE KEYS AWAY

‘The earthquake did not feel that bad,’ says Yusnidar, ‘but then my son Yudi went down to the sea. He said there were fish all over the beach and there was a wave coming.’ The shoreline is just 500 metres from where Yusnidar and her family lived in the centre of Lhokgna, a tiny village on the far north-west coast of the province of Aceh, Indonesia, so they knew they needed to move fast. They were fortunate, Yusnidar, now in her late sixties, says: as headteacher of the local primary school she had a decent income and the family, well off by local standards, all had motorbikes. Her son, Yudi, sped off to pick up his sister from a nearby house while his mother, unaware of how bad things were about to get, took the time to grab a few treasured possessions including a small bag that held room keys to the guest house the family owned. With her bag in hand, she jumped on to the back of her husband Darlian’s bike, and they tore off in search of higher ground.

Those motorbikes saved their lives, Yusnidar reflects. Without them the tsunami wave that destroyed Lhokgna on the morning of 26 December 2004 would have caught the family, as it did so many of their neighbours. Now retired, Yusnidar is still comfortably middle class. She wears a crisp shirt, her dark hair is held back by a thin white band, and she plays with a thick gold bangle that rests halfway up her left forearm as she recounts the tsunami and its impact. Many years of dealing with tourists has given her good English: ‘We were the first in the village to set up a homestay,’ she says, explaining how the couple took in their first guests – initially providing accommodation free of charge to surf explorers – in 1981. They soon turned it into a business, which gradually expanded as the couple added extra buildings when times were good. The additional income from the guest

house allowed them to pay for high school and university educations for their kids.

The terrain rises quickly here as you move inland, soon becoming dense jungle. The track they fled up that day still exists: retracing their route, it is possible to get a few hundred feet above sea level after just a couple of minutes. This meant Yusnidar and Darlian were safe, as were their three children. But you cannot see the beach or the village from the hillside, which is covered in dense jungle, and after sheltering there for a few hours the parents decided to walk back down and assess the damage. ‘I picked up my bag of keys to go and check on my home and the guest house,’ she recalls. But Yudi, then 22, had already ventured down the hill to the edge of the village, and he stopped her. ‘He shouted at me: “No, Mumma!”’ She pauses, sighing. ‘He said there was nothing. No house, no buildings, no homestay. All gone.’

Under-estimating the severity of the situation in the village would have been easy to do. This was no normal disaster – the forces unleashed that morning had rocked the earth on its axis, destroyed five million homes and claimed almost 230,000 lives. The people of Lhokgna, its twin village of Lampuuk and the town of Banda Aceh were the first and hardest hit. What happened in these places that morning was terrifying. What has happened since is a story of stubborn survival, resilience and rebuilding that illuminates the basic building blocks of economics.

As she finishes her account of the disaster, Yusnidar makes a lobbing motion with her hands, as if she is throwing something away. Her treasured bag of keys, the years of work and investment it embodied, had become a relic of a life, a village and an economy that had been wiped away. She threw the bag into the jungle and walked down to Lhokgna to start again.

## THE DAY THE EARTH CHANGED SHAPE

Tectonic plates usually move extremely slowly, shifting at most 8 cm in a year. (Glaciers, which can move over 15 km in a year, are thousands

of times faster.) But just after 8 a.m. that day, things sped up as, around 50 km off the western coast of Aceh, the Indian Plate fell 30 metres in a few seconds, driven down by the opposing Burma Plate. From this epicentre a long thin rupture started to appear and, like a giant zipper being closed across the ocean floor, it drew the plates together quickly. Starting off the coast of Aceh it stretched 400 km to the north, moving at nearly 10,000 km per hour, or nine times the speed of sound.

