



Managing disaster response through mobile

Latin America





The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with almost 300 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces industry-leading events such as Mobile World Congress, Mobile World Congress Shanghai, Mobile World Congress Americas and the Mobile 360 Series of conferences.

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Disaster Response

The GSMA Disaster Response Programme works with mobile network operators, humanitarian organisations, governments, NGOs and the broader mobile ecosystem on a national, regional and global basis to drive the creation and adoption of coordinated, impactful solutions and practices that leverage the ubiquity of the mobile technology under the umbrella of the Humanitarian Connectivity Charter. The Charter represents a set of shared principles adopted by members of the mobile industry to support improved access to communication and information for those affected by crisis in order to reduce the loss of life and to positively contribute to humanitarian response.

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1. Introduction

Mobile networks and the connectivity they provide can be a lifeline for those affected by natural disasters and other humanitarian emergencies. They are vital to facilitating access to information and coordinating assistance within affected populations and among governments, first responders and the international humanitarian community.

In March 2015, the GSMA launched the Humanitarian Connectivity Charter to support the mobile industry in improving preparedness and resilience. The charter consists of a set of shared principles adopted by key players in the mobile industry, and endorsed by key humanitarian organisations, to support improved access to communication and information for those affected by crisis in order to reduce the loss of life and positively contribute to humanitarian response.

The principles of the Humanitarian Connectivity Charter are:

- to enhance coordination within and among mobile network operators before, during and after a disaster
- to scale and standardise preparedness and response activities across the industry to enable a more predictable response
- to strengthen partnerships between the mobile industry, government and the humanitarian sector.

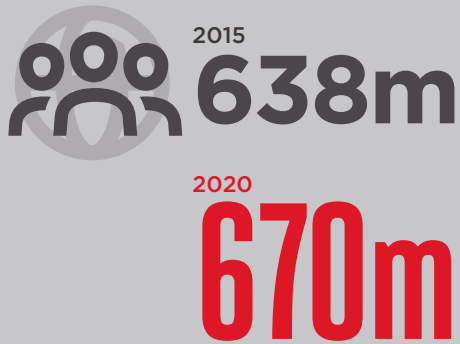
To date, over 100 MNOs operating in more than 75 countries have committed to these principles. Charter engagement will be based in four key regions where the majority of these signatories operate: Asia Pacific, Middle East and North Africa, Sub-Saharan Africa and Latin America.

This report is part of a series focusing on these regions. The report provides an overview of the mobile industry in Latin America, the disaster risk landscape and examples of the innovative solutions being developed by the industry. As well as a regional overview, this report focuses on two markets – Colombia and Guatemala. These countries have been selected as examples due to their disaster risk profiles.

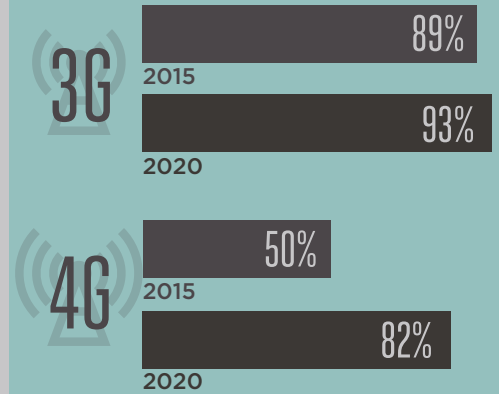


2. LATIN AMERICA MOBILE MARKET

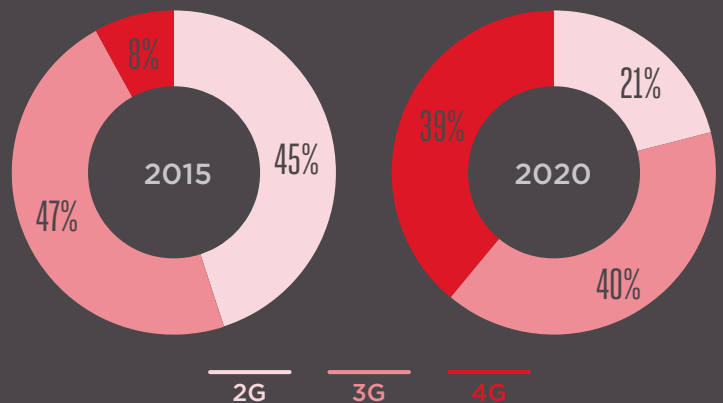
Population



Population coverage

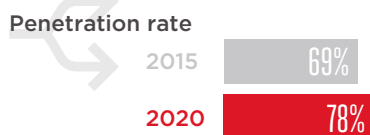
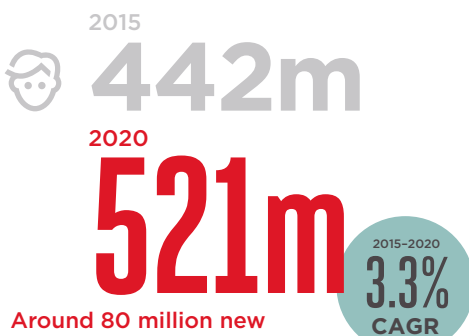


