4.3 Overview of approaches to universal access and service

Chapter 3 summarizes the main approaches that policy makers and regulators use towards achieving universal access and service (UAS) targets.

In **Section 3.1**, the historical context of universal service (US) policy is outlined with a review of traditional, non-competitive (administrative) approaches that have been used primarily in developed countries over the past few decades. Traditional, non-competitive methods are not relevant to developing countries and are discussed to provide context only.

Section 3.2 introduces the form of dedicated initiative gaining ground in liberalized markets - competition for subsidies from Universal Access and Service Funds (UASFs).

Section 3.3 considers the importance of non-government and community-based initiatives in the development of sound UAS policy, including village phone programmes, community networks and public Internet access strategies.

Section 3.4 describes the importance of an open access policy to key infrastructure such as backbone and international gateways, as well as options and models for shared network infrastructure.

Section 3.5 describes some other approaches and initiatives towards promoting UAS, including the experience of co-operatives and rural or regional licences for telecom provision in rural areas. This section also discusses scenarios for which these models might be best suited, including for broadband development. It also gives an overview of local or community radio in various countries and lessons learned.

Reference Documents

- **Broadband infrastructure investment in stimulus packages: Relevance for developing countries**
- **Universal Access & Service (UAS) and Broadband Development**

4.3.1 TRADITIONAL INCUMBENT OBLIGATIONS

This section describes the recent history of universal service (US) and universal service obligations (USOs), drawing primarily on experience in developed countries. While not generally applicable to developing countries, the background of US and USO is important for understanding recent approaches and policies, as covered in subsequent sections. The concept of US existed pre-liberalization and its characteristics and changes are discussed in **Section 3.1.1**.

In relatively mature network environments, once targets have been chosen, (e.g., defined penetration targets for underserved areas, or the provision of public payphones in certain locations), and it has been determined that market forces alone cannot assure the achievement of the target, the regulator will likely make industry fulfil these targets. Methods of designating a US provider after market opening are discussed in **Section 3.1.2**.

Section 3.1.3 presents methods of allocating US funding.

Section 3.1.4 covers a method of raising funds for US through access deficit charges.

4.3.1.1 UNIVERSAL SERVICE AT THE TIME OF MONOPOLY

Monopoly thinking is largely irrelevant for today's developing countries. A multitude of providers and investors provide great opportunities for latest technologies and network growth, but the consequences of history live on in the current situation of some developed countries, in the literature, and in some people's mindsets. In countries where liberalization is delayed because of political or legal obstacles, continuing to use traditional incumbent obligations should be considered only as temporary and interim measures, if at all.Before liberalization, there was usually a single network operator in an area (or country); this operator had to fulfil whatever social obligations were required, particularly when these organizations were government departments. Universal service obligations (USOs) were often not explicit but were seen as part of the organization's general public service mandate. Specific recognition of any losses was rare and unlikely to be objectively supportable because there would be no suitable accounting information. When any losses were recognised,

they were expected to be met by internal cross-subsidies. No unfairness was perceived because social obligations were in society's interest and the organization's customers, who ultimately bore the cost, represented most of society.When liberalization was being considered, many incumbent operators initially used their social roles to help secure preferred arrangements for the new regime. When a fight against liberalization was lost, incumbents often argued in favour of access deficit charges or shared funding of USOs. This was often more to burden their new competitors than to gain significant, direct benefits for themselves [1]. Generally, the obligations were preserved and made explicit for the first time. There was little debate about the content of the obligations, and none about who should bear them: the incumbent was the only candidate. The obligations were often just a statement of existing practice. One such statement is found in the Practice Note *The residential service obligations of the incumbent in New Zealand in 1993*. In a liberalizing market, imposing USOs on the incumbent operator alone is contrary to the objective of creating a level-playing field. However, some developed countries have used administrative USO designation, as discussed in Section 3.1.2, but the trend is now to more competitive procedures. USOs are often used by the incumbent operator as a reason to delay re-balancing tariffs, agree to fair interconnect agreements and provide access to its national backbone and international gateway at cost-based market prices. A liberalizing market moves away from forced obligations towards a regime where the cost of universal access and service (UAS) provision is shared proportionally among all industry participants and all players have an opportunity to participate in the provision of UAS, typically through a competitive mechanism.

Practice Notes

- **The residential service obligations of the incumbent in New Zealand in 1990**

4.3.1.2 ADMINISTRATIVE USO DESIGNATION AFTER MARKET OPENING

Shortly after market opening, developed countries often introduced administrative, non-competitive procedures for designating a company to fulfil a universal service obligation (USO). These procedures are used where there is only one candidate capable of fulfilling the USO, despite the sector being open to competition, because new entrants are still far from national service provision. Typically, only an incumbent was considered capable, as it often was already providing near-total fixed-line coverage. Recognising this likelihood, the EU requires USO designation procedures to be "efficient, objective, transparent and non-discriminatory…" but not necessarily competitive. Where an open tender is not used, the EU prefers the designation to be:

- Open, in the sense that both the specification of the obligation to be fulfilled and the proposal of the designated provider are publicly available;
- Subject to public consultation;
- Broken down into components (geographic or functional), so that more than one company can be designated; and
- Of moderate duration.

