

# Comores

## 1 Key Features

The Union of The Comoros is located in the Indian Ocean off the east coast of Africa and northwest of Madagascar. It consists of four islands - Anjouan (Ndzuwani), Moheli (Mwali) and Grande Comore (Njazidja), where the capital Moroni is located, and the island of Mayotte (under French administration). The three islands have a total land area of 1,862 km<sup>2</sup>, the third smallest land area in Africa.

The population of the Comoros (excluding Mayotte) was estimated at 788,000 in 2015, ranking it 165th in the world. But given that the population is spread over a small area distance, density is 424 people per square kilometer, 26th in the world. Just over half (52%) of the population resided on Grande Comore, 42% on Anjouan and 6% on Moheli according to the 2003 Census. People living in rural areas account for 72% of the population. The average household is large with 5.4 persons.

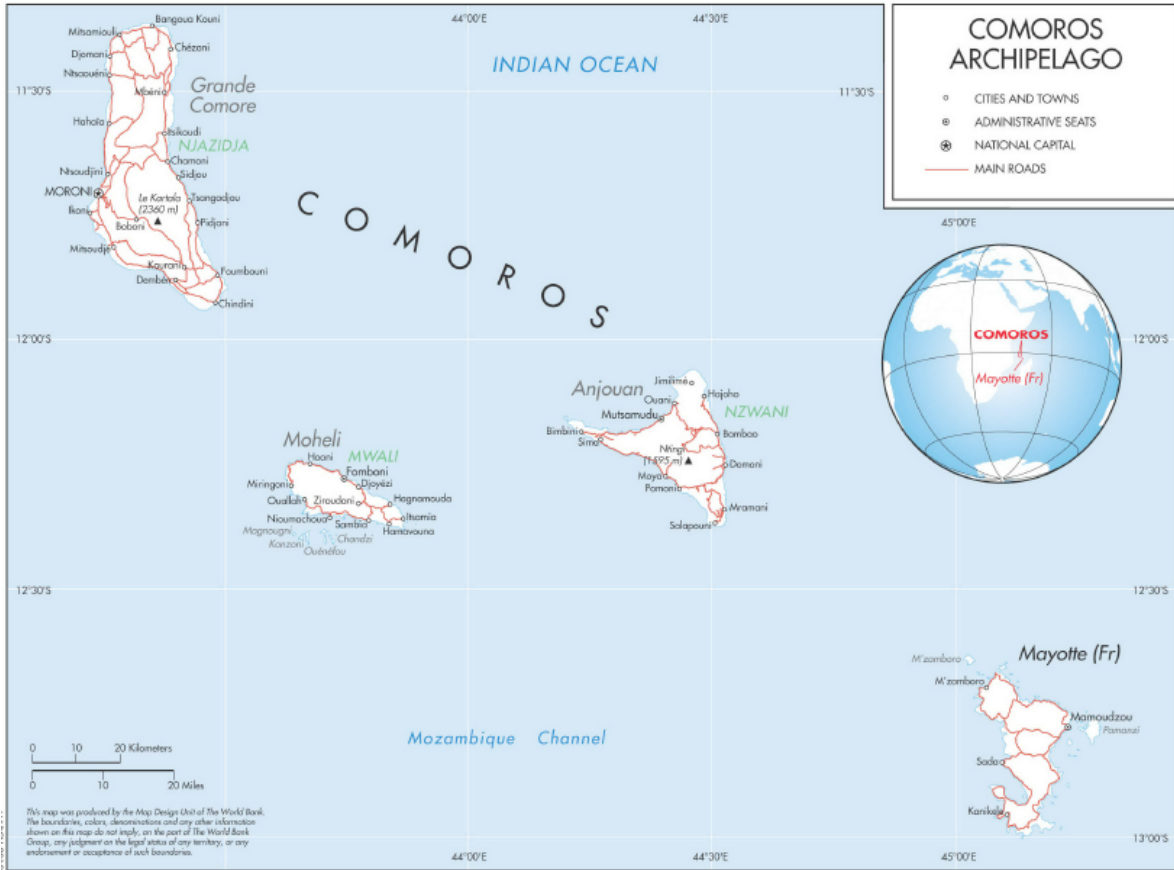
Three principal languages are in use. Shikomor is the local and official language spoken by practically the entire population. Although it is written using either Arabic or Latin alphabets, its use is primarily oral due to the lack of a stable script.<sup>1</sup> Arabic and French are national languages used in the educational system and the Comoros is a member of both the Arab League and the Organisation Internationale de la Francophonie. According to a 2012 survey, 63% of women and 77% of men between the ages of 15 and 49 are literate.

