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**FOURTH ICTP-URSI-ITU(BDT) COLLEGE ON RADIOPROPAGATION:
Propagation, Informatics and Radiocommunication System Planning**

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Miramare - Trieste, Italy

Telecommunications

Development and the Future of the Radio

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TELECOMMUNICATIONS

DEVELOPMENT AND

TECHNOLOGY OFFICE

RADIO

M. RADICELLA

INDICES TO MEASURE THE ECONOMIC STATUS OF A COUNTRY

**Gross National Product (GNP)
and GNP per Capita :**

in local currency converted in US dollars by
the average annual exchange rate

**Gross Domestic Product (GDP)
and GDP per Capita :**

in local currency converted in US dollars by
the average annual exchange rate

Real GDP per Capita :

in *Purchasing Power Parities*

US dollars (PPP\$) to take into account the
relative purchasing powers of currencies

When a country rank by INCOME is well ahead of the rank by HDI there is indication that this country still *have considerable potential for translating its income into well-being improvement of the their people*. This well-being is related to the increase of the infrastructure of the country including sanitation, water, railways and roads, power and TELECOMMUNICATION.

DIFFERENCES BETWEEN GDP PER CAPITA AND REAL GDP PER CAPITA

COUNTRY	GDP per Capita (US\$)	Real GDP per Capita (PPP\$)
China	320	2946
India	285	1150
Thailand	1640	5270
Chile	2340	7060

HUMAN DEVELOPMENT INDEX (HDI)

It contains three equally weighted aspects of the human development of a country :

- **LONGEVITY** (given by life expectancy at birth)
- **KNOWLEDGE** (given by adult literacy and mean years of schooling)
- **INCOME** (given by the real GDP per capita in PPP\$)

HDI varies from 0 to 1

Above 0.8 :

high human development

_____ 0.8 _____

Between 0.5 and 0.79 :

medium human development

_____ 0.5 _____

Below 0.5 :

low human development

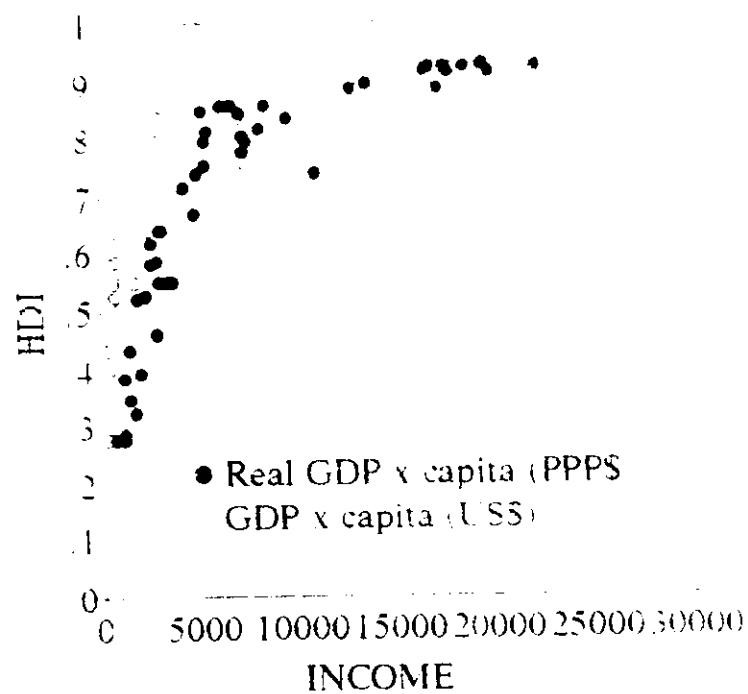


Fig. 2. Relation between HDI and income indices for a group of 47 countries

HDI AND INCOME RANKS OF

DEVELOPING COUNTRIES

COUNTRY	HDI RANK	REAL GDP PER CAPITA RANK	RANK DIFFERENCE
S. Arabia	22	5	-17
Morocco	46	35	-11
Gabon	49	33	-16
Congo	54	42	-12
Cambodia	74	64	-10
Sudan	77	66	-11
Uganda	80	70	-10
Benin	82	59	-23
Si. Leone	94	71	-23
Afghanistan	95	84	-11

