Applications of
Information and Communication
Technologies to reduce
the Digital Divide

1. ICT for developing countries: the "Engineering Without Borders" experience

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Engineering Without Borders

INGENIERÍA SIN FRONTERAS

- ✓ Non Governmental Organisation for Development
- ✓ Mainly centred on Technology for Human Development
- ✓ Based on volunteers
- ✓ Autonomous, non-party and non-religious organisation

Why ISF?

- × 6200 millions people on the world
- × 1000 millions are poor
- × No safe water for 1100 millions
- × No stable electricity for 1800 millions
- × Precarious housing for 1000 millions
- × 56% homes have no telephone

What ISF does?

- × Development projects
- × Advocacy, campaigns
- × Education for development
- × Studies and research on Technology for Human Development

Development programs

- × Lines of work
  - ✓ Social infrastructure and services
  - ✓ Water supply and sanitation
  - ✓ Agricultural development and small businesses
  - ✓ Energy
  - ✓ Information & Communication Technologies
  - ✓ Fourth world
- × 30 projects in 16 countries (Latin America, Africa and Europe)

Advocacy and Campaigns

- × Technology for Basic Needs
- × More and Better Official Development Aid
- × Fair Trade
- × Military I+D in the University
- × External Debt

Education for Development

- 9 Courses in 5 Universities
- Graduate Thesis on Cooperation for Development Award
- Technology for Human Development Annual Conference
- Engineering in Development Workshops
- Conference on Education for Development at the University

Formal Education

Introduction to cooperation for development

- ✓ Human rights & the concept of development
- ✓ Human and sustainable development
- ✓ Global view of the developing world
- ✓ History of the international fight against poverty
- ✓ Internacional structure of cooperation for development
- ✓ Technology and Society
- ✓ Technology for human development
- ✓ Technology development projects & programs

Studies & research on Technology for Human Development

- Telemedecine systems for rural healthcare
- I-D "Informática y Discapacidad": Computer Science and Handicapt

Who we are?

- 12 territorial associations
- Members: 1,000
- Volunteers: 400
- Employees: 15
- Annual budget: 1,500,000 €

Information and Communication Technology for Human Development

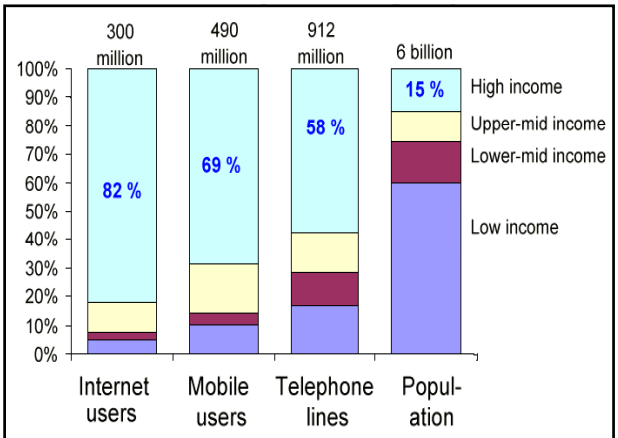
Workshop on communication with farmers in Kilosa, Tanzania

ICT can help human development...

- Providing information
  - ✓For health and education
  - ✓For remote specialists and researchers
- Enabling empowerment
  - ✓Giving voice to NGOs
  - ✓Empowering governments of poor countries
  - ✓Addressing censorship
- Raising productivity
  - ✓Creating commerce for small businesses

... but there are many barriers in poor countries

- Scarce infrastructure
  - ✓Telecommunication networks
  - ✓Acces to stable electricity
  - ✓Liberalisation is not always helping
- Low quality of telecommunication
- High cost of ICT
- Not updated systems
- Not well training human resources
  - ✓for research, use, maintenance/repair and management



Source: ITU World Telecommunication Indicators Database.

