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PARTICIPANTS' REPORTS-1

# ICTP - URSI - ITU/BDT WORKSHOP ON THE USE OF RADIO FOR DIGITAL COMMUNICATIONS IN DEVELOPING COUNTRIES

( 17 - 28 February, 1997 )

# "Radio Digital Communications in West Africa"

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**URSI - ICTP-ITU/BDT**

**Workshop on the use of radio for digital communications in developing countries**

***Trieste,(Italy), 17-28 Feb 1997***

***Communication:***

# Radio digital communications in west Africa

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# PLAN

# I. Executive summary

In the early 80's, african PTO have started digitization of their networks, purchasing digital switches and microwaves links, introcucing fiber optic cables as for urban inter-switches links needs or even for long distance links.

From the 90's some PTO adopted IDR technology for their satellite communications systems .

Nowadays, as they continue to widespread digital technology in their network, they also begin use of WLL to quickly bring telephone to new subscribers in an cost effective manner.

Otherwise,one of the great problems african PTO are constantly facing with is the dramatic continuous increase of their waiting lis of potential subscribers due to unsuitable final wireline local loop as it usually takes several years to materialyse total-fixed LAN Wealther customers have also urged implementation of cellular

# II. Digital communications and african telecommunications network improvement

## *II. 1. Towards microwaves links digitization in a large scale*

**Percentage of some african transmission digitization**

| Country | 1995 | Forecast year 2000 |
|---|---|---|
| ***Benin*** | **23,50 %** | **100 %** |
| ***Burkina F.*** | **92,50 %** | **100 %** |
| ***Mali*** | **20,4 %** | **100 %** |
| ***Senegal*** | **79 %** | **100 %** |
| ***Togo*** | **93 %** | **100 %** |

Many reasons have lead african PTO to increase digitization of their network:

**1.Financial constraints**

Investments in digital microwaves links are continuously decreasing, and financial institutions are very much attentive to the way scarce resources loaned are used

**2. Technological evolution**

As african countries have no local telecom industry, PTO must purchase what developed countries industries offer in the market.

**3. National video signal transportation needs**

Mostly for political reasons, PTO are often compelled to remove analog transmission network and implement a new one including national video signal transportation

**Benefits from moving to digital microwaves:**

1. ***Cost effective investment and maintainability (Telemeasures and easy cards replacement)***

2. ***Low power consumption (use of solar energy)***

3. ***Few number and higher level trained human resources***

4. ***Narrower rooms or outside buildings***

## *II.2. Moving from old copper wired links to TDMA technology for rural telecommunications*

Almost all african PTO are removing old manual or automatic copper wired rural telecommunications system and implementing TDMA technology to provide telecommunications services in the rural areas using Lucent technologies (former TRT/Philips) IRT1500 , IRT 2000 or canadian SR100, SR 500.

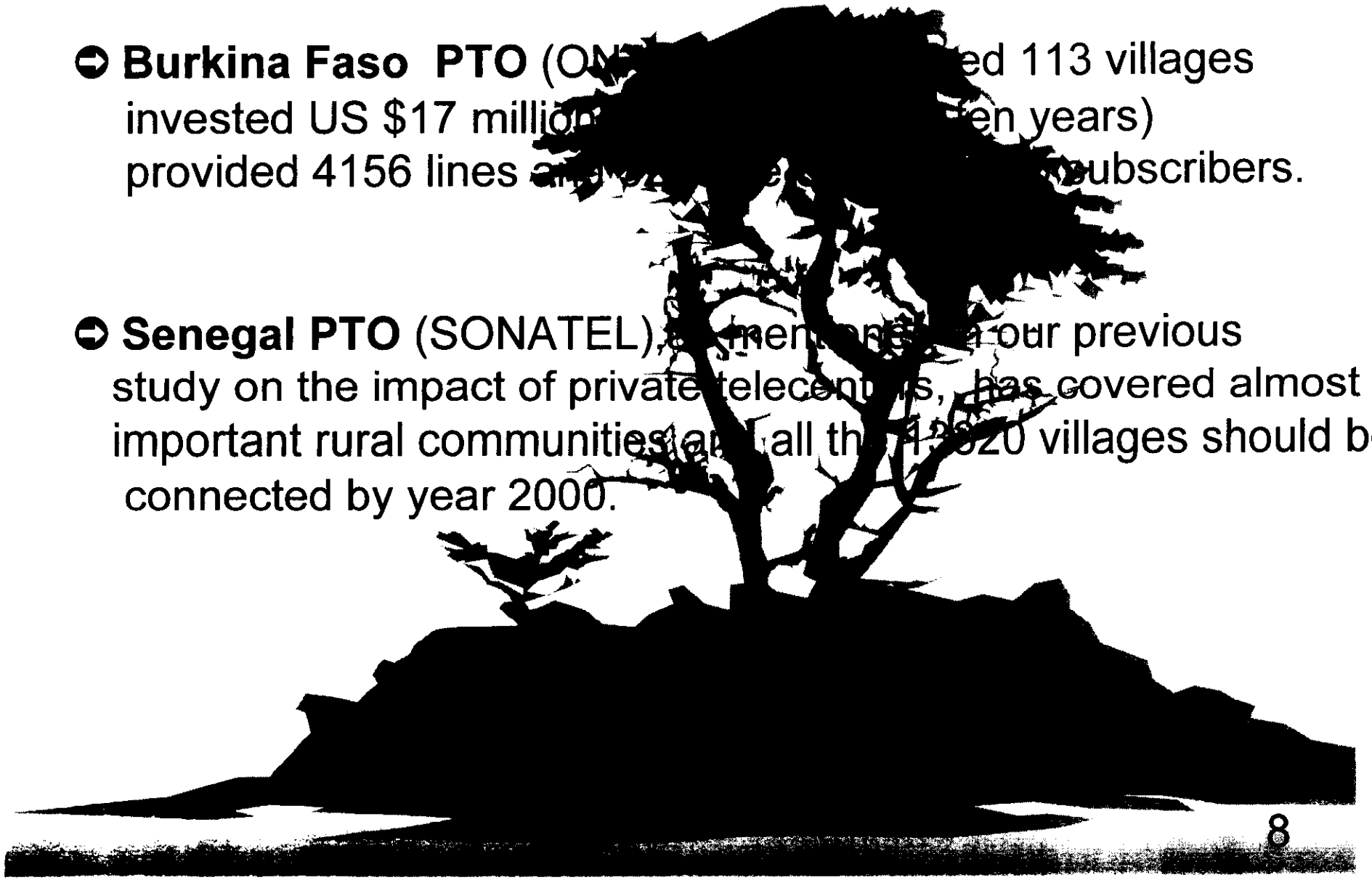
For example:

- **Ivory Coast's** PTO (CI TELCOM) has an investment program of near US $ 170 millions in rural telecommunications covering 312 villages and using DECTstandard to connect some subscri

- **Benin's** PTO has covered 26 villages with a total of 697 main lines availability and 402 lines installed.

- **Burkina Faso PTO** (ON[illegible]ed 113 villages
  invested US $17 millio[illegible]en years)
  provided 4156 lines a[illegible]ubscribers.

- **Senegal PTO** (SONATEL), [illegible] our previous
  study on the impact of private telecent[illegible]s, has covered almost all
  important rural communities a[illegible] all th[illegible]20 villages should be
  connected by year 2000.

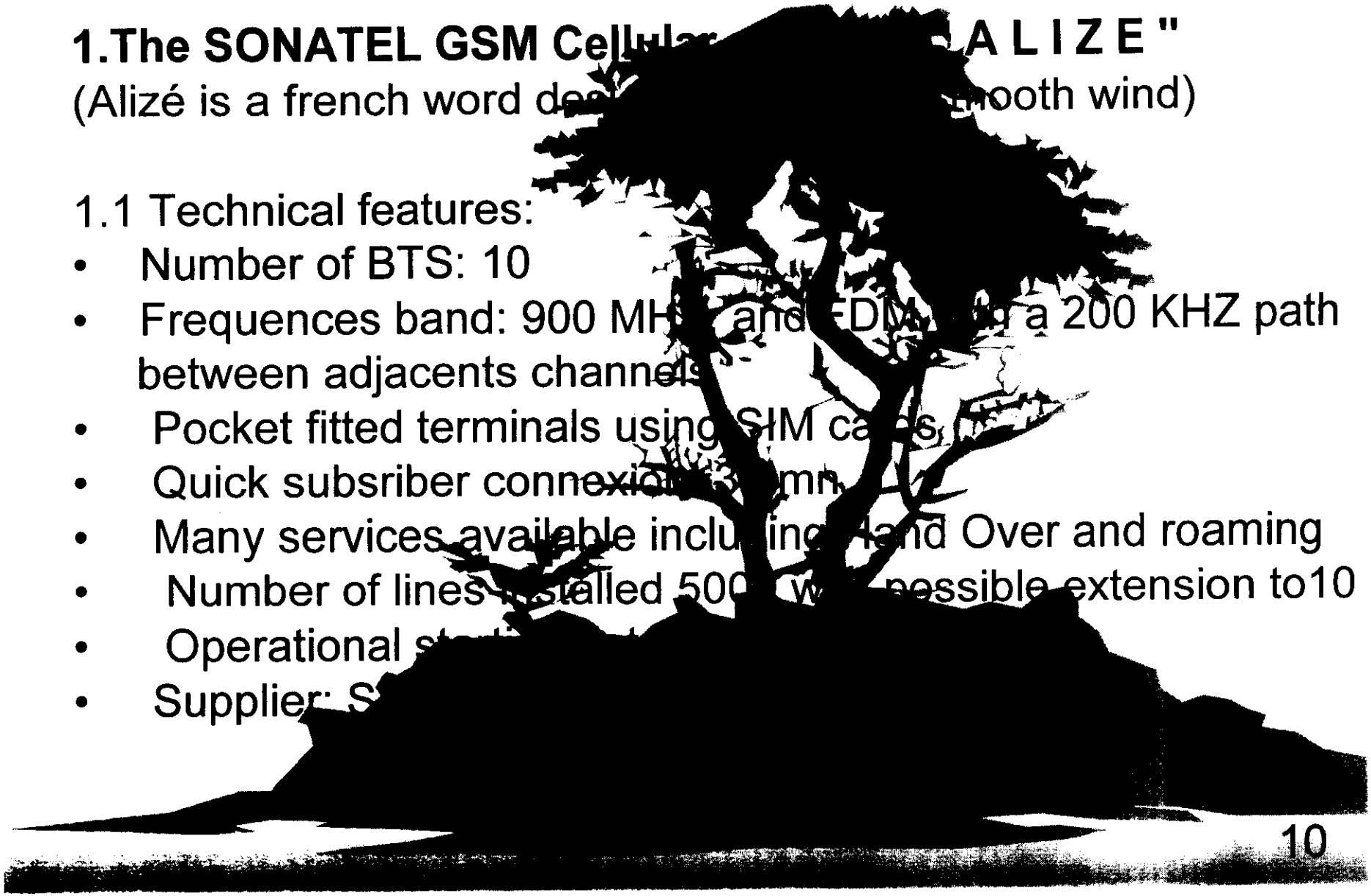