Comoros is classified by the World Bank as a low-income economy and by the United Nations as a Least Developed Country (LDC). GDP per capita was US\$791 in 2015. Agriculture is significant contributing just over one third (34%) of the economy in 2014, but that figure has dropped by five percentage points since 2010, in part due to price competition from other, larger producers. According to a 2012 survey, agriculture employed 29% of men and 23% of women. The country's export base is narrow, with three crops—vanilla, cloves and ylang—accounting for around three quarters of exports. Fishing is important engaging around 8,500 people.<sup>2</sup> Tourism receipts were reported at just over US\$50 million in 2014, or around 8% of GDP.<sup>3</sup> Agriculture, fishery and tourism are seen as sectors with the highest growth potential. Remittances, mainly from diaspora in France are significant and account for over a quarter of GDP. The sale of passports provided a lucrative, but ultimately brief source of income between 2011 and 2014 (Abrahamian, 2015), but ultimately the scheme foundered.

Since independence from France in 1975, Comoros has gone through a number of different governments and considerable political instability including several coups. However, the last two changes of Government have been peaceful, most recently in April 2016.

Comoros exhibits some of the characteristics of Small Island Developing States (SIDS). Its location is remote with no close neighbors (over 300 kilometers from Moroni to the east coast of Africa and over 500 kilometers to Madagascar), it has a small population and its economic resource base is limited. On the other hand, the country is less susceptible to natural disasters than other SIDS.<sup>4</sup>

### **Figure 1.1: Map of Comoros**



Source: World Bank.

# 1. Status of Int

<sup>1</sup> UNICEF. 2016. Comoros - The Impact of Language Policy and Practice on Children's Learning: Evidence from Eastern and Southern Africa. [http://www.unicef.org/esaro/Comoros\\_LR.pdf](http://www.unicef.org/esaro/Comoros_LR.pdf)

<sup>2</sup> See "Comoros and FAO" at: <http://www.fao.org/3/a-ax422e.pdf>



## 2 Connectivity Indicators

General narrative description of internet uptake in the country - 10 lines plus table below:

|                                  | Year | Total   | Penetration<br>(as a % of<br>population) |
|----------------------------------|------|---------|--|
| Population                       |      |         |  |
| Mobile Subscriptions (SIM cards) |      | 378,047 | 49.1                                     |
| Internet Users                   |      |         |  |
| Broadband Subscriptions, mobile  |      | 35,730  | 4.6                                      |
| Broadband Subscriptions, fixed   |      | 1,102   | 0.14                                     |
| International capacity in use    |      | (Gbps)  | (Kbps/capita)                            |
| AS Numbers                       |      |         |  |
| IP addresses (v4/v6)             |      |         |  |
| ccTLD Domain Names registered    |      |         |  |

Sources: Central Bank of Comoros.

Missing information for table above:

Fixed telephone subscriptions (including fixed CDMA wireless) TOTAL 26,316 PENETRATION 3.4%

Mobile dongles (MPESSI) TOTAL 9,816 PENETRATION 1.3

As of the date of this report, Comoros Telecom and Comoros Cables were the sole Internet Service Providers (ISPs), though only the former was providing service. However, a new market entrant, Telma Comoros (TelCo) is expected to start providing services before then end of 2016, having received a license in December 2015 following a competitive tendering process.