The ICT divide

	Africa	Asia	LAC	UE	EE.UU.	Japan	TOTAL
Population	10%	58%	9%	6%	5%	2%	100%
Telephone lines	1%	24%	7%	23%	21%	7%	100%
Mobile Telephone	20%			32%	25%	23%	100%
Computers	1%	15%	4%	24%	36%	9%	100%
PC / 100 hab.	0,8	1,7	3,4	24,9	51,0	28,7	6,5
Annual Increase	15%	22%	15%	11%	14%	21%	15,%
Internet Hosts	0,2	2,8	1,2	8,5	53,2	2,6	71,8
Hosts / 100 hab.	0,02	0,08	0,23	2,27	19,5	2,06	1,2
Annual Increase	18%	61%	136%	32%	74%	56%	65%

The network high society

- **High incomes**
- **High education**
- **Men**
- **Young**
- **Urban**
- **English spoken**

Seven proposals for a real Information Society for all

1. **Connectivity**
2. **Community**
3. **Capacity**
4. **Content**
5. **Creativity**
6. **Collaboration**
7. **Cash**

Some experiences around the world

FITEL
FONDO DE INVERSION EN TELECOMUNICACIONES

- **Peru: FITEL**
  - ✓1% turnover of the telecomm industry
  - ✓Public phones in 5,000 villages
  - ✓Internet access in distric capitals
- **Senegal:** private enterprises has to extend telephone network in 50% villages with more than 3,000 hab.

The Village Phone

GrameenPhone GRAMEEN™ Banking for the poor

The Village Phone

- Mobile phone as a public phone
- Concessionaire
- 1 phone for 2,500 people
- 2.8 millions users
- Slower growth from 2000

Telecenters

- **Center for public access to Information and Communication services**
  - ✓Telephony, fax and Internet
  - ✓Photocopy, text processor and printing
  - ✓Training on computer use

Some examples of telecenters

- More demand on telephone than on Internet
- Community participation
- Local leadership and management
- Technology is only a tool, but it has to work (maintenance is difficult in rural areas)
- Host organisation for the telecenter (broadcast radio or library)
- Barriers on education, age, gender
- More research is needed to evaluate impact

Type of telecenters

Type of telecentro	Management Finaning	Location	Cost	Variety of Services	Economic Profit
Comercial	Private	Urban	Very low	Very low	Very high
Franquicia	Private Public	Urban	Low	Low	Very high
Comunitario	Private Public	Urban Rural	Medium	Medium	Medium
Local Government	Public	Urban	Medium	High	Medium
Multiporpouse	Public	Rural	Very high	Very high	Very low

Cost and Variety of Services ↓ Economic Sustainability ↑

Telecenters: lessons learned

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InfoDes

- **Objective**
  - ✓ Rural development through information services for small producers and local governments
- **Information Centers**
  - ✓ with library, projection room, Internet and radio broadcast

InfoDes (evaluation in 2001)

- ✓ ICT does not broke local economic isolation
- ✓ Access to juridical, economic and political information does not improved local management capacity
- ✓ There is local demand on information
- ✓ Not only economic information are needed, but also political, social and cultural information
- ✓ Institutions are aware local adequate information is needed

INGENIERÍA SIN FRONTERAS

Engineering Without Borders and ICT for Human Development

BorgouNet

Telematic services for development organisations in north Benin

BorgouNet Services

- **Internet acces for development organizations**
  - ✓Telecentre
  - ✓Telephone
  - ✓Radio (WiFi and VHF)
- **Users training**
- **Maintenance services for users**
- **Health Information Systems**

ehas

Enlace Hispano Americano de Salud

Hispano-American Health Link

Health Center

- "Health micro-net"
- In district capitals
- Usually telephone line
- 4 hours of electricity
- Headed by physicians
- 5 to 10 workers
- Little laboratory

Health Post

- Lowest in the hierarchy
- Hedead by the health center
- Small towns
- No telephone lines
- No electricity
- Difficult access
- Low trained personnel
- 1 worker

Communication conditions

- Scare infrastructures
- Long distances
- High cost in communications
- Difficulties on sending information
- Coordination problems
- Limited professional experience
- High job rotation

The *ehas* proposal

- Appropriated telemedicine systems
  - ✓ Information services for rural healthcare workers
  - ✓ Appropriated communication technologies