## III. Regulatory changes an[illegible] operating

West african PTO are m[illegible]nopolistic situation to a competitve one and [illegible]ate cellular network either by themselves ([illegible]LI, Benin BURKINA FASO) but private op[illegible] licence to operate cellular network in some countries (Gha[illegible]ory Coast). Even if many african PTO had st[illegible]ded op[illegible]analog cellular networks since the 90's, almost[illegible]f the[illegible]e moving to digital technology with GSM standard. Fo[illegible]wi[illegible] is a glance at Senegal PTO (SONATEL) and [illegible]na Faso [illegible](ONATEL) experience.

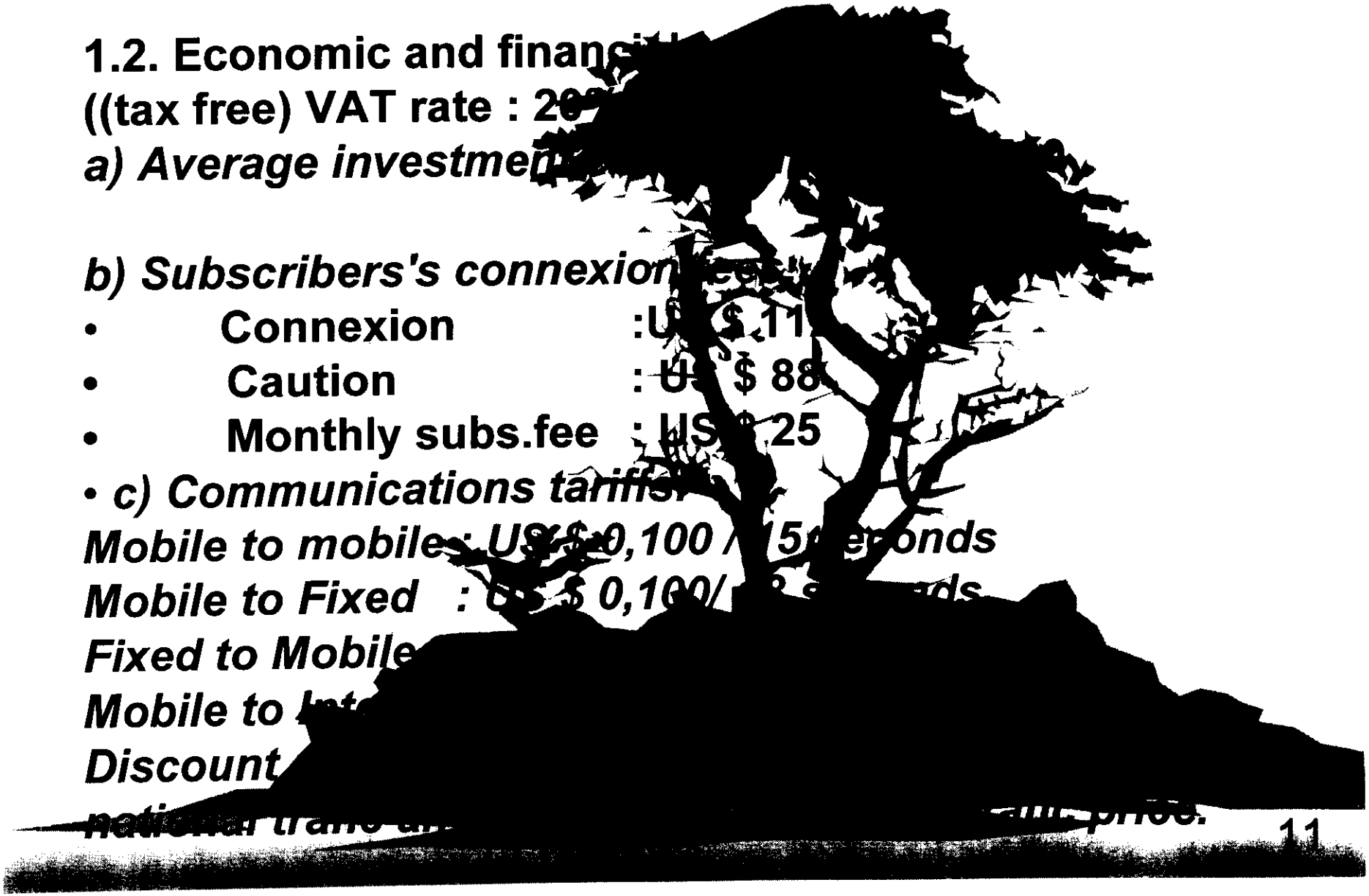
## 1.The SONATEL GSM Cellular [illegible] A L I Z E "