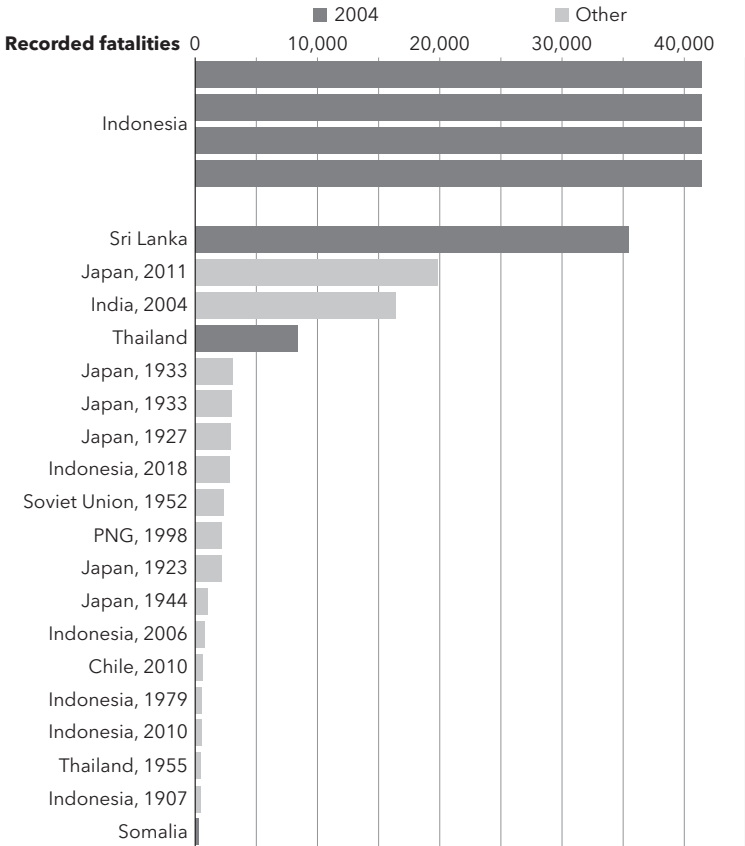
The vibrations created an earthquake known as a 'megathrust'. It had a magnitude of 9.1, releasing 40 zettajoules of energy, enough to sustain global energy consumption for 80 years, and equivalent to 500 million Hiroshima atomic bombs. The shock that started just 50 km from the coast of Aceh was so big that the earth wobbled on its axis and even changed shape (our planet is now a more perfect sphere and spins faster, so we have slightly shorter days). It was the kind of thing that happens perhaps every 500 years.

Earthquakes often cause tsunamis, so something on this scale could be expected to cause a large wave. But scientists examining the seabed have recently discovered why things were so extreme in this case. Alongside the main faults, a series of secondary ruptures appeared, forcing huge chunks of the seabed up into space occupied by the ocean, and creating waves that were bigger and faster than any tsunami on record. The fishing villages of Aceh's north-west coast, Lhokgna and Lampuuk, were directly in its path. As in other parts of the world, the waves rose up and slowed as the waters shallowed. Here they reached 90 feet.

The waves killed 227,898 people across 14 countries, with Aceh being hit first and hit hardest. In Lhokgna and Lampuuk, more than 90 per cent of the villagers perished – the population fell from 7,500 to just 400. The Rahmatullah mosque was the only building that survived on this stretch of coastline, as every home, hostel and restaurant was destroyed. Yet within just a few months the Acehnese were rebuilding their lives and their economy, resulting in a remarkably fast rebound. Today, stories like Suryandi's are

## Killer waves: the 20 worst tsunami disasters on record

*Deaths caused by tsunami waves, 20 highest since 1900*



Source: Emergency Events Database (EM-DAT)

common in this unique place: people are back on the beach, living as they did before.

The extremes in the first part of this book are places where an economy survives and comes to thrive despite all the odds. On this definition, Aceh is a fascinating place to study. In this little-known corner of Indonesia, the people were put to unmatched stress, and many were encouraged to move away from their decimated coastline.



Yet they stayed put, rebuilt quickly and soon started to thrive. I went to Aceh to meet the people to understand what drives the human urge to rebuild, how we should measure the strength of an economy, and to ask locals about the source of human resilience in the face of such a devastating shock.

## THE STORY OF ACEH

Around the headland in Banda Aceh, the regional capital, the disaster was devastating. Almost 170,000 people (around 55 per cent of the population) lost their lives. Ulee Lheue is a pretty suburb with neat rows of houses enclosed by tropical trees, ferns and palms; it is also low lying, close to the sea and completely flat. After wrapping around the headland, the tsunami waves would still have been 10 metres high here, and they destroyed every home in the neighbourhood. Yet today the streets run as they did then, parallel to the plot of the local mosque and right down to the shore. The house at the very end of the road, closest to the water, is a metre above sea level at most and would have been the first here to be flattened by the wave. Its owner then, as now, is a jolly local policeman called Mohammad Iqbal.