Internet is available via ADSL, leased lines, wireless CDMA dongles (MPESSI), 2G/3G and public Wi-Fi. Fixed broadband is generally only available in urban areas. The 3G network was launched in 2013 by Comoros Telecom. However, it currently covers only the main cities.

Fixed telephone penetration is just 3.4% of the population and the number of subscriptions (including fixed CDMA wireless) dropped by over 4,000 in 2014. The mobile market grew 23% in 2014 and mobile penetration was 49 subscriptions per 100 people. The level of access is higher, as a 2012 household survey found that 73% of homes had a cellphone (DGSP and ICT 2014). There were 35,730 Mobile Internet users in 2014 accessing the Internet using both 2G (GPRS/EDGE) and 3G technologies. Despite a more than two fold growth since 2010, fixed broadband is extremely limited with only 1,102 ADSL subscriptions in 2014. It would appear that users are substituting for fixed broadband by using the MPESSI dongle with 9,816 subscribers in 2014.

There are no official Internet usage surveys conducted in the country. According to Comoros Telecom, it had 137,000 Internet subscribers in 2015 (including fixed and mobile) equivalent to 17 subscribers per 100 people. However, some of these are likely duplicate subscriptions (e.g., a person having both a mobile and fixed subscription) and as supply side figures, do not accurately reflect Internet use in the country. Given the absence of demand side data on Internet use, Facebook usage statistics can be utilized as proxy. The social media application has grown tremendously over the last five years. There were just 6,660 Facebook users in the country in March 2011 and by September 2016 this had grown almost ten times to 65,000 or 14% of the population aged 15 and older. There is a significant gender Facebook gap. While 20% of men aged 15 and older use it, the figure is less than half that for women (9%). Interesting that overall male Facebook penetration is about 8 percentage points higher than men with a complete secondary education or higher. For females, Facebook penetration is the same as the percentage of women with a complete secondary education or higher suggesting that education is more of a barrier to online application usage for women than men.

Pricing for Internet services is high and speeds low. There are four ADSL options with speeds ranging from 0.512 - 4 Mbps. ADSL prices have not changed for the last few years despite the availability of undersea fiber optic bandwidth from the EASSy cable, which arrived in 2011. The monthly price for a 512 kbps connection is KMF 18,500 (US\$ 42), equivalent to over 60 % of average per capita income. There are different price options for wireless that revolve around the length of the data plan and the amount of data. A monthly 1GB 3G data plan costs KMF (US\$ 17) or a quarter of per capita income. This is clearly beyond the reach of most Comorians and it is likely most access the Internet using cheaper access plans with less inclusive data and hence constraining use. Speeds are relatively slow with various sources reporting similar average downloads of 2 Mbps and uploads of 1 Mbps in September 2016.<sup>1</sup>



## 3 National ICT Policy & Regulatory Frameworks

### 3.2 Policies and Regulations

The government has initiated a number of steps to liberalize the telecom sector. Privatization of Comoros Telecom has been mulled since 2005 but has had recent impetus due to structural reforms advised by international development partners. The IFC were invited to conduct a selection process and had identified several potential bidders, and established a data room. However, IFC was hesitant to move forward without passage of a new law, and this was rejected by Parliament in March 2015.<sup>1</sup> Parliamentary opposition was in part due to the expected impact on the large number of staff employed by Comoros Telecom. This is despite evidence suggesting that overall employment in the telecom sector would rise because of competition.<sup>2</sup> Comoros Telecoms successfully lobbied to have the privatization process dropped until after the April 2016 elections, and in return agreed to cover some of the debts of MAMWE, the state-owned electricity utility. The new Government has indicated that privatization may be back on the agenda.