(Alizé is a french word de[illegible]mooth wind)



1.1 Technical features:

- Number of BTS: 10
- Frequences band: 900 MH[illegible] and [illegible]DM[illegible] a 200 KHZ path between adjacents channels
- Pocket fitted terminals using SIM cards
- Quick subsriber connexion [illegible]mn
- Many services available inclu[illegible]ing Hand Over and roaming
- Number of lines installed 500[illegible] w[illegible]possible extension to10 000
- Operational s[illegible]
- Supplier: S[illegible]



## 1.2. Economic and financial

**((tax free) VAT rate : 20**

***a) Average investment***

***b) Subscribers's connexion***

- **Connexion** **:U $ 11**
- **Caution** **: U $ 88**
- **Monthly subs.fee** **: US $ 25**

- ***c) Communications tariffs:***

***Mobile to mobile: US$ 0,100 / 15 seconds***

***Mobile to Fixed : US $ 0,100/ 2 seconds***

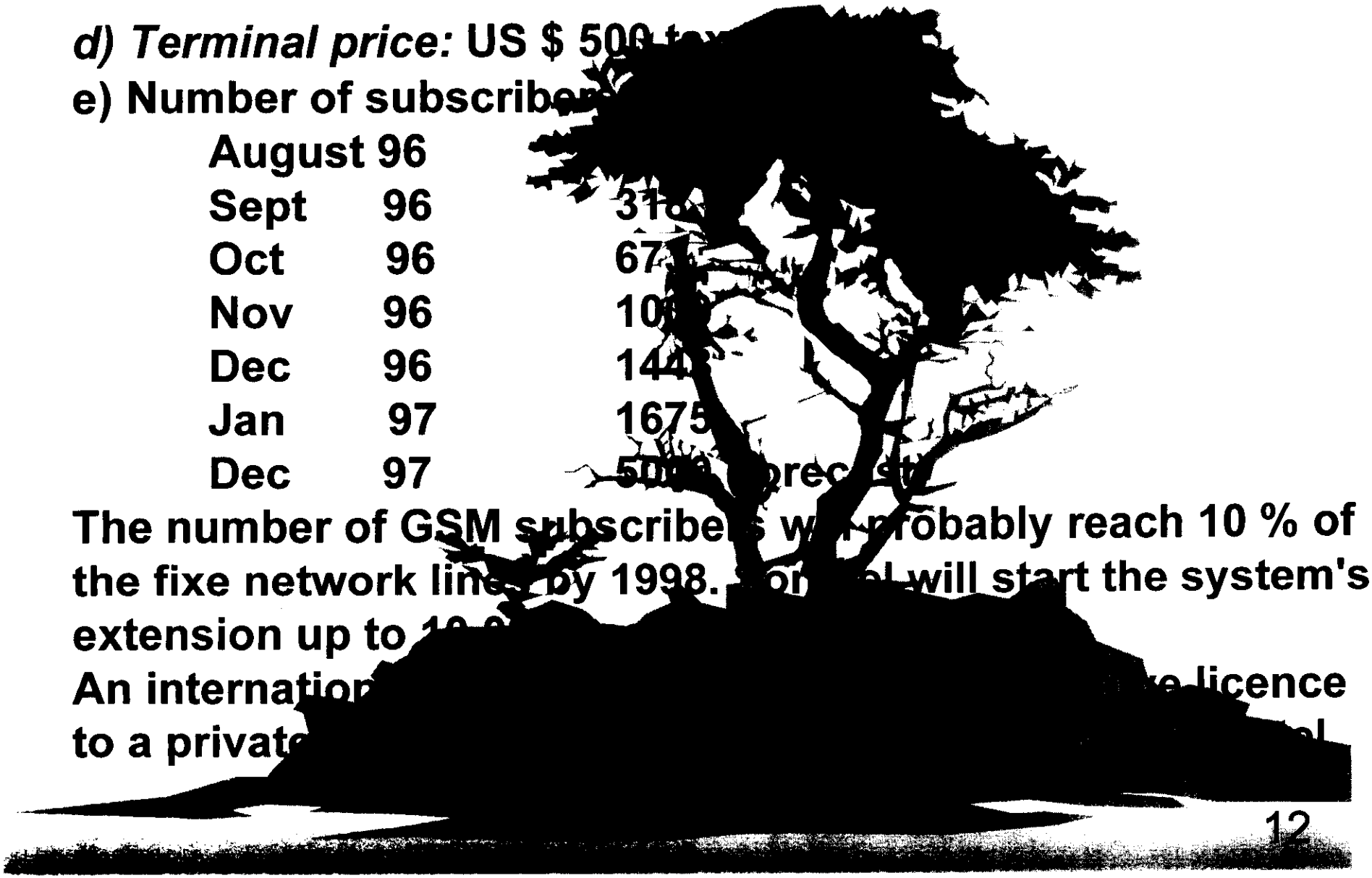
***Fixed to Mobile***

***Mobile to Int***

***Discount***

***national trans***

***mn phone.***



***d) Terminal price:*** **US $ 500 to**

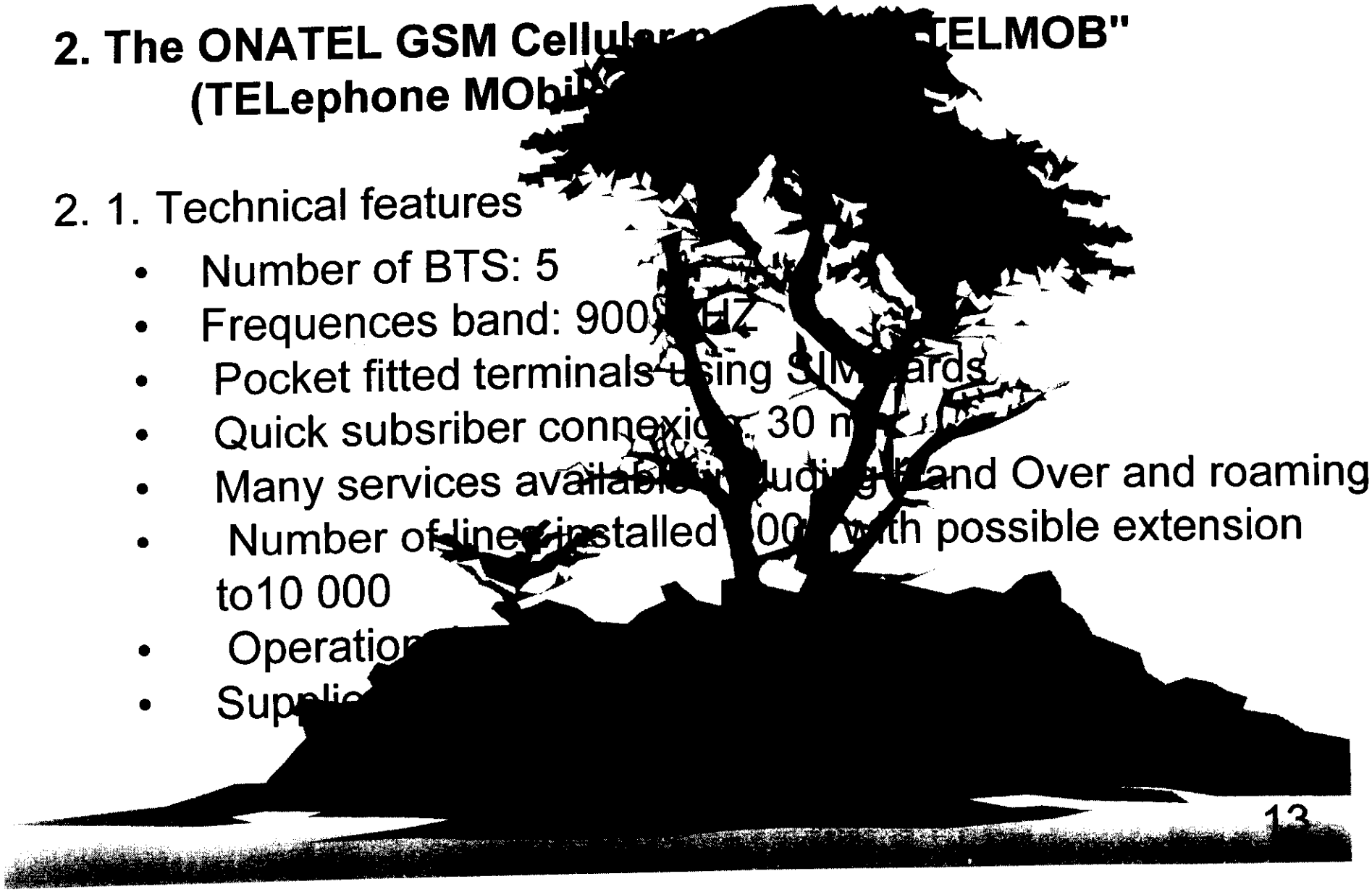
**e) Number of subscribers**

| | | |
|---|---|---|
| **August** | **96** | |
| **Sept** | **96** | **31** |
| **Oct** | **96** | **67** |
| **Nov** | **96** | **10** |
| **Dec** | **96** | **144** |
| **Jan** | **97** | **167** |
| **Dec** | **97** | **50** **prec** |