You can see why the family likes living here – the area around the mosque is a hub of activity. Mohammad's brother-in-law cycles up as we talk. He has built a mobile display cabinet, placed it on top of a side car and attached it to the side of his bicycle, from which he sells fruit and jewellery – freshly cut pineapple, melon and mango along with the large *aqiq* rings set with chunky gemstones that Acehnese men favour. His son, also Mohammad Iqbal, speaks good English and explains that he lost his mother, brother and sister in the disaster. The younger Mohammad is the first person to say something I end up hearing a lot: 'Welcome to Aceh. Remember that the letters in our name stand for Arabic, Chinese, European and Hindu.' The story – that this is a special place founded by traders – is strong in the minds of the Acehnese, a people who understand the history of their land and regard it as exceptional.

## THE PEPPER CAPITAL AND VERANDA TO MECCA

Aceh's location, so devastating in 2004, has through most of its history been an economic asset. As maritime trade began to flourish in the fifteenth century, Banda Aceh became the gateway to the Malacca Strait, the channel that links the Pacific and Indian Oceans and is the primary shipping lane joining India and the west with China, Japan and the east. Cargoes from the Spice Islands – pepper, nutmeg, mace, cloves, ginger and cinnamon – were shipped up the strait and then on to ports in Sri Lanka and India as they headed west to Europe. They were light and their uses in curing meat and making medicines made them hugely valuable: nutmeg was worth more than its weight in gold in Britain, and London dockers would happily be paid in cloves. The spice ships navigating the Malacca Strait were like floating buckets of cash, and offering them safe harbour, as Banda Aceh did, was a lucrative business.

As well as controlling a strategic port, the Acehnese became powerful exporters, selling nutmeg and cloves, together with betel nuts, which can be chewed to give a caffeine-like high. But the big money here came from the global pepper boom. Pepper vines thrived when planted along Aceh's west coast, and by the 1820s the region was producing up to 10,000 tonnes a year, half the world's supply. Local farmers stopped cultivating rice and instead sent pepper south, trading it for lower value rice plus gold to settle the difference in value of the crops. Trade meant Aceh became richer than other parts of Sumatra, allowing it to maintain supreme maritime strength. For its control of shipping and the products of its land, the Acehnese came to understand that their end of the island was superior.

Others recognized the value of Aceh too, leading to centuries of battles and warfare between the Acehnese and rivals who sought control of the Malacca Strait. The early enemy was the Malacca Sultanate based across the water on the Malay Peninsula (modern-day Malaysia). Later, as European powers explored the east, Britain became an important protector, guaranteeing Acehnese independence in

order to prevent the strategic region falling into enemy hands. But in 1871 the UK stepped back, allowing the Dutch to invade and claim the whole of Sumatra. The Acehnese resisted, and hostilities continued until after the Second World War. As part of the post-war peace process Aceh was bundled up with the rest of Sumatra and made part of the new Republic of Indonesia. It was a merger the Acehnese never agreed to, fuelling an independence struggle with regular battles between GAM (Gerakan Aceh Merdeka, the Acehnese guerrilla army) and Indonesian forces.

One of the fears about our economic future is that ageing, technology and inequality will lead to greater divisions: between the old and young, those with skills and those lacking them, the rich and the poor. The importance of understanding divisions, and how they widen or heal as an economy evolves, was another reason to visit Aceh. Its unique history meant the place had its own fault-lines, competing claims and factions that pre-existed the tsunami. This idyllic-looking spot was a land where peace talks had failed, a large military presence operated alongside an active rebel army, and which had a population who identified as Acehnese first and Indonesian second. Would the pressure of rebuilding exacerbate these divisions or would the challenge bring people together?