Connections Excluding M2M

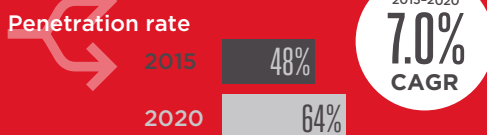
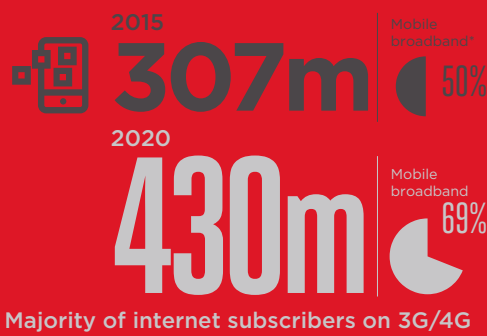


Operators continue to invest in 4G network build-outs and subscribers migrate to higher speed networks

Unique subscribers

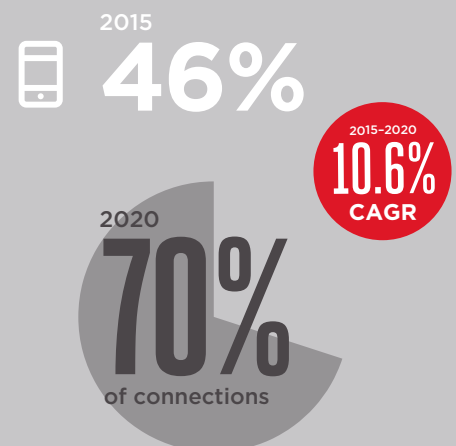


Mobile internet subscribers



*3G and 4G

Smartphone adoption



3. Disaster response in Latin America

For this report, Latin America includes the 50 countries that make up Southern and Central America as well as the islands of the Caribbean.

Economically, Latin America is considered a developing region, with an average GDP per capita of \$8,363. As a result, resources for disaster relief efforts are limited and often insufficient for the scale of the natural disasters in the region. Historically, the region has experienced significant political instability, leading to humanitarian concerns in many countries. This is most prominent in Colombia where, according to the UNHCR, there are more internally displaced citizens than any other country in the world. In addition, years of instability and under-investment have left many countries in the region with inadequate infrastructure. This can exacerbate the effects of natural disasters while hampering response efforts.



Figure 1: Disaster risk by country: Latin America

Source: *Inform Risk Index*

As Latin America is located in an area of significant seismological activity, earthquakes are a common occurrence in the region. For instance, in 2016 earthquakes in Ecuador killed over 600 people, with damages estimated at \$3 billion. These also bring the risk of tsunamis and further damage. In 2010, an 8.3 magnitude earthquake in Chile generated powerful waves along the coast, forcing more than 1 million people out of their homes. The warm tropical waters of the Caribbean Sea generate powerful cyclones that often develop into hurricanes. In 2016 Hurricane Mathew hit Haiti, killing 480. As with many disasters in the region, the lack of infrastructure in Haiti exacerbated the aftershock of the storm, with many still homeless today. The mountainous topography of much of the region also makes it vulnerable to landslides and flash floods, particularly during periods of intense rainfall.

Despite the challenges faced across the region, damage from natural disasters can be mitigated through diligent disaster response planning. The effectiveness of such planning is well demonstrated in Chile. Following the 2010 earthquake that killed more than 500 people, the government instigated a series of policies to safeguard the country from future disasters. This led to a complete overhaul of the country's earthquake response protocols, the introduction of regular evacuation drills and the implementation of stricter building codes. As a result, in 2015 when a 4.5 metre tidal wave was triggered by an 8.4 magnitude earthquake, only 11 people were killed following the successful evacuation of more than 1 million people from the coastal regions.