**The number of GSM subscribers will probably reach 10 % of the fixe network line by 1998. Sonatel will start the system's extension up to**

**An internation licence to a private**

## 2. The ONATEL GSM Cellular [illegible] "TELMOB"
## (TELephone MObile)



2. 1. Technical features

- Number of BTS: 5
- Frequences band: 900 MHZ
- Pocket fitted terminals using SIM cards
- Quick subsriber connexion: 30 mn
- Many services available including SMS and Over and roaming
- Number of lines installed 5 000 with possible extension to10 000
- Operation
- Supplie

## 1.2. Economic and financi

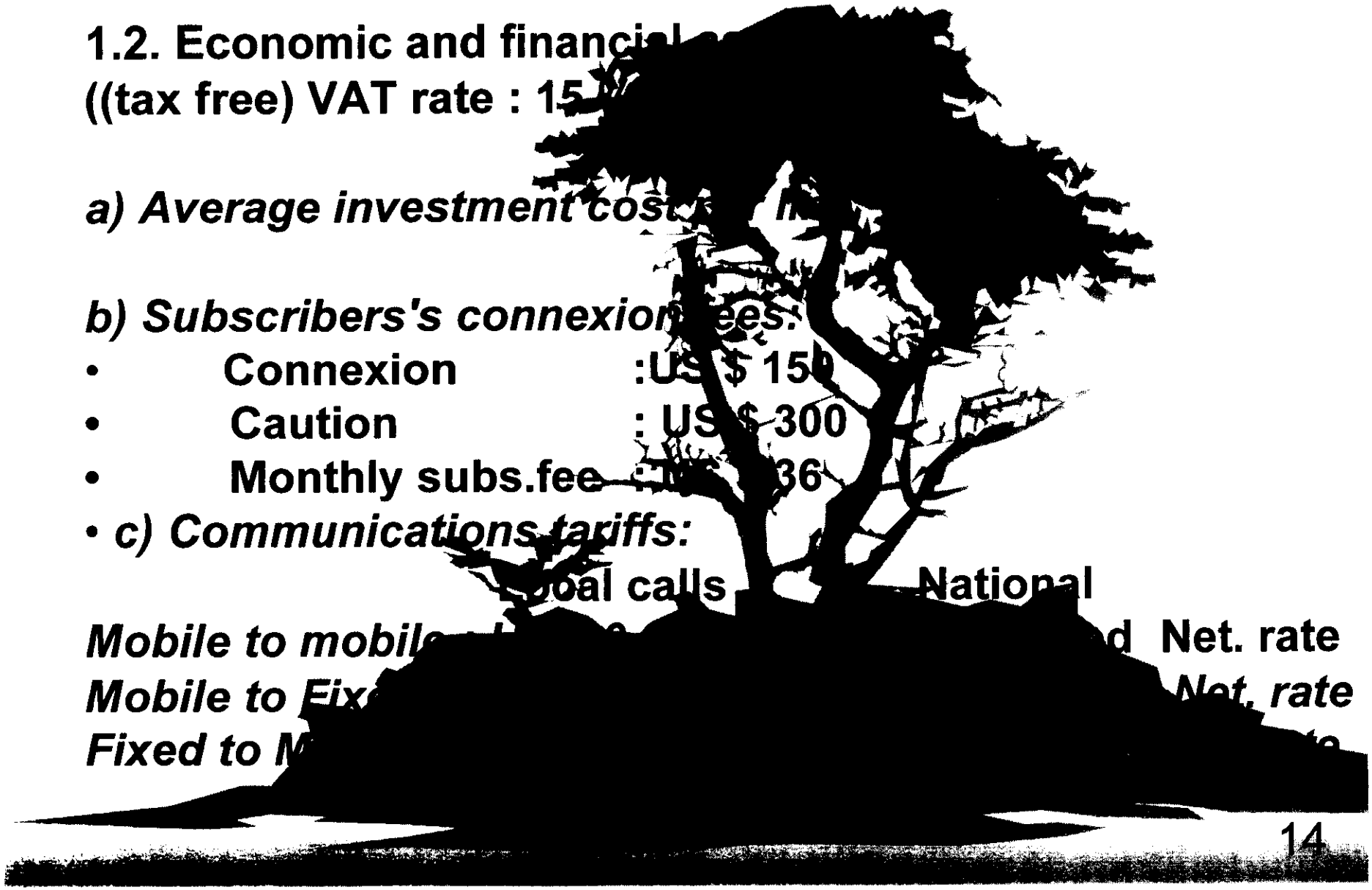
((tax free) VAT rate : 15

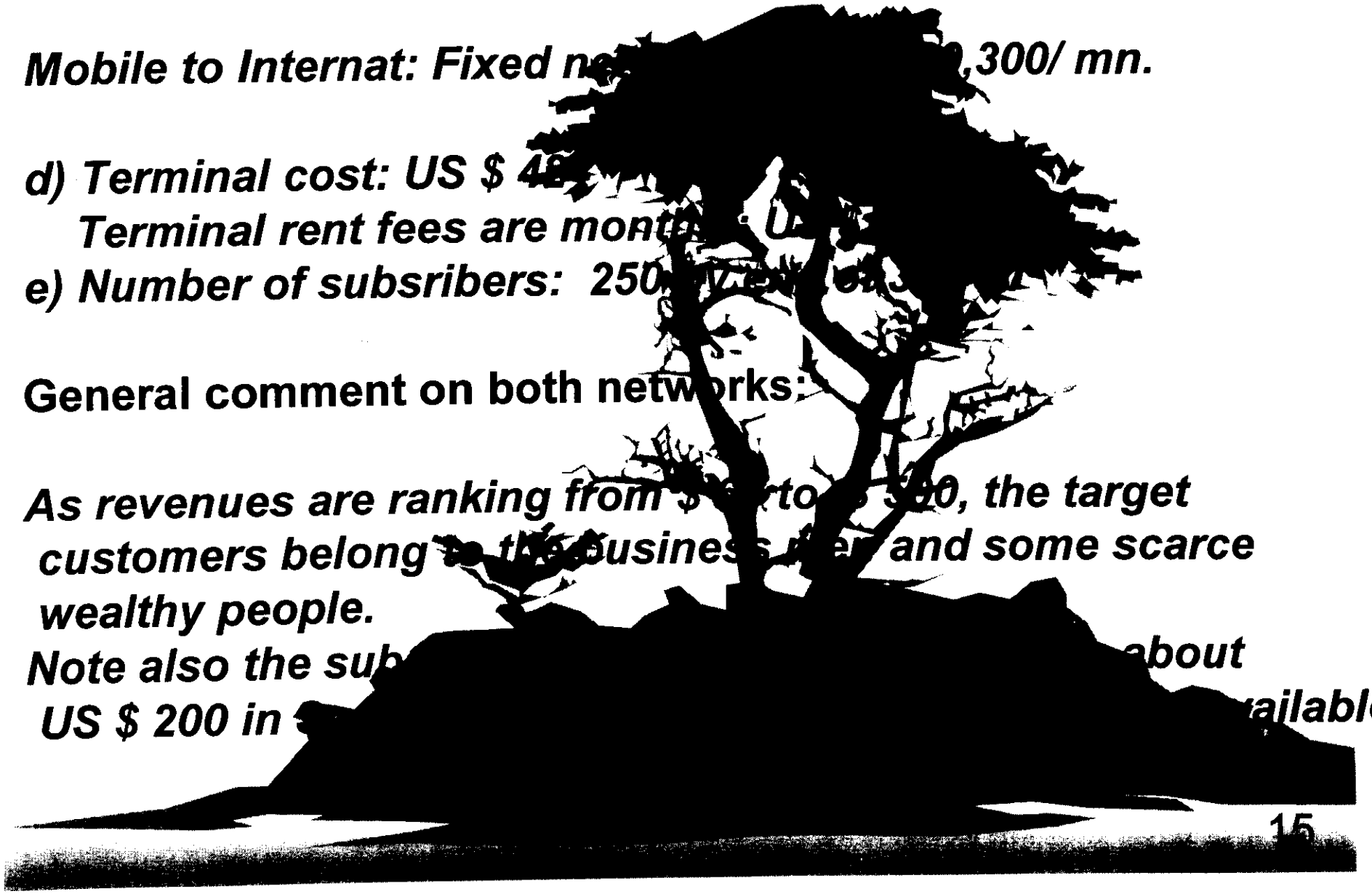
*a) Average investment cost*

*b) Subscribers's connexion fees:*

- Connexion :US $ 150
- Caution : US $ 300
- Monthly subs.fee : US $ 36
- *c) Communications tariffs:*

| | Local calls | National |
|---|---|---|
| *Mobile to mobil* | | d Net. rate |
| *Mobile to Fix* | | *Net. rate* |
| *Fixed to M* | | |