## RESILIENCE

### THE COFFEE KING

‘The water was eight metres when it passed through here,’ says Sanusi, 52, pointing to the roof of a nearby two-storey building to emphasize the point. His cafe – Sanusi Coffee – is at the heart of Lampaseh, a suburb of Banda Aceh around 15 minutes by motorbike from the west coast. He is smartly dressed, with an impressive bushy moustache, and his business is buzzing around us: at the main bar a stream of commuters swings in and out for takeaway espressos; outside,

customers sip iced green tea and pick from plates of snacks under awnings providing welcome relief from the blistering sun. Sanusi explains that he did not outrun the tsunami – the roads here became too congested to escape by motorbike – but survived by shimmying up the trunk of a coconut tree. By the time he slid down, his business had been washed away, taking with it a safe containing his life savings. Sanusi returned home to find his house flattened, and his wife and eldest son dead. He recalls sitting traumatized for a day or so, doing nothing.

Within a couple of days he had decided to rebuild his coffee shop. ‘This is what I do,’ he says, ‘and I had my surviving children and customers to think of.’ After losing his house, much of his family and all his savings, how would rebuilding be possible?

One thing the tsunami waves did not destroy was Sanusi’s knowledge of the coffee business. He started as a teenager, working for a wholesaler: ‘I learned about trade pricing, and where to source the best beans.’ Sanusi orders a young helper to bring us a bag of raw green coffee beans for a demonstration, selecting examples of plump ones that will make it to his roasting facility and the thinner ones that will be discarded. His suppliers, high up in Aceh’s mountainous Gayo region, were unaffected by the disaster, so maintaining a supply of coffee was no problem. As we talk, he carefully continues to pick at the bag of beans, separating good from bad. The Acehnese don’t drink alcohol but guzzle coffee, and Sanusi knows the business better than anyone. Determined to rebuild, what he needed was cash.

In any other situation Sanusi would have been the ideal candidate for a bank loan: an entrepreneur who knew his supply chain inside out and had a track record of turning coffee beans into profit. But the local banks had been destroyed, and the international aid agencies that started to arrive were focused on housing and sanitation rather than on business loans. His savings were gone and new funds impossible to find.

Then a customer, an academic from Jakarta who regularly visited Aceh, came to his rescue, loaning him 5 million rupiah (then around

\$500, or £300). Using this to pay labourers and order new equipment, Sanusi Coffee was operating again within just five months of the disaster. ‘Rebuilding this place was not just for me – look,’ he says, proudly gesturing towards street vendors selling snacks to his customers (*peunajoh*, a sticky rice ball wrapped in banana leaf, is the most popular). Next he points to another stall that has set up outside, selling portions of rice and various curries to be taken home wrapped up in palm leaves as *bonkus* – Acehnese takeaway. His place has become a lesson in how even the smallest assistance can go a long way when combined with knowledge, skill and effort. A local hub once again, Sanusi Coffee is its own thriving mini economy where one business supports another. As the local coffee king finishes his account, he sits back and gives a rueful smile. In front of him are two neat piles of coffee beans: good ones on the left, bad on the right.

## A LIFESAVING TRADITION

Banda Aceh’s old market, Basar Aceh, is a fantastic place to shop. Fruit stalls are piled high with tropical offerings including scaly purple snake fruit, hairy red rambutan and the spiky green durian, like a bloated green rugby ball, that the Acehnese adore. (Supposedly the king of fruit, it smells like a wet dog; local hotels display signs asking guests not to bring them on to the premises.) It is the run-up to Ramadan – prime wedding season – and the haberdasheries are packed with women comparing material for dresses and their first sets of curtains; down tiny side streets an army of tailors can be seen, their sewing machines whirring as they work. Bridal gowns with plenty of lace are the current style, says one shopkeeper, explaining that newlyweds’ taste in curtain material is more perennial: they like to buy deep-red fabrics reminiscent of the colours of the Acehnese flag. At the heart of Basar Aceh is the key to this economy – the shops that buy and sell jewellery and gold.

Harun Keuchik Leumicek, the head of the local gold traders’ association, sits in a private room at the back of his shop in the old

market. The place is cool, quiet and pleasantly pungent; a sink in the corner is stacked with red and blue tubs of Brylcreem, the shelf above it lined with various bottles of eau de cologne. Harun, in his seventies, is as natty as he is fragrant, dressed in black silk trousers cut wide like culottes, black snakeskin leather shoes and a short-sleeved batik shirt with a fiery red motif. His right ring finger carries the large blue gemstone that is common among Acehnese men; his left wields a giant diamond, which is not. The walls of his lair display awards for his expertise in gold and from a previous life in journalism. He adjusts his solid-gold Rolex, explaining that a centuries-old tradition was one reason local families were able to bounce back from tragedy so quickly.