A second mobile license was awarded in 2007 to Twama Telecom. However, it never launched, due to opposition from the incumbent, and its license was cancelled in 2012. A new bid for a full service operator was started in 2015, through a competitive selection process funded by the World Bank, and in December of that year, a license was awarded to the Telma consortium from Madagascar for CFA 7,010 billion (US\$ 16 million).<sup>3</sup> Telma is due to start operations in December 2016 but has had difficulty in reaching an agreement on interconnection, although this was part of the license agreement.

The World Bank is spearheading a major ICT sector project under the fourth phase of the Africa Regional Communications Infrastructure Program (RCIP 4). According to the 2013 Project Appraisal Document, the US\$22 million grant has three components. One supports an enabling environment through market liberalization and sector reform as well as capacity building. The second component revolves around connectivity including financing undersea fiber optic cables to Mayotte and Madagascar. The third component consists of project management including monitoring and evaluation. However, the Comoros Government missed a self-imposed deadline of 30 September 2016 to fulfill conditions relating to the release of funds (US\$12m) for the undersea cable

The electronic communications law was adopted in 2014.<sup>1</sup> ANRTIC has also issued regulations relating to equipment standardization, frequency pricing, operator fees, licensing, interconnection and national numbering plan.

Legislation covering e-commerce, data privacy and computer security have not been enacted, though a draft law has been prepared.<sup>2</sup>



[1http://www.nrtic.km/uploads/gallery/578737f08b7af.pdf](http://www.nrtic.km/uploads/gallery/578737f08b7af.pdf)

### 3.1 Authorities

|   |                                     |                         |
|---|-------------------------------------|-------------------------|
| <b>ICT Policy Agency</b>                | <a href="#">Ministry name</a>       | Comments                |
| <b>National Regulatory Authority</b>    | <a href="#">Regulator name</a>      | Comments                |
| <b>Universal Service Agency</b>         | USA Name (or operated by regulator) | Comments                |
| <b>ccTLD registry</b>                   | Name                                | Comments                |
| <b>ICT Statistics agency(ies)</b>       | Name(s)                             | ICT Statistics gathered |
| <b>Radio Spectrum Management Agency</b> | Name                                | Comments                |

## 1. Institutional Structures

The Ministry of Posts and Telecommunications, Promotion of New Information and Communication Technologies, charged with Transport and Tourism ("Ministre des Postes et Télécommunications, de la Promotion des nouvelles technologies de l'information et de la Communication, chargée des Transports et du Tourisme") is the overall ICT sector organ.

The National ICT Regulation Authority (Autorité Nationale de Régulation des TIC (ANTRIC)) is the sector regulator. It was established by decree N°065/PR of 23 May 2009. It is charged with developing sector policy including creating a competitive environment, managing scarce resources and defending consumers by ensuring tariffs and oriented towards costs with good quality of service. It is also charged with developing a universal service policy and representing Comoros at relevant international organizations.

<sup>1</sup>See "Comores Télécom Privatisation: Summary of Advisory Services Project Information" at:  
<http://ifcextapps.ifc.org/ifcext/spiwebsite1.nsf/a24f910d8d23aa078525753...>

[2](#)World Bank. 2016. "Renforcer la performance du secteur telecom en s'attelant a transformer Comores Telecoms."

| <b>National ICT Policy and Broadband Plan</b>   | <b>Names and Links to documents, (date)</b> | <b>Comments, plans</b> |
|---|---|------------------------|
| Basic Telecom Law (Legislation and regulations on market entry/licensing and competition) | Names and Links to documents, (date)        | Comments, plans        |
| Infrastructure sharing regulations  | Names and Links to documents, (date)        | Comments, plans        |
| Interconnection regulations   | Names and Links to documents, (date)        | Comments, plans        |
| Cybersecurity/e-commerce/privacy  | Names and Links to documents, (date)        | Comments, plans        |
| Intermediary liability legislation  | Names and Links to documents, (date)        | Comments, plans        |
| Universal Service legislation   | Names and Links to documents, (date)        | Comments, plans        |
| Radio spectrum regulations and assignments  | Names and Links to documents, (date)        | Comments, plans        |
| Policies to reduce gender imbalance and increase the role of women                        | Names and Links to documents, (date)        | Comments, plans        |