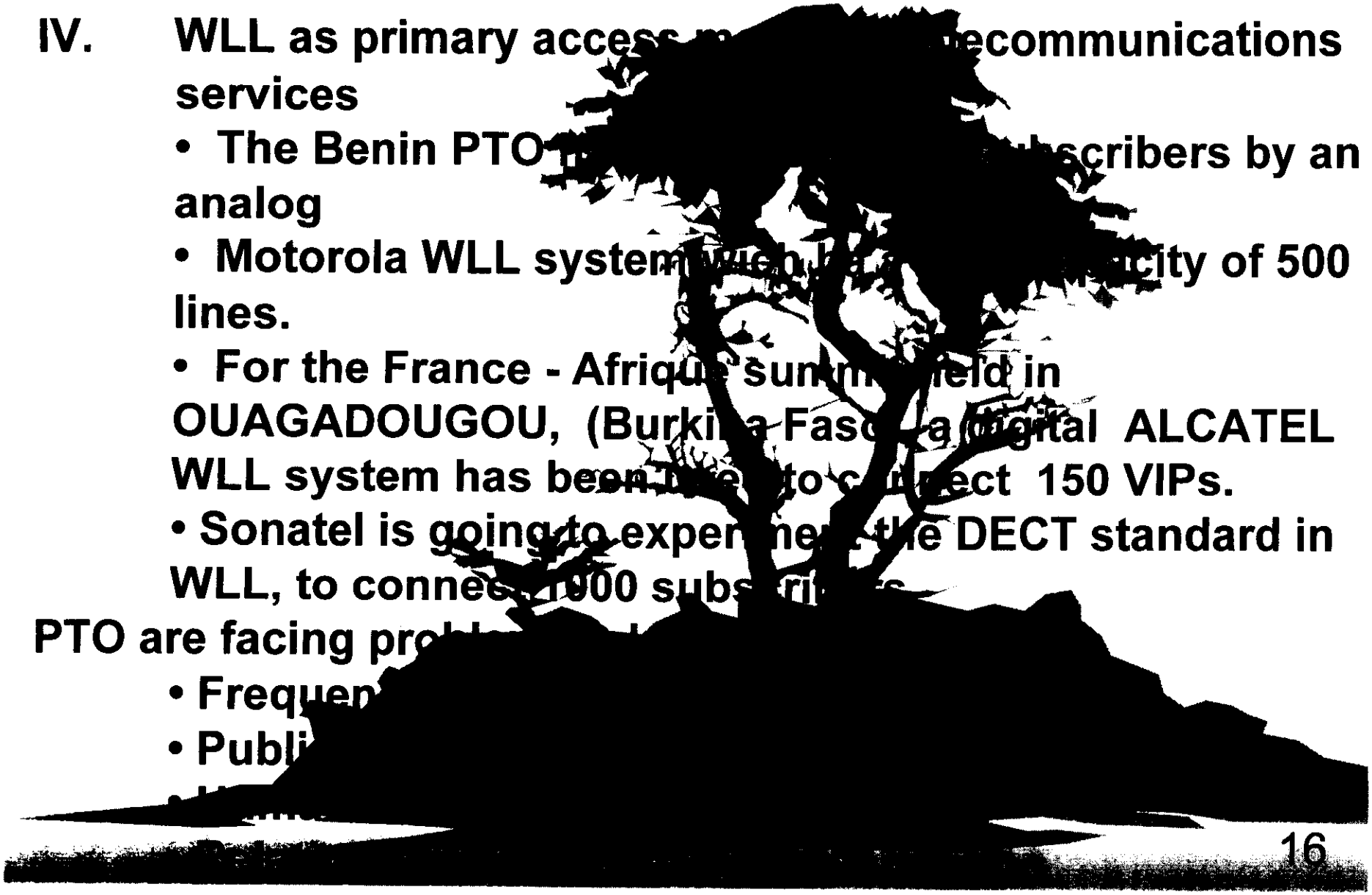


Mobile to Internat: Fixed n ,300/ mn.

d) Terminal cost: US $ 4
Terminal rent fees are mont
e) Number of subsribers: 250

General comment on both netw rks:

As revenues are ranking from to 0, the target customers belong to the busines and some scarce wealthy people.
Note also the sub about US $ 200 in ailable.



## IV. WLL as primary access m[illegible]ecommunications services

- The Benin PTO [illegible]scribers by an analog
- Motorola WLL system which ha[illegible]city of 500 lines.
- For the France - Afriqu[illegible] sum[illegible]ield in OUAGADOUGOU, (Burki[illegible]a Faso[illegible]a digital ALCATEL WLL system has been [illegible]to c[illegible]ect 150 VIPs.
- Sonatel is going to exper[illegible]e[illegible] the DECT standard in WLL, to connec[illegible]1000 subs[illegible]ri[illegible]s

PTO are facing pro[illegible]

- Freque[illegible]
- Publi[illegible]

## IV. Conclusion and pr[illegible]volution

The african telecommuni[illegible]so register
an important growth o[illegible]unications
services, even by now there is [illegible]erstanding
due inaccurate models of intro[illegible]chnology.
The constant decrease of inve[illegible]nd the rapid
deployment combined with the [illegible]echnologies like CDMA
and others will be factors that le[illegible]rators to a quick and
soon adoption of these means t[illegible] gap in telecommuni-
cation developpement.

Some west african op[illegible] their[illegible]verage investment
cost per line from [illegible]0 and even less
in a very cl[illegible] terminals
will also co[illegible]
tech[illegible]