‘Whatever the purpose of their trip, the first thing people do at the market is check the price of gold,’ says Harun. In Aceh, gold is king; the Acehnese have their own nomenclature for gold ingots, and their own system of weights and measures (the basic unit, the mayam, is around 3.3 grams). When an Acehnese person asks a jeweller for the gold price it is akin to a western shopper checking their bank account. Banks are not widely used in Aceh, Harun explains: ‘Here people put their trust in gold.’ Since savings are often held as gold ingots or weighty jewellery, the market price tells them how well they are doing, and whether it is a day to scrimp or splurge.

Gold also acts as a kind of informal insurance mechanism, explains Sofi, the 36-year-old heir to the busiest gold shop in the market. When preparing for marriage a man will need to ensure he builds up a stash of gold ahead of the day. This payment – known locally as ‘the price of marriage’ – is different from a dowry since it is given to the wife and held by her, rather than by her father. The going rate in Banda Aceh is 20 mayam (around 40 million rupiah, or \$2,800, or £2,200), almost enough to exchange for one of the solid bangles that glow in Sofi and Harun’s display cases. In an economy buffeted by the ups and downs of farming and fishing, the people are used to buying gold after bumper harvests or fishing seasons and selling it after lean ones. That culture means a woman’s gold is both her

personal treasure and plays a functional role as the family's financial buffer. The annual wage for a labourer here would be around 30 million rupiah; wearing a gold bangle is like having enough cash on your wrist to employ a builder for a year.

The gold-based system of saving and insurance is ancient, informal and unregulated. It worked quickly and efficiently in the months after the tsunami. The gold traders were the first shops in Basar Aceh to re-open – Harun and Sofi were both up and running within three months. They sold no gold and instead became bulk buyers of ingots and jewellery, allowing customers to generate funds for rebuilding. While some lost gold in the disaster, I meet many survivors who were able to sell jewellery they were wearing. And they got a fair price: while in many markets a rush of sellers would depress the local price, gold is a global commodity. Harun and Sofi were able to buy at the international price, confident that they could ship the gold to contacts in Jakarta who would buy it. This traditional form of finance insulated Aceh and provided its entrepreneurs with rapid access to cash.

This traditional system is the first example of a theme that came up in all the extreme economies I visited: informal systems of trade, exchange and even currency are hugely important. When the formal economy is damaged, it is often informal and traditional systems of trade, exchange and insurance that spring up first, and become the source of resilience. A key lesson is that we need to understand and value them more. The Acehnese financial system is a prime example: the kind of set-up that is seen as outdated and inefficient by western experts, it worked quickly and efficiently. The contrast with the western financial system, in which banks' own borrowing (their 'leverage') tends to amplify turbulence rather than dampen it, could not be sharper.

## **BACK TO THE BEACH**

As the people in nearby Banda Aceh were struggling to their feet, restaurateur Suryandi's village, Lampuuk, lay in tatters. After working

for an international charity for a few months clearing rubble and timber to unblock roads, he went to work at a restaurant in the town. Tents were soon erected in Lampuuk, creating what the locals called the 'refugee camp' where the village had been. Suryandi felt drawn to his old village and so moved back, taking the only job there was – fishing. 'I got seasick and bored,' he says, and after three months bobbing around on the Indian Ocean he decided to rebuild his restaurant.

His first challenge was getting permission. On the day of the tsunami the local fishing chief had screamed about divine retribution and the idea had caught on, especially among village elders in Lampuuk who had agreed that the tsunami was a message about lax morals on the beach. 'The problem was never with western tourists,' says Suryandi. The concern was that young locals were spending too much time flirting on the sand and too little working, studying and praying. The elders decreed that the beach must close indefinitely.