The *ehas* services

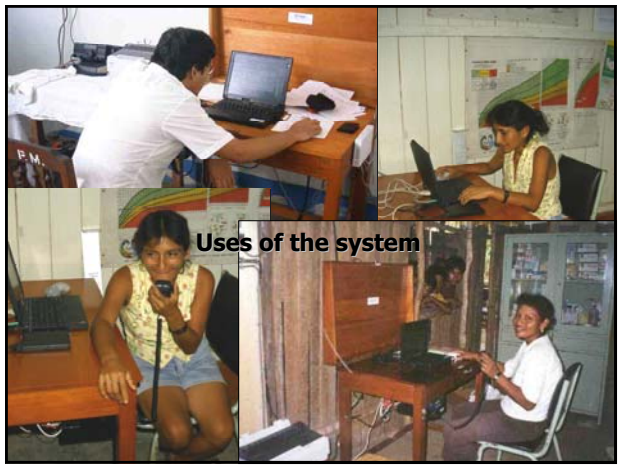
Developed by local heath partners and centered on health workers needs: information exchange, training, emergency management and reduce professional isolation

The *ehas* services

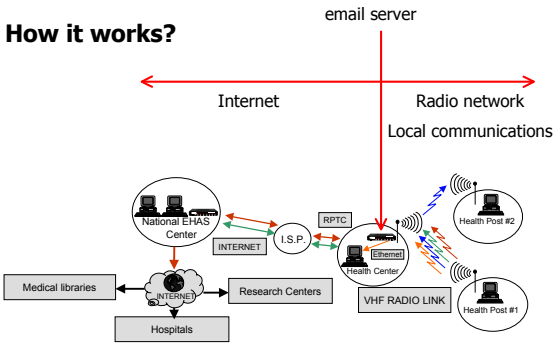
- Voice communication
- e-mail
- Distance training
- Electronic publications
- Distance consultation
- Access to remote health information
- Support for epidemiological surveillance
- Support for drug delivery

The *ehas* technology

Developed by technical local partners and based on low cost technologies, wireless systems, and free software



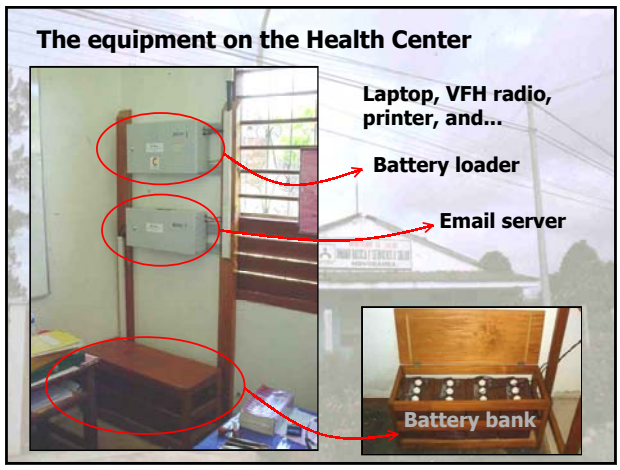
How it works?



The equipment on the Health Posts

The equipment on the Health Posts

The equipment on the Health Center



Three level maintenance system

- **Users**: preventive maintenance
- **Local maintenance technicians**: control, simple repairs and reposition.
- **National *ehas* partners**: complex repairs and local technicians training

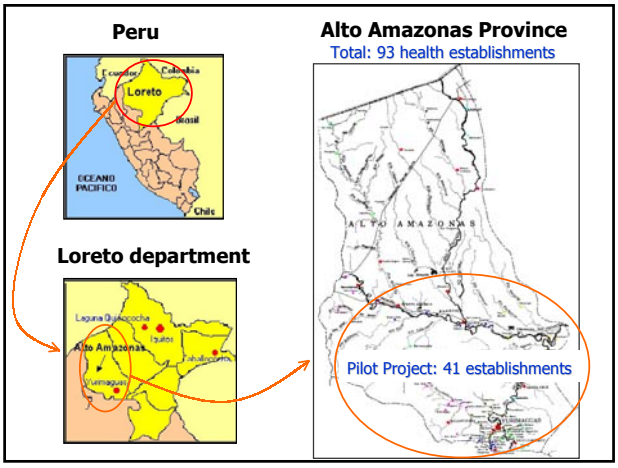
ehas objective

To create national conditions to employ appropriated telemedicine systems for rural primary health care (low cost and adapted to local needs)