Disaster type	Location and date	Impact
 Earthquake (7.0 magnitude)	Haiti, January 2010	222,572 people estimated to have died Over 220,000 residences collapsed or severely damaged 3.5 million people affected
 Epidemic (cholera outbreak)	Haiti, October 2010–2015	By 2015, nearly 9,000 people had died Over 700,000 people, more than 6% of the population, have had the disease Following the outbreak cases were reported in Venezuela, Dominican Republic, Cuba and Florida in the US
 Tropical cyclones and typhoons - Hurricane Stan	Guatemala, October 2005 (six countries affected)	Around 1,668 people died, mostly in Guatemala Majority of the damage caused by mudslides and flooding triggered by the heavy rain €800 million of damage in Guatemala alone, equivalent to 3.4% GDP
 Floods and landslide	Brazil, January 2011	Over 900 people died Damage was caused by a combination of flooding, landslides and mudslides across the state of Rio de Janeiro More than 355,000 people were affected
 Earthquake (7.8 magnitude)	Ecuador, April 2016	668 deaths, eight missing people and 6,274 people with severe injuries 140,000 people were left without adequate housing
 Earthquake (8.0 magnitude)	Peru, August 2007	600 people died and over 1,000 people were injured In some of the worst hit areas, 75% of buildings were damaged while over 75,000 families were affected
 Earthquake (8.8 magnitude) and tsunami	Chile, February 2010	526 people died Around 372,000 homes were damaged Total cost of damage was estimated at \$30 billion

Table 1: Impact of recent disasters in Latin America

Source: EM-DAT, ReliefWeb

Flooding and landslides are the primary source of natural disasters in the region; these are usually triggered by hurricanes or severe storms. Earthquakes and other geophysical disasters are also notably present in the region.

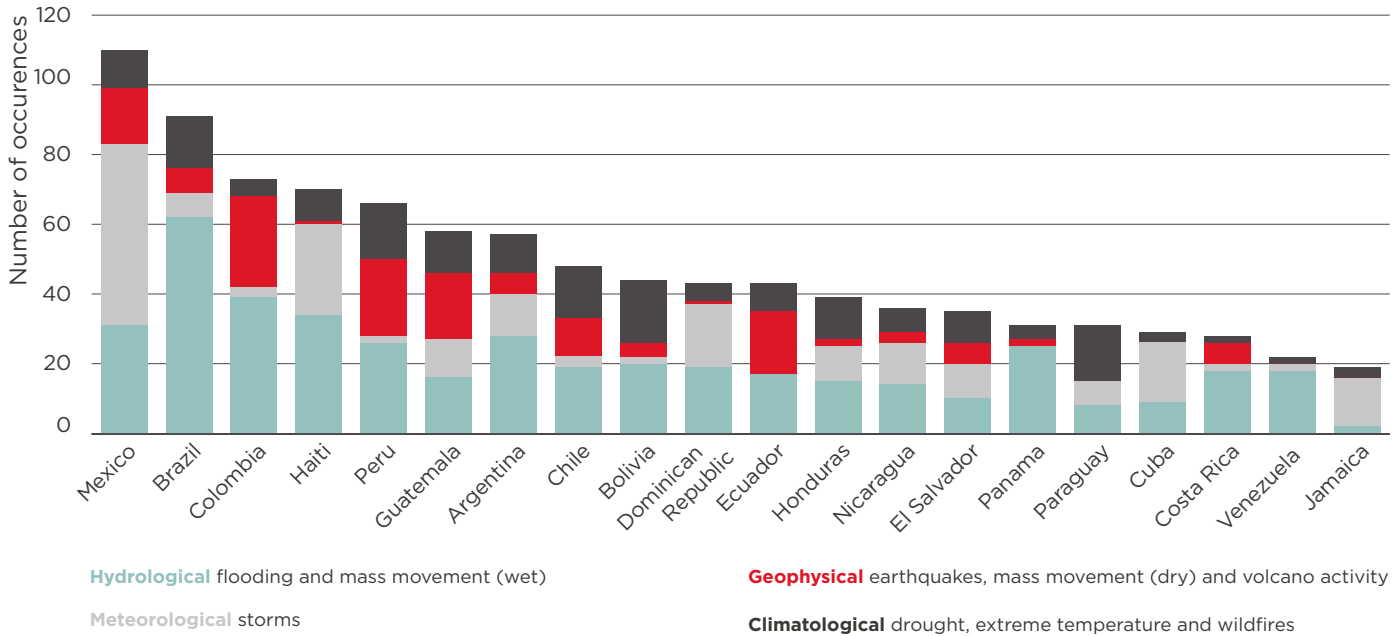


Figure 2: Top 20 countries in Latin America for natural disasters by disaster type, 2000-2016
 Source: GSMA Intelligence, EM-DAT

As a result of the region’s vulnerability to natural disasters, as well as its macro political and economic instability, four of the 15 most at-risk countries in the world can be found in Latin America according to the World Risk Index.