To bring about a relaxation of the new regulation, the beach entrepreneurs made an economic case: there was too little work in the village, and re-opening the beach would create jobs. The meetings went on for three months until the elders relented, on one condition. In the chaotic days after the tsunami, some locals whose bodies had been washed inland had been buried far from their home village, violating beliefs about what constitutes a good burial. To rectify things, the entrepreneurs would have to exhume these corpses and return them to Lampuuk. Once this gruesome task was complete the beach re-opened, but there were still problems: some villagers were superstitious, some were traumatized, others were simply afraid. The beach, once the focal point of village life, remained deserted.

Suryandi went back immediately and, lacking a rich benefactor, rebuilt his hut using scrap wood washed up on the shore. Then foreigners working for aid agencies came to his rescue in an unexpected way. There was no aid money for his cafe, he recalls, 'But those aid workers saved me – they were not scared of the sea and became my first customers.' Once locals heard that foreigners were frequenting



the shoreline they gradually ventured back too. Suryandi operated from his shack until he had saved 15 million rupiah in profits, enough to put up a proper building. Today his Akun restaurant sits in prime position at the head of the bay next to the safe swimming water. A new outfit next door rents out arm bands and life jackets. The beach is now popular again, the economy so much improved that a building like his would cost at least 100 million rupiah to buy today, he says.

## DESTRUCTION AND GROWTH

After a while you start to understand that the rapid rebuild is a common story here. One night I meet 61-year-old barber Yusuf in a cafe and we chat while eating *Aceh Mei* – instant noodles souped up with extra vegetables and spices. He didn't escape the wave but was engulfed by it, waking up in the afternoon of 26 December fully 8 km from his home with dead bodies either side of him. He had been laid out in a line of victims. His right leg was broken in a number of places but he managed to stand. 'When I got up the local villagers thought I was a zombie,' he says, laughing. Back from the dead, his barber shop was open within a year.

The speed of the rebuild and the fact that informal networks of trade and traditional finance sprang up before external help arrived are striking. A bigger surprise is that the local economy did not just rebound but improved. Akhyar Ibrahim is a serial entrepreneur who runs a private school and a business training institute, and owns and manages a series of rice fields. An engineer by training, the 61-year-old shows me around the house he designed and built in the late 1980s. An unorthodox design, based around many central columns, it withstood the tsunami. Over green tea and crackers he mulls over how the disaster changed things. 'Regarding the economy, things are very much better now.' Akhyar lost the second of his five sons in the disaster but, he continues, 'Lifestyles are better too. The tsunami had huge costs, but it also had benefits.'

The idea that the tsunami brought benefits to the region can be hard to believe. Everything here – from the personal trauma of lost friends and relatives, to the evidence of the region’s physical devastation on show in the local museum – points to a place that was smashed and beyond repair. Yet in many ways things did get better in Aceh following the tsunami. A good chunk of this is down to a stronger economy. For an economist, a short-term boom here is less surprising than for most: the perplexing truth, seen across the world, is that natural disasters can make an economy grow faster. Understanding why this is the case helps to demystify Aceh’s miraculous recovery and illuminates the most important measure used in economics.

## SHAKING THE FOUNDATIONS

The first attempt at a systematic measure of the size and strength of an economy was set out by William Petty in the 1650s. Petty was a polymath: a surgeon and professor of anatomy at Oxford, a gentleman-farmer, an agricultural and maritime inventor (he designed an automatic grain planter and an early catamaran, and came up with a proposal for attaching engines to boats), and a leading civil servant. (He would have known about Aceh, since during his lifetime the English and Dutch were pitched in major battles for control of the seas, including the Malacca Strait.) The three Anglo-Dutch wars between 1652 and 1674 were costly, with the taxes to fund the conflict falling on landowners, including Petty. He thought this unfair, and so set out to measure Britain’s economy more accurately and work out who should bear the burden of taxation. His central argument was that while assets such as land and buildings were one part of a nation’s wealth, the annual flows of money associated with the world of work – wages, together with firms’ income and profits – were the original source of a country’s economic might. They were being overlooked, and business owners and workers should pay more tax.