The *ehas* strategy

- National programs: Peru, Colombia y Cuba
- Four main steps:
  - ✓Reinforce local partners: Technical and medical Universities
  - ✓Information & Communication needs studies
  - ✓Develop pilot projects
  - ✓Impacta evaluation of pilot projects
- Involve Health Ministry at local and national level

ehas - Alto Amazonas
Pilot project



The cost of the *ehas* systems

- Infrastructure cost: 4,195 €/station
- Operation cost: 18 € monthly/station
- Savings: 154 € monthly/station
- Repayment: 2.5 years

Impact evaluation

Medium time: 9 month of use

- High use of the system (email 71%)
- Users consider system useful for consultation and training
- Greatest impact on emergencies
  - ✓ 58 life saved and 40% time saving in evacuations
- Good reliability and usability

Impact evaluation

- Time savings in preparing and sending reports
- Money savings mainly in reducing evacuations
- Less impact on drug delivery and report exchange: organizational change
- Maintenance system must improve

Impact evaluation

- Medium time evaluation: 9 month of use of the system (sep01 to jun02)
- Technical viability, sustainability, impact on the clinic process, impact on patients health, acceptability and cost/benefit study
- 81 indicators
- Qualitative and Quantitative techniques

Impact evaluation

- Use of the system
  - ✓ Voice: 100% use radio frequently (12 daily calls)
  - ✓ e-mail: 71,4% (10 daily messages)
  - ✓ Computer: 86,7% daily
  - ✓ Printer: 86 monthly sheets in HP and 470 in HC
- Usefulness for consulting
  - ✓ Before: 94% difficult or impossible to consult
  - ✓ Now: 93% easy and quick to consult
  - ✓ 700% increase on consults
  - ✓ Consults : 391 for diagnosis and 254 for treatment, 97% of then satisfactory answered

Impact evaluation

- Usefulness for distance training
  - ✓ 95% of health workers considers the system is adequate for their training (17 sobre 20)
  - ✓ 93% receive notice for live training (before: 35%)
- Usefulness for patients evacuations
  - ✓ 100% of the evacuations are noticed by the system
  - ✓ Shared vehicles on 64% of evacuation
  - ✓ 3.5 hours saving thanks the system (8.6 h. to 5.1 h)
  - ✓ 58 life saved in 205 patients transferences

Impact evaluation

- Reliability
  - ✓ Voice: 97%
  - ✓ e-mail: 90%
  - ✓ Preventive maintenance is well done by 97% users
- Usability
  - ✓ Voice: easy to use for 100%
  - ✓ Computer: 77%
  - ✓ e-mail: 93%

Impact evaluation

- Time savings
  - ✓ To prepare reports: 7 h./month (from 20 to 13 h.)
  - ✓ To send reports: 3.37 days/month (HP attended)
  - ✓ Evacuations: 3.5 hours reduction (from 8.6 to 5.1 h)
  - ✓ 23 less evacuations/month in all the health network

Impact evaluation

- Money savings (average monthly salary: 120 €)
  - ✓ Monthly savings per worker: 44 €
  - ✓ Thanks to avoiding transfers (in 39 establishments/month)
    - For the health system: 714 €
    - For the patient: 2,429 €
    - For the local government: 1,123 €
  - ✓ Savings for avoiding lost on productivity (in 39 establishments/month)
    - For avoiding workers travels: 2,024 €
    - For time saved in preparing reports: 540 €
    - For avoiding travels of patient and their family in urgencies: 2.883 €

Impact evaluation

- Things to improve (organizational level)
  - ✓ Local maintenance system
  - ✓ To consider emailed reports as official documents
  - ✓ Little impact on drug delivery: communication system is not enough exploited
  - ✓ Little impact of training on healthcare attention

The *ehas* partners

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Future perspectives

+ Peru
  - ✓ Monitoring and evaluation of *ehas-Alto Amazonas*
  - ✓ Second pilot project
+ Colombia
  - ✓ First pilot project in Cauca Department
+ Cuba
  - ✓ First pilot project in Guantánamo Province

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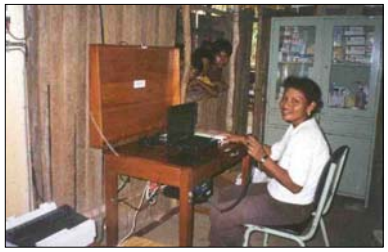
Enlace Hispano Americano de Salud
www.ehas.org



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