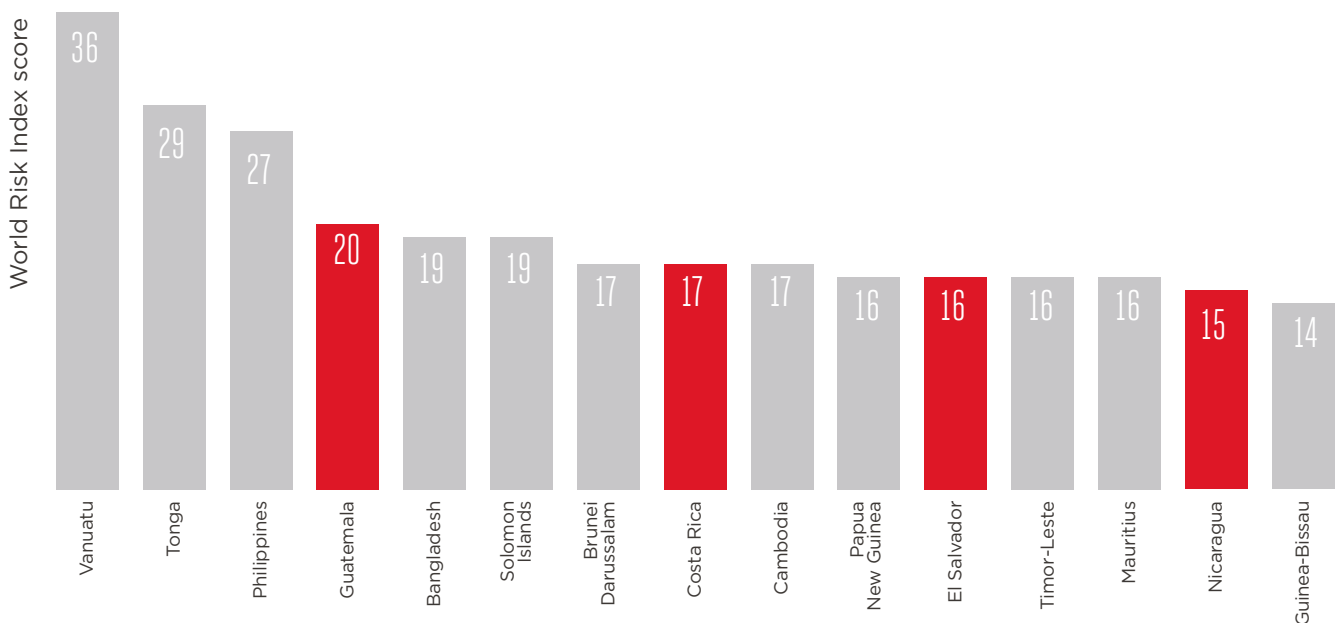


Figure 3: Top 15 countries by disaster risk in the world
 Source: World Risk index

3.1 Mobile money in Latin America



17m registered accounts in December 2015, up 24% on December 2014

56% 

of total transactions by volume were merchant payments in December 2015

48% 

were active accounts (on a 90-day basis)

40% 

of total transactions value represented by bulk payments

There is an increasing focus on the ‘digitisation’ of humanitarian assistance and the provision of aid or services via mobile. An example is the use of digital cash transfers by humanitarian agencies to distribute funds to beneficiaries via mobile. In order to assess the feasibility of incorporating mobile money into preparedness and response activities, it is becoming necessary for humanitarian organisations to gain a greater understanding of the mobile money context in the regions they operate in.

While overall transaction volumes and values are small relative to other regions, in recent years there has been strong growth in mobile money across Latin America, particularly in the remittance space. According to the World Bank, remittance inflows in the region rose by an estimated 4.8% in 2015, faster than any other region.¹ In part this is due to a high percentage of unbanked and underbanked in the region – on average around 50% but up to nearly 80% in countries such as Nicaragua and Haiti.² This is set against a backdrop of 70% mobile subscription levels and near-ubiquitous 2G coverage.