Petty’s argument that policymakers needed an accurate measure of economic strength that considered every source of income and

every sector of an economy never really caught on. For 250 years economists studied single sectors, tracking the volume of industrial production, the tonnage of coal mined, or the value of manufacturing exports. Economic analysis and policy were done in a piecemeal way, with no all-encompassing measure. Then, in the 1930s, the US economy suffered a huge recession that became the Great Depression, which spread across the globe. The Great Depression is the defining event of modern economics and led to a detailed investigation of the sources of economic growth. It was necessary to devise a master measure of everything the economy does. A group at Cambridge University came up with the solution, producing a set of economic accounts for the UK in 1941. This marked the beginning of the modern focus on gross domestic product, or GDP.

GDP is a measure of the monetary value of a nation's economy, and can be thought of as a camera capturing an economy through three alternative lenses: the first lens picks up production, the second captures income, while the third focuses on spending. When something is produced, GDP rises; when income accrues as a worker's wages or firm's profits, GDP rises; and when money is spent by a person, company or government, GDP rises. Perhaps the most important thing about GDP is that its three lenses capture live activity rather than past achievements: factories, shops or homes that were built and sold last year count for zero in this year's GDP. All these things are important physical assets, but since they are not part of this year's production, income and spending they represent the activity of the past. GDP aims to capture what a country's residents are doing now, rather than what they have done previously.

The 2004 tsunami destroyed physical assets on a huge scale. In the twin villages of Lhokgna and Lampuuk every house was destroyed; across Aceh 139,000 were lost. Large factories collapsed and around 105,000 small businesses and their buildings were wiped out. In the harbour at Banda Aceh fishing boats were smashed into driftwood – 14,000 across the region met the same fate – and the riverside huts used by fishermen to clean and sell their catch were

washed away. On the beachfront, every cafe was obliterated; the parasols and surfboards would never be seen again. All of these things were important, the result of years of work. But having been produced and purchased in the past, none of them counted as the kind of 'current activity' captured by GDP. On that terrible morning when the tsunami wrought its destruction, the size of Aceh's economy as measured by GDP did not shrink.

Of course, economic potential had been lost: the wiped-out factories and restaurants took with them jobs as factory workers and waiters, for example. But offsetting this loss of capacity for production and income generation was the fact that rebuilding a village or town means lots of fresh activity. Take housing: in the four years following the disaster, 140,000 new homes were built in Aceh. Each one meant builders needed to spend on materials such as bricks, wood and electrical wire, and they had to pay the wages of the workmen who use them. All this generates income for companies – the builders' merchant, the concrete supplier and the haulier – and for tradesmen such as the bricklayer, joiner and electrician. Once the job is finished, a new house has been produced. Construction means a rush of the three types of activity – producing, earning and spending – that contribute to GDP. As accounts like Suryani's and Sanusi's show, the determination of the Acehnese meant an immediate urge to rebuild homes, schools, shops and roads. This, in part, explains the puzzle of why an economy, measured by GDP, will tend to grow in the aftermath of a natural disaster, even one at the extreme scale seen in Aceh.

## THE AID BOOM

While traditional forms of saving helped provide immediate capital to some entrepreneurs, outside help was needed to pay for the mass reconstruction. Cruise around the villages here on a motorbike for a few days and you can see exactly where the cash came from. Approaching Lhokgna from the south, the coast road crosses a

steel-truss bridge carrying the logo of the US donor agency, USAID. As you enter the village, all the houses – detached bungalows on small plots – have a similar design on their front wall: the dark-green circle enclosing two crossed swords beneath a palm tree, which is the emblem of Saudi Arabia, a major donor of funds for housing. Half a mile north to Lampuuk a road turns inland; this street, the one Suryandi fled up on the day of the tsunami, is lined with properties bearing the star and crescent of Turkey above the porch. The Turkish-donated houses are the best, locals say, since they came with fully equipped kitchens.

Overall \$6.7 billion was spent in Aceh in the four years following the disaster. The cash created its own turbulence, a kind of mini boom. The aid agencies brought their own workers on decent salaries who had money to spend; they hired many locals and made huge orders of brick, concrete and timber for reconstruction. This demand surge pushed up prices: inflation rose from around 5 per cent in 2004 to 20 per cent in 2005 and topped 35 per cent the following year. Business owners still grumble about this because it eroded their profit margins: the cost of essential staples like sugar, rice and coffee surged but it was hard to raise the prices customers were charged. But in the main these are remembered as good years for the economy. Aid-agency cash supported local jobs and wages, and flowed to local businesses. Aceh, now an aid economy, was buoyant.