## **4 Network Infrastructure**

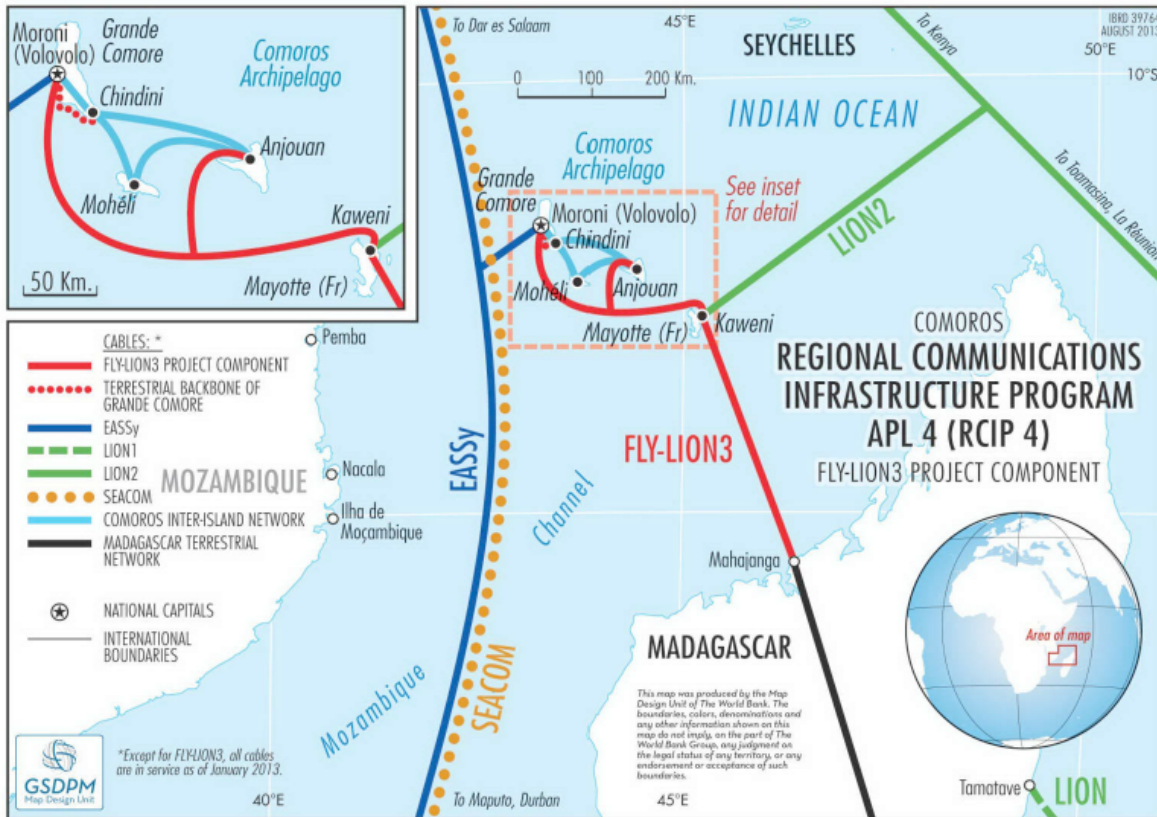
### **4.1 International connectivity**

Comoros has traditionally relied on satellite connectivity for international communications. Comoros Telecom is an investor in the EASSy submarine cable and in 2010, the cable landed in Grande Comore and put into operation in 2011. Used international bandwidth has increased to 600 Mbps in 2015 from just 15 Mbps in 2010 before arrival of the cable. Although wholesale prices have dropped from US\$5,500 per Mbps per month before the cable, they are still steep at US\$ 2,500.<sup>1</sup> It is not clear why the price is so high, other than the fact that Comoros Telecom still holds a monopoly. IP transit prices were just over US\$70/Mbps/month in Nairobi in mid-2015<sup>2</sup> so the conclusion would be that the transport costs Comoros Telecom is paying on EASSy to get traffic to a landing point on the African mainland are steep (its traffic lands in South Africa and Djibouti). Comoros Telecom was not a member of the original Western Indian Ocean Cable Consortium (WIOCC) that forms the main membership of EASSy. Instead, the spur from the main cable to Comoros had to be fully financed by Comoros Telecom, using funds from Orange set against future payments of international mobile termination rates from France. Because of Comoros's late entry, the price paid for the cable was much higher than the market rate.

There are plans for a second undersea cable connection under the auspices of the World Bank RCIP-4 project. It would leverage the proximity of Mayotte, which already has a link to the LION cable and further add a link to Madagascar (Figure 4 .2). Comoros Cables has been created to manage the cables of Comoros Telecom (EASSy and the new FLY cable as well as the inter-island domestic fiber backbone). The intention is that the Comorian government, Comoros Telecom and Telma (winner of the second license) will jointly own the company. It will operate as a wholesale provider in order to increase the scope for open access and cost-based pricing.