Beyond remittance, there are several other notable mobile payment areas emerging. Companion cards have shown strong growth in Latin America, with the region accounting for a third of global product launches. Companion cards are defined as debit or prepaid cards linked to the same source of funds as the mobile money. At any point in time, the balance available on a customer’s mobile money account seamlessly reflects that on the card. Integration of mobile money services with public transport has also grown in prominence. This can happen through partnerships between mobile money providers and transport authorities (e.g. Zuum in Brazil) or mobile money providers acquiring ticketing systems themselves (such as with MPeso in Nicaragua).

¹ “Remittances Market in Latin America: Will mobile money facilitate financial inclusion?” World Bank, April 2016

² Understanding mobile money trends in Latin America & the Caribbean, GSMA, September 2016

3.2 Innovative services in Latin America

Mobile operators have launched services across the region that enable them and their customers to improve their preparedness and response to disasters.

Chile

Following several major earthquakes in the country, Telefónica Chile has continued to develop and improve its business continuity contingency plan, which includes periodic rehearsals in case of emergencies, and an integrated management and control system for the fixed and mobile network. In an emergency, local, mobile and long-distance national calls can be enabled through the 188 short code free of charge; free call booths can be established for those without a phone; and billing of customer accounts can be postponed and in some cases suspended for services such as SMS, paging and calls, depending on the context and duration of the emergency.

Many other MNOs across the region have similarly robust business continuity management and early warning systems.

Guatemala

In 2013 Tigo Guatemala and Oxfam formed a partnership to simplify and enable the distribution of humanitarian cash transfers to families affected by child malnutrition and drought. Families were issued with a SIM card and personal PIN; they could then receive authorisation codes sent by Oxfam via SMS. With these codes, families could collect their emergency funds from the nearest Tigo point of sale.

Colombia

MNOs have deployed resources to help publicise a National Evacuation Drill and the Search and Rescue Drill organised by Colombia's National Unit for Disaster Risk Management in 2016. Through these efforts, 9 million people were informed via a series of broadcasts across the country.

Paraguay

In Paraguay, Tigo Money has an agreement with the World Food Programme to disburse emergency funds. It also works with the government to distribute financial support through Tekoporã - a social programme set up to reduce poverty and promote upward mobility.

4. Country focus: Colombia

4.1 Mobile market

As the fourth largest economy in the region and with a population of more than 48 million, Colombia is an important market for operators in Latin America. The country has seen strong economic growth in recent years. Between 1990 and 2015, the country's GDP (PPP) grew from \$120 billion to nearly \$700 billion.

There are currently five mobile operators active in the country; Claro, America Movil; Movistar, Telefonica; Tigo, Milicom; Avantel; and ETB. All five operators offer 2G, 3G and LTE services.

Colombia's telecoms market is well developed and representative of an average Latin America market. GDP per capita stands at \$6,056 while the regional average is \$8,363. Some 40% of connections are 3G and 13% are LTE, compared to 45% and 15% respectively across the region. The majority of connections in Colombia are prepaid - 83% compared to 77% across the region. As a result ARPU in Colombia stands at \$9.09, only slightly lower than the regional average of \$12.24.

While the country's size and diverse landscape create challenges in achieving coverage, a primarily urban population (77%) helps mitigate these issues. As a result, 2G and 3G population coverage are both at more than 90%. Operators continue to invest in Colombia, reflected in the rapid growth of LTE coverage. Introduced in 2012, LTE now reaches 85%. Claro has announced it plans to increase this to 100% by 2018.

Since 2012 the government has required citizens to register their handsets. Operators have proactively enforced this policy, suspending more than 2.8 million unregistered handsets between August 2015 and April 2016.³

Claro, Telefónica Movistar and Tigo-Une, together with the Mobile Industry Association of Colombia (Asomóvil), have signed the GSMA Humanitarian Connectivity Charter as part of the "We Care Colombia" campaign. The ultimate aim of the charter is to strengthen access to communication and information for those affected by crisis in order to reduce the loss of life and positively contribute to humanitarian response.