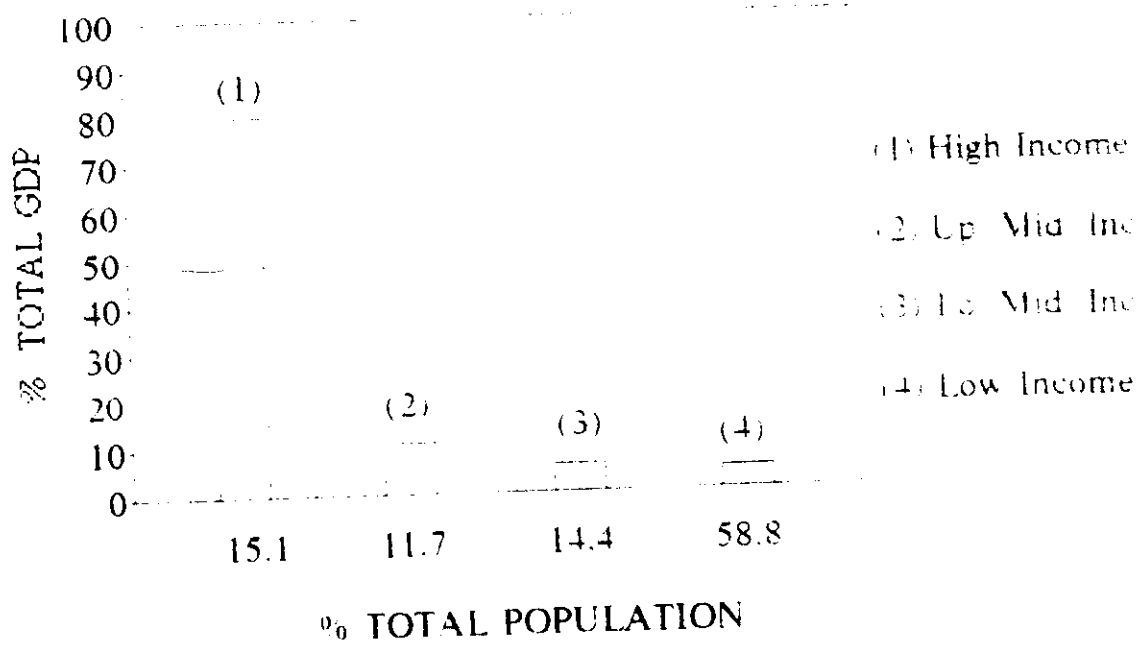


Figure 1.- Relation between income given in percentage of total world GDP and percentage of total population.

DEVELOPMENT INEQUALITIES WITHIN COUNTRIES

COUNTRY	OVERALL HDI	POOREST REGION HDI	RICHEST REGION HDI
Brazil	0.756	0.549	0.838
Nigeria	0.348	0.156	0.666
Egypt	0.551	0.444	0.738
China	0.644	0.404	0.865

TELECOMMUNICATIONS

"THE INFRASTRUCTURE OF INFRASTRUCTURES"

Dissemination of information

Education

Emergency and health services

Commerce and other economic activities

Public administration

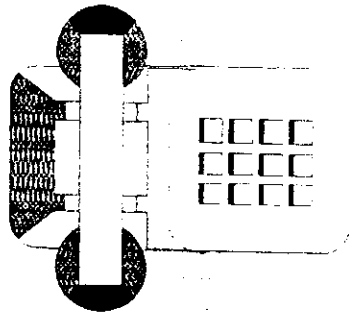
TELECOMMUNICATIONS

PLAY AN ESSENTIAL

ROLE IN AREAS LIKE

**The presence of the first reliable telephone
line in a village or community in some
developing countries will:**

*create
new opportunities
for trading
in the area*



*play
a fundamental role
in case of health
or environmental
disaster emergencies*