Today the fading emblems, flags and logos painted by foreigners on the things they donated are the main reminder of their work. After four intense years of activity the aid agencies withdrew in 2008. The number of foreign workers in Aceh fell from 8,000 to a few hundred and job opportunities for locals plummeted. In 2009 the Indonesian government agency overseeing the aid effort was shut down, having done its job. Inflation in Aceh went back to the national average as the tide of aid money receded.

Sucking all that activity out of an economy – the spending, the wages, the construction projects – is a recipe for a big drop in GDP. Since this measure of the economy is based on activity, development

economists worried that while the rebuild had created short-term activity the economy would shrink in GDP terms, suffering a recession. What happened next was mysterious. Despite the loss of all the aid-agency spending and all the job cuts, economic growth continued to rise: having grown 19 per cent during the four-year aid boom, the economy expanded by 23 per cent over the next four years. Where was all the new spending, income and production coming from?

### **BUILDING BACK BETTER: ROADS, MACHINES OR IDEAS?**

If you are in search of a hot meal in Lhokgna, Dian's restaurant is the place to visit. She is always open and sells delicious marinated fish and curries in generous portions. Sitting at one of the tables on a quiet night she puts Aceh's improved economy down to something less palatable: sewerage. Some things are worse today, she says: the traditional houses were preferable in style to the new ones (they were wooden and had upper floors with balconies, whereas the replacements are concrete bungalows). But the big change is having your own toilet. Before the disaster the village lacked a basic sewerage system, with the nearby river providing clean water and taking dirty water away. The modern homes have plumbed-in bathrooms, cutting out time-consuming walks to the river.

As the rebuild continued, the notion of 'building back better' became a well-known phrase, referring to the policy of using modern designs and materials to improve the local infrastructure. The new coast road built by USAID is wider than the old one, and the steel-truss bridge it crosses at Lhokgna is higher and longer than its stone-column predecessor, the remains of which protrude from the river like broken teeth. Mid-way between Lhokgna and Banda Aceh, a family-run factory that once processed coconuts into paste and cooking oil has been retooled as a cement plant with a row of gleaming mixer trucks parked outside. The raw material comes from a large cement factory a few minutes' drive down the coast. Owned by

Lafarge, a French company, it was destroyed in 2004 and re-opened in 2010 with 30 per cent higher capacity. While there is some quibbling over the precise design of the houses, the aid-funded rebuild left Aceh with better roads, bridges and factories than those that were lost. All of this improved the potential for trade and tourism.

But the ongoing benefits of the aid effort went further than pure cash, and many were informal or unintentional. Take use of technology, which survivors say shifted hugely after the tsunami. For Suryandi the arrival of outsiders using mobile phones improved things for entrepreneurs. The beachfront restaurateurs invested in basic burner-style mobiles, using them to call in help if there are lots of customers at the beach, or if the kitchen needs fresh supplies. Yusnidar says the diffusion of motorbikes has improved life: before the tsunami only richer families had them, but money earned during the aid boom means that every family has at least one, with better-off families owning a car. These changes modernized Aceh, making it easier to get ready for work, to know where you need to be and to get there quickly.

The disaster led to subtler changes that have influenced both the economy and wider society, explains Zuhir, a village chief. Zuhir is 43 and says his job is hard because most of the village elders died in the tsunami. Before the disaster the elders set the rules that the chief would then enforce. Vital information – on property rights and customs – was passed down by word of mouth, so that today it can be impossible to resolve disputes. ‘Important information died out with the elders,’ says Zuhir. Like many in Aceh’s smaller conurbations, he mourns the loss of village-specific traditions that had been maintained by elders and are now lost for ever.

Despite this loss, new ideas and customs have arrived that have made things better, Zuhir says, ‘people in Aceh have become more open’. It is a sentiment I hear across the region. Take the Acehnese view of the Dutch. Before the tsunami locals say it varied from unmasked hatred to a sort of unfriendly mocking. (Someone being deceitful or sly could be accused of ‘being Dutch’ here, the slur a reference to the Dutch tendency to send spies to the region to live among the