³ "Colombia blocks 2.8 mln unregistered mobile phones", Telecom Paper, May 2016

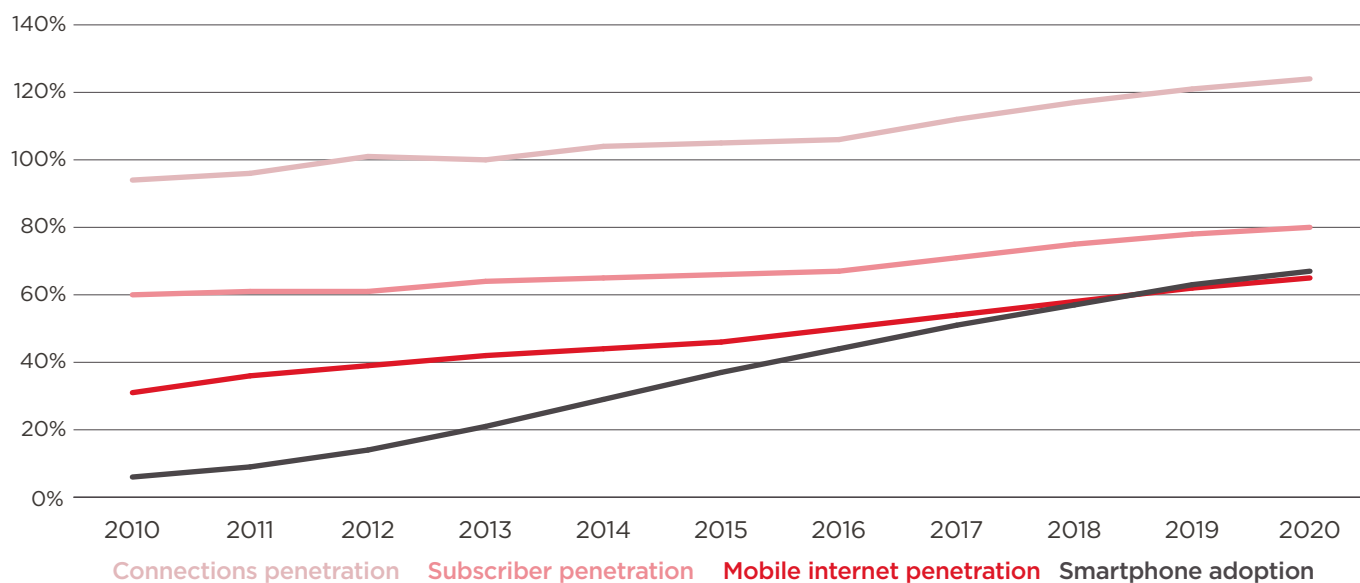


Figure 4: Colombia mobile market

Source: GSMA Intelligence

Note: penetration measured as percentage of population; smartphone adoption measured as share of connections

4.2 Disaster profile

The long-running struggle in Colombia between the government and the FARC (Revolutionary Armed Forces of Colombia - People's Army) has led to mass internal relocation. The UNHCR estimates that there are as many as 7.2 million citizens who have been internally displaced or living as if displaced. At least half of those displaced have moved to housing around the country's major cities, where there have been reports of violence and disease as a result of overcrowding. Following negotiations with the FARC, it is hoped that many of these people will be able to return to their homes.

Colombia has a rugged topography and is in a seismically active area at the northern edge of the Andes. As a result, the country is one of Latin America's most disaster-prone. More than 150 disasters have affected the country over the past 40 years, claiming more than 32,000 lives and impacting more than 12 million people according to the Inter-American Development Bank.

Of particular note were the floods of 2011, considered to be the worst on record for Colombia. More than a year's worth of rain fell during the month of April, causing the Magdalena and Cauca rivers to overflow and the government to declare a national state of emergency. The ensuing flooding and landslides are estimated to have caused \$5 billion worth of damage and killed nearly 500 people. This followed heavy flooding in 2010, which itself led to 300 deaths and 2.2 million people left homeless.

2015 also saw particularly heavy flooding, with an estimated 20,000 people affected. Landslides triggered by the overflowing of the river Liborina killed 85 and destroyed hundreds of homes.











Disaster type	Event count	Total deaths	Total affected	Total damage (\$000)
 Ground movement	7	14	62,148	14,000
 Viral disease	2	91	24,406	-
 Riverine flood	37	1,875	9,964,607	344,0000
 Flood	3	39	40,225	-
 Landslide	12	576	3,950	-
 Convective storm	2	16	7,718	-
 Tropical cyclone	1	0	3,074	-
 Ash fall	7	16	42,358	-

Table 2: Disasters in Colombia between 2000 and 2016

Source: EMDAT

4.3 Mobile money snapshot

39%  of the adult population in Colombia had a bank account in 2014, according to the World Bank

 **2.5m** people in the country manage their money digitally

In 2014 the number of mobile banking transactions in the country grew by

334%⁴ 

To assess the feasibility of incorporating mobile money into preparedness and response activities, it is increasingly necessary for humanitarian organisations to gain a greater understanding of the mobile money context in the markets they operate in.