contribute to slow down rural exodus

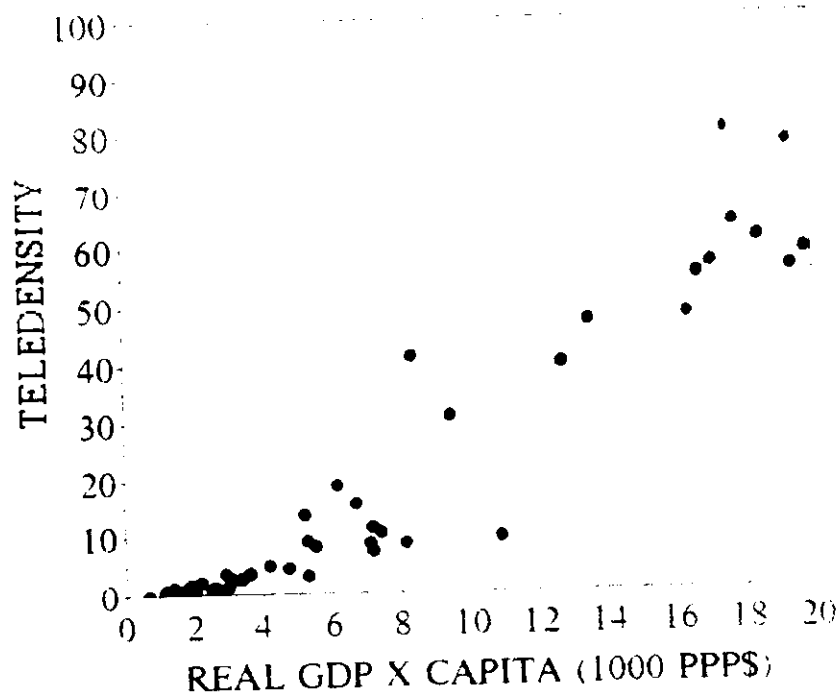


Fig. 3.- Relationship between Teledensity and Real GDP per capita (PPPS)

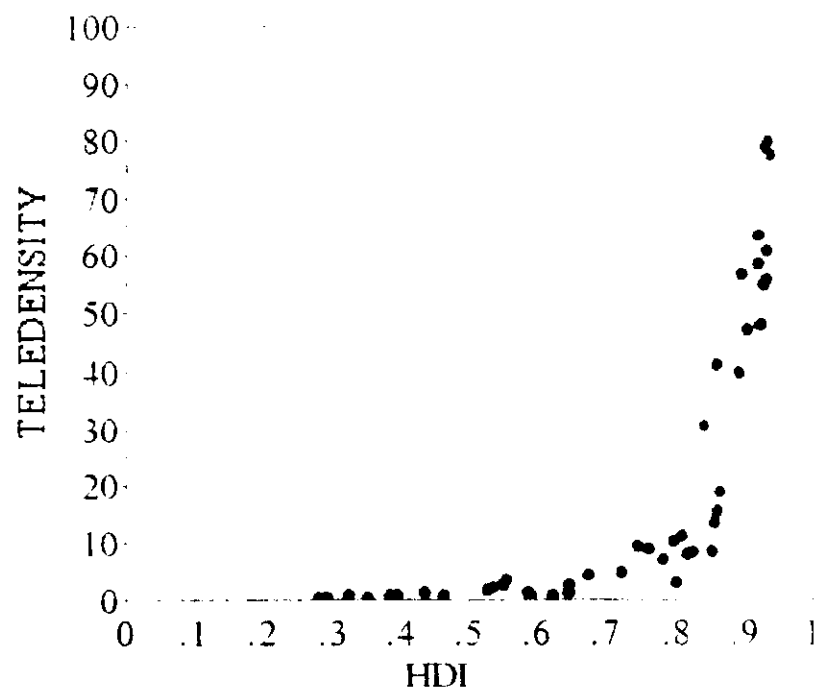


Figure 4.- Relationship between Teledensity and DHI.

Table 4

PROJECTION OF MAIN TELEPHONE LINES TO BE ADDED AND ANNUAL INVESTMENT

REGION	MAIN LINES TO BE ADDED (K)	ANNUAL INVESTMENT (MUS\$)
Africa	12282	2302
Americas	70083	13140
Asia	107548	20166
Europe	89364	16756
Oceania	3936	739
Former URSS	27559	5167
Total World	310772	68269

A larger absolute increase of number of lines can be expected in those countries that have a rapid increase in their general living standards, as compared to those that have only an increase in their income. It means that increased human development creates demand for more telecommunications.