There is an undersea fiber optic cable connecting the three islands completed in December 2011. Comoros Cables should also in the future manage this. It has suffered some recent cuts but is currently functional. Also, separately to the project financed by the World Bank, Comoros Telecom has accepted a loan of US\$31m from China EXIM Bank, which is paid directly to Huawei, for work on a fiber backbone network in each of the islands, plus undersea fiber from Anjouan to Mayotte and from Chindini to Moroni. Unlike the World Bank credit, for which payment is postponed for 40 years, the China EXIM Bank payment must be repaid straightaway, with interest payments over 30 years.

#### **Figure 4.2: Current and planned undersea fiber optic cables in Comoros**



Source: World Bank.

[1http://documents.worldbank.org/curated/en/903931468000027290/Africa-RCIP4-Regional-Communications-Infrastructure-Program-APL-4-RI-P118213-Implementation-Status-Results-Report-Sequence-05](http://documents.worldbank.org/curated/en/903931468000027290/Africa-RCIP4-Regional-Communications-Infrastructure-Program-APL-4-RI-P118213-Implementation-Status-Results-Report-Sequence-05). IN practice, given that Comores Telecom's only wholesale customer is itself, these prices are purely notional.

## **4.2 Public Network Operators**

## **4.3 Government Networks**

Government operated networks, PPPs

## **4.4 Private Networks**

Corporate networks

## **4.5 Civil Society/NGO Networks**

Non profit/relief/UN networks

## **4.6 Interconnection and hosting**

There has not been a need for an Internet Exchange Point (IXP) in Comoros due to the ISP monopoly held by Comoros Telecom. Presumably, Comoros Telecom is using traffic management routines to keep local destined traffic within Comoros rather than using expensive international bandwidth the boomerang the traffic. The need for an IXP will be dependent on the degree of future market liberalization. The World Bank RCIP project contains a sub-component on establishing a carrier-independent IXP (World Bank 2013). A workshop was held in March 2014, in cooperation with the Internet Society (ISOC) to plan for a future IXP.<sup>1</sup>

Comoros Telecom is responsible for the .km ccTLD.<sup>2</sup> In connection with that, it offers hosting. However, it is planned that, with market liberalization, responsibility for manager .km will pass to ANRTIC.