- Colombia currently has four active mobile money providers: Ahorro a la Mano (Bank Bancolombia), DaviPlata (Bank Davivienda), Mi Plata (CoopCentral) and Transfer Aval (Aval Group).
- In July 2015, Colombia implemented new financial inclusion laws, detailing the regulatory regime for the mobile money market, creating a more favourable environment for mobile money services.

⁴ "Keys to the growth of mobile banking in Colombia", BBVA Innovation Center, March 2015

5. Country focus: Guatemala

5.1 Mobile market

Guatemala has become one of the fastest growing economies in Latin America with 4.1% GDP growth between 2014 and 2015. Despite this, it remains one of the poorer countries in the region with a GDP per capita of just \$3,904. Although peaceful now, the country has historically suffered considerable political instability. As a result, there has been minimal investment in public infrastructure over the years.

Guatemala currently has four active mobile operators, Tigo, Millicom; Claro, America Movil; Movistar, Telefonica; and RED, Intelfon. All the operators offer 2G, 3G and LTE services except for RED which offers 2G services only.

Guatemala is a predominantly prepaid market in which just 6% of connections are contract accounts. Despite strong population coverage of 95% and 40% for 3G and 4G respectively, subscriber penetration is significantly lower than surrounding markets at 53%, though it is growing rapidly. Subscriber ARPU in Guatemala is currently at \$19.10, higher than the regional average of \$12.24.

The Guatemalan government requires all SIM cards to be registered. By the end of December 2016 more than 2 million accounts were suspended following a renewed effort to enforce registration.⁵

Claro, Movistar and Tigo have signed a cooperation agreement with the GSMA and the International Federation of Red Cross and Red Crescent Societies, pledging to work together on the use of mobile services to prepare for and respond to emergencies caused by natural disaster, through the We Care Guatemala campaign. The programme has several goals, including:

- setting up a coordination board or committee among government institutions responsible for disaster response, the private sector and other key stakeholders
- creating an action protocol to prioritise the mobile network as a public necessity in emergencies or crises
- raising awareness and providing training on appropriate use of mobile telephony in emergencies
- promoting voluntary blood donation in emergencies and informing the population about safe places or shelters set up to provide assistance
- analysing the best technologies to implement for emergency response.

⁵ 2.2m mobile users fail to register ahead of SIM deadline, TeleGeography, October 2016

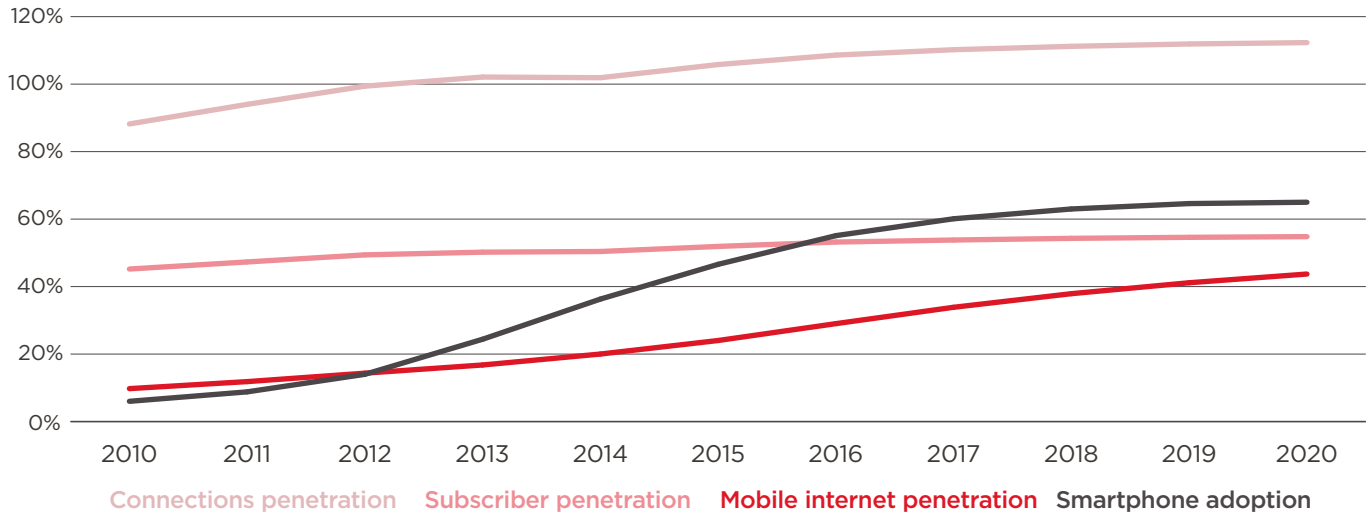


Figure 5: Guatemala mobile market

Source: GSMA Intelligence

Note: penetration measured as percentage of population; smartphone adoption measured as share of connections

5.2 Disaster profile

Situated on the Motagua fault line and in a region that regularly experiences extreme weather, Guatemala has a history of severe natural disasters. The majority of incidents result from flooding and landslides caused by hurricanes, but earthquakes and volcanic activity have also caused significant damage. This is compounded by the lack of infrastructure across the country. As a result the World Risk Index has ranked Guatemala as the fourth most at-risk country in the world.