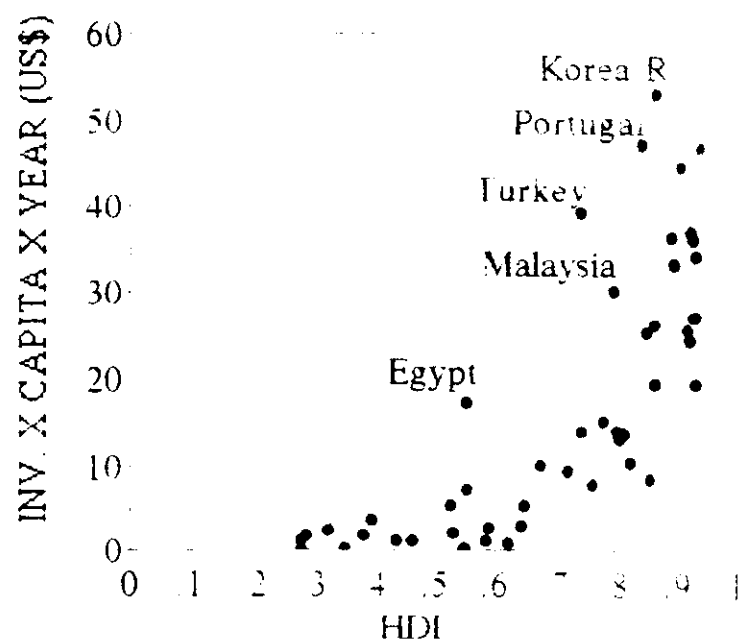


Figure 5. - The relationship between prevision of investments per capita and per year and present HDI.

RADIOCOMMUNICATIONS

THE RADIO SPECTRUM

The radio spectrum is the natural resource used, but not consumed, in radio-communications and ranges from very low frequencies (3-30 KHz) to optical frequencies (300-3000 THz).

Radio spectrum utilization and management involves technical factors together with economic, political and sociological aspects that make necessary the establishment of international agreements and national regulations.

The *Radiocommunication Sector* of the *International Telecommunication Union* is the body in charge of ensuring the rational, equitable, efficient and economical use of radio spectrum by all radio-communication services.

THE INCREASING ROLE OF RADIO IN TELECOMMUNICATIONS

1984

Use of satellite Systems for most intercontinental routes and international television exchange

Mobile low capacity networks, mainly non cellular using HF radio technology

1994

Increasing use of satellite technology for direct TV-radio broadcasting and mobile communications

Analogue cellular radio is the dominant technology for mobile communications

Satellite will be mainly used for direct broadcasting and mobile applications

Digital cellular radio will be the dominant technology for mobile communications

2004

Mobile satellite communications will be used as systems to compete with existing local operators and to provide **communications to remote areas**

Increasing use of radio-based systems for data transmission systems

MORE ABOUT PRESENT AND FUTURE OF MOBILE COMMUNICATIONS

It represents one of the major growth industries with a value of approximately 17 US\$ billion per year and a subscribers annual increase of 45%.

By the beginning of next century the CEC envisages that 50% of the total teletraffic will be radio based and an ambitious research program was started under the *Research and Advanced Communications for Europe* (RACE) program to study the creation of a third generation mobile system.

By the beginning of next century Personal Communications Mobile Satellite Systems like MOTOROLA IRIDIUM INMARSAT PROJECT 21 and TRW COMSEY will be operational for global communications.

WORLDWIDE

development of the new generation of telecommunications networks and a series of new initiatives in the field of spectrum management in various countries.

Cooperation with the International

Telecommunications Union (ITU) is a priority for the Ministry of Communications. The Government has signed the ITU Convention and the ITU Recommendation on the use of radio frequencies in the mobile service, and has also signed the ITU Recommendation on the use of radio frequencies in the fixed service.

Strategic planning is being carried out in close cooperation with the ITU, and the use of radio frequencies is being managed in accordance with the ITU Recommendation on the use of radio frequencies in the mobile service, and the ITU Recommendation on the use of radio frequencies in the fixed service.

RADIO IN WORLD TELECOMMUNICATION DEVELOPMENT

At the *First ITU World Telecommunication Development Conference* held in Buenos Aires, Argentina, March 21-29, 1994, a series of 12 programmes were decided. Among these programmes of particular interest to developing countries the following are directly oriented towards radio use in telecommunications:



Programme n. 4 *Development of Maritime Radiocommunications Services*



Programme n. 6 *Frequency Management*



Programme n. 8 *Mobile Cellular Radio Telephone Systems*

ACKNOWLEDGMENT

Basic information from:

- >World Bank World Development Report 1994,
- >UNDP Human Development Report 1994,
- >ITU World Telecommunication Development Report 1994,
- >Final Report of the First World Telecommunication Development Conference, 1994.