[1http://www.internetsociety.org/events/axis-workshop-comoros-bp](http://www.internetsociety.org/events/axis-workshop-comoros-bp)

<http://www.domaine.km/index.php>

4.6.1 Data centers

4.6.2 IXPs

4.6.3 Caching and other shared services

## **4.7 Capacity building Infrastructure**

The University of the Comoros offers some programs in informatics, notably through the Institut Universitaire de Technologie (IUT). The Network of French-Comorian Alliances (Réseau des Alliances franco-comoriennes) offers courses in office applications available to around 900 students per session.<sup>1</sup>

There is a limited startup community with most educated youths pursuing careers in politics, working for others or informal work.<sup>2</sup> Under the RCIP-4 program, it is planned to establish a co-working space at the IUT, as well as other measures to encourage entrepreneurship and digital literacy. In November 2016, Comoros will host the Indian Ocean WebCup, a competition held over a weekend for application developers and designers from the region.<sup>3</sup>

[1http://www.comores.campusfrance.org/site/le-reseau-des-alliances-franco-...](http://www.comores.campusfrance.org/site/le-reseau-des-alliances-franco-...)

[2http://comorestoday.com/770-2/](http://comorestoday.com/770-2/)

## 4.8 Power supply infrastructure

The availability of adequate power is a challenge in the Comoros.<sup>1</sup> The electricity sector suffers from unreliable distribution and losses of up to 40%. Electricity shortages cause ongoing blackouts lasting for hours. It takes an average of four months for a business to get a connection.<sup>2</sup> Several projects funded by the African Development Bank and World Bank are underway to alleviate the problems.

Nevertheless, the availability of electricity at the household level is relatively high for an LDC. The proportion of households with electricity stood at 69% in 2012, thanks in part to the relative high population density (Table 4 .2). The lack of electricity is not a strict barrier to ICT access. There is a higher share of mobile phones in households in rural households than electricity implying that users are finding ways to charge their cell phones (e.g., away from the household, using car batteries, etc.).

**Table 4.2: Availability of electricity and mobile phones in households (% of households), 2012**

| Electricity |       |       | Mobile phone |       |       |
|-------------|-------|-------|--------------|-------|-------|
| Total       | Urban | Rural | Total        | Urban | Rural |
| 69.3        | 85.1  | 61.4  | 73.0         | 86.6  | 66.3  |

Source: Direction Générale de la Statistique et de la Prospective (DGSP) et ICF International. 2014. *Enquête Démographique et de Santé et à Indicateurs Multiples aux Comores 2012*.

[1http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operati...](http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operati...)

[2http://www.doingbusiness.org/data/exploreeconomies/comoros/#getting-elec...](http://www.doingbusiness.org/data/exploreeconomies/comoros/#getting-elec...)

## **4.9 Government ICT Programmes and Projects**

### 4.9.1 E-Government

The use of ICTs in public administration is limited. Only a few government agencies have an online presence and at the time of this report, the national portal was under construction.<sup>1</sup> According to the UN, the country's 2016 E-government score was 0.2155 ranking it 176 out of 193 countries.<sup>2</sup>

<http://beit-salam.km> according to the United Nations Public Administration Country Studies. [Accessed 30 September 2016]



#### 4.9.2 **Education & health**

According to information from the World Health Organization (WHO), ICT initiatives in health are virtually zero.<sup>1</sup> There is no e-Health policy or strategy although there is a strategy for developing a Health Information System (HIS). There also is some use of text messages to promote health as well as emergency announcements.

[1http://www.who.int/goe/publications/atlas/2015/com.pdf?ua=1](http://www.who.int/goe/publications/atlas/2015/com.pdf?ua=1)

### **4.9.3 Emergency Services**

### **4.9.4 Agriculture**

Given the importance of agriculture and fishing in the economy and for livelihoods, the use of ICTs is very relevant. However, like other sectors, the application of ICTs is limited. The Food and Agriculture Organization (FAO) reported that it is supporting a project that includes a component to create a food safety database and a food security monitoring system.<sup>1</sup>