Guatemala has suffered several disasters of particular note:

2005

Storm - Hurricane Stan struck in October 2005 and led to extreme flooding and landslides, wiping out entire villages. An estimated 50,000 people were affected and at least 1,500 died. The hurricane was estimated to have cost Guatemala 4.1% of GDP.

2010

Storm - Tropical Storm Agatha caused damage to much of Central America. In Guatemala the storm caused serious flooding and multiple landslides. The government declared a state of emergency and 112,000 people were evacuated. Some 20,000 were made homeless by the disaster. At least 200 people are estimated to have died.

Volcano - Two days before Agatha reached Guatemala, the Pacaya Volcano erupted and forced the closure of roads and airports, exacerbating the effects of Agatha. The two disasters together were estimated to have cost Guatemala 2.6% of GDP.⁶

⁶ "Disaster Risk Management in Guatemala", World Bank, October 2013

2011

Tropical Depression 12-E – Extensive flooding and multiple landslides caused heavy damage to roads and infrastructure. The storm affected at least a third of the country. It is estimated that at least 45 people died and there were up to 30,000 victims of the storm.

2012

Earthquake – On 7 November 2012 the San Marcos earthquake struck, registering 7.4 on the Richter scale. The President declared a state of calamity across the country as 78,000 people were left without power and nearly 20,000 were evacuated. Around 15,000 homes were destroyed, with an estimated 45 deaths.

2015

Landslide – Heavy rains caused a landslide in the El Cambray II village of Guatemala's Santa Catarina Pinula municipality. It affected approximately 1,000 people, destroyed 125 houses⁷ and resulted in an estimated 350 deaths.⁸

The Guatemalan government has taken steps to minimise damage from natural disasters. An example is the adoption of the 2009–2011 National Program for Disaster Prevention and Mitigation (NPDPM). This was established in conjunction with the World Bank and saw a loan of \$85 million made to the Guatemalan government. The money was used to implement a series of projects to improve meteorological and seismological monitoring as well as to assess the structural vulnerability of public buildings. The government has also developed a National Strategy for Disaster Risk Reduction 2012–2017.











Disaster type	Event count	Total deaths	Total affected	Total damage (\$000)
 Drought	4	41	4,180,081	114,000
 Ground movement	5	55	1,417,649	210,050
 Viral disease	3	9	19,230	-
 Cold wave	3	6	4,493	-
 Severe winter conditions	1	0	8,141	-
 Riverine flood	15	138	906,865	61,913
 Flood	1	6	8,291	-
 Landslide	10	652	58,111	505,000
 Tropical cyclone	11	1,724	987,362	1,638,500
 Ash fall	4	0	12,600	-

Table 3: Disasters in Guatemala between 2000 and 2016


Source: EMDAT

⁷ USAID

⁸ EMDAT

5.3 Mobile money snapshot

 **Over 7,200**
mobile money outlets
across the country⁹

 **40%** Only 40% of citizens
have an account with a
financial institution¹⁰

In order to assess the feasibility of incorporating mobile money into preparedness and response activities, it is becoming necessary for humanitarian organisations to gain a greater understanding of the mobile money context in the markets they operate in.

Mobile money has seen strong growth in Guatemala. There are currently two mobile money services active in the country: Tigo Money (Tigo, Milicom) and Bancamigo (Claro, America Movil).

Tigo Money in Guatemala is distributing humanitarian aid in partnership with Oxfam. Families are given a SIM card, and Oxfam sends the cash transfer to their mobile phones. The scheme was used to send cash transfers to families who lost their homes in a 2012 earthquake that hit the town of San Marcos, killing around 40 people. Oxfam and Tigo have continued their alliance and developed an 'Immediate Response' programme, which allows them to organise the delivery of financial aid to affected areas within 48 hours of a natural disaster occurring.

⁹ Knoema

¹⁰ World Bank



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