## **4.10 Banking and E-Payments**

According to the IMF, only around 10% of the population has a bank account. There is no formal mobile money implementation in the Comoros, though it is expected that Telma Comoros will introduce one as soon as it commences service. Deployment of mobile money would strengthen financial inclusion and facilitate financial transactions where there were only 27 ATMs and five bank branches in 2014.<sup>1</sup> Despite lack of a formal mobile money system, it appears that airtime credit is being used as a way to transfer funds. According to the Global Financial Inclusion Database, four percent of the population aged 15 and older received money over their mobile phone in 2011.<sup>2</sup> The Central Bank recently issued guidelines that acknowledges electronic payments but creates a number of obstacles such as the types of payments and amounts.<sup>3</sup>

As noted, remittances are significant amounting to US\$129 million in 2015.<sup>4</sup> Evidence from other countries suggests that the use of mobile money for international remittances is often cheaper and more direct compared to other methods.

[1http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C&sid=1460043...](http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C&sid=1460043...)

[2http://datatopics.worldbank.org/financialinclusion/](http://datatopics.worldbank.org/financialinclusion/)

[3](http://www.banque-comores.km/DOCUMENTS/Bulletin_BCC_n9_Mars_2016.pdf)Central Bank of the Comoros. 2016. "III. Nouvelle réglementation relative aux moyens et systèmes de paiement." *Bulletin trimestriel de la Banque Centrale des Comores*, March.  
[http://www.banque-comores.km/DOCUMENTS/Bulletin\\_BCC\\_n9\\_Mars\\_2016.pdf](http://www.banque-comores.km/DOCUMENTS/Bulletin_BCC_n9_Mars_2016.pdf)

[4http://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT](http://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT)

## 4.11 Media

The Office de Radio et Télévision des Comores (ORTC) the national broadcaster, offers clips from new programs on its website (<http://www.radiocomores.km/index.php/historique-de-l-ortc>). It also has a web site targeted at diaspora in France (<http://www.ortc.fr>). Radio Comores is also available on several streaming services. One of the national newspapers has a web site (<http://www.alwatwan.net>).

## 1. Tourism

The government tourist office has a web site (<http://www.tourisme.gouv.km>) with visitor information for the country. Mobile roaming is theoretically available for around 80 countries, but in practice is very limited for tourists roaming in Comoros, who are obliged to purchase a local SIM card.<sup>1</sup>

## 5. INFRASTRUCTURE READINESS POLICY CHECKLIST

[Contribute to the Infrastructure Readiness Policy Checklist >](#)

## 6. Commentary

Despite the demonstrated impact of ICTs in areas that are of particular importance for development, currently there are very few significant uses of ICT across the economy. This is partly due to low take-up and historically high prices that have discouraged use, experimentation and the creation of a relevant market. There have been a number of one off projects to implement ICTs in different areas but these have generally not scaled.

## 7. Country contacts and online resources

Bullet list or table of names and urls

### Comments

Connection to the EASSy cable, creation of an inter-island fiber optic backbone and the launch of 3G services has provided a connectivity platform for the Comoros. However, tariffs remain high in relation to the low incomes in the country, discouraging take-up. It is expected that the recent award of a second telecom license and plans for a second international undersea cable link, will intensify competition at both the wholesale and retail levels, leading to more widespread adoption of the Internet in the country.

Although connectivity is improving, low levels of literacy constrain online usage. They also discourage development of e-business services given the small market size. The lack of electronic payment options that can monetize innovative ICT products and services is an obstacle to wider application of ICT across the economy. The level of ICT expertise in the country to develop applications and services is lacking. Hence, Comoros is missing the benefits that ICTs can deliver for development, particularly given its remoteness and limited human resources.

Considering the lack of financial resources, there is a role for the international community in promoting wider application of ICT across the economy and key social sectors such as agriculture, education and health. The World Bank RCIP-4 has set aside US\$5m for demand stimulation programs, but much more is needed. Interventions need to be able to scale so that ICT has a lasting and sustainable impact in the Comoros.

[Comments Contribute to the ICT Infrastructure Readiness](#)