Some EU countries have opted to make the operator with significant market power (SMP) in the retail access market, the universal service (US) provider. With more mature liberalized market, the EU is moving toward more competitive designation procedures, led by new member states. Estonia broke new ground in 2006, by being the first member state to designate through an open tender procedure, an alternative operator as its US provider. This is the Finnish company Elisa, rather than the incumbent.Administrative procedures may sometimes be appropriate in developing countries when the overhead of organizing competitive procurement is not justified. This could be the case if:

- The amount of work to be done is small, and one candidate is obviously well-placed to do it (e.g., a cellular company serving one or a few villages in a coverage hole);
- Local participation is a major element, and there is only one credible local participant (e.g., a local organization running a telecentre); and
- There are few potential suppliers and genuine competition among them is unlikely (e.g., if the opportunity is open only to a duopoly of existing licensed operators).

Administrative procedures may also be preferred if the country lacks the capacity to organize and run a fair, open competition. *Guidelines for administrative procedures* Guidelines for administrative procedures should be based on the principles of *transparency* , *objectivity* and eventual *contestability* . The procedures must include the following:

- Specification of the task to be fulfilled, with concrete and realistic goals, including the time in which it must be fulfilled;
- A proposal by the organization that is to fulfil it;

- A review and verification that the proposal is of the required standard; and
- A contract between the regulator (or other awarding agency) and the fulfilling organization, that clearly states what is to be done and which provides recourse in case of inadequate performance. A contract would also spell out any financial arrangements and limits of compensation for the operator, if any.

Contestable USOs Between 2001 and 2004, Australia had an experimental period of contestable universal service obligations (USOs): though Telstra retained the obligations, other companies could offer or compete to undertake them and receive the subsidies in specific areas, in place of Telstra. No other companies actually came forward with offers, but the experiment was seen as a valuable demonstration that USO subsidies received by Telstra were fair. A summary of the experience and lessons learned is provided in the Practice Note *Australia and contestable USO provision*.

Practice Notes

- **Australia and contestable USO provision**

4.3.1.3 ADMINISTRATIVE ALLOCATION OF UNIVERSAL SERVICE FUNDING

As soon as funding is available for providing universal service (US), it becomes more interesting to providers. With funded US provision, it is possible to award service contracts and funding by competitive tender as discussed in **Section 3.2** and in more detail in **Chapter 7**. But where networks are already well developed and the obligation is primarily to maintain existing facilities rather than to install new ones, the incumbent will often be much better placed to fulfil the obligation than any new entrant could possibly be. In these circumstances, administrative procedures for allocating universal funding have been developed. Administrative procedures exist, for example, in the USA, Canada, Australia, and France.

Estimating the costs of universal service provision

All procedures for administrative (versus competitive) payment of compensation to operators, which receive or accept universal service obligations (USOs), are based on calculations of the costs that the company incurs in fulfilling USOs. Usually, these are net avoidable costs. An EU study [1] provides a full explanation of the relevant economic theory and its application, in which:

- "Net" means that the benefits that the company receives from fulfilling the obligation are subtracted from the costs. These benefits include revenues directly attributed to the obligation, such as revenues paid by customers who are connected because of it. Sometimes they also include indirectly attributed revenues, such as those for inbound calls to the subsidised areas. Sometimes they also include intangible or intrinsic benefits, such as those listed in the Practice Note *Potential advantages in being a USO provider*. These are difficult to estimate but may be significant; and
- "Avoidable" means that costs will only be taken into account if they would not be incurred without the obligation. For example, if a remote customer is served from an existing exchange, the incremental cost of connecting him to the exchange is an avoidable cost, but the cost of the exchange itself is not avoidable.

Calculating relevant costs and benefits for USO funding purposes is a major undertaking. Cost calculations in telecommunications are never clear-cut, they involve elements of judgement and attributions that are to some extent arbitrary and estimated. Because large inter-industry transfers may be involved, it is important to get these calculations as accurate as possible. The choice of the costing methodology to be used is important and ultimately must be practical and acceptable to all parties. All the countries mentioned in this section have elaborate cost models for USO costing, which require specialised expertise to run them. These models also rely on the industry to provide well-founded data input. In turn, these data often require highly-developed accounting systems, which the companies would not put in place for purely commercial reasons. See endnotes [2] from France and [3] from Korea.

Reasons for current low use of administrative USO funding

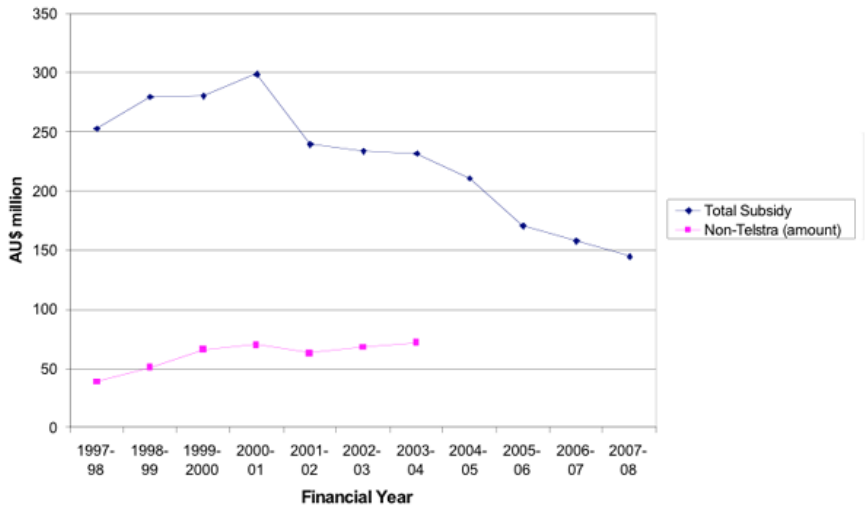
The difficulty of estimating costs acceptably is one reason why few regulators in Europe have implemented this system, even though the Universal Service Directive allows them to do so if they judge that the cost has become an unfair burden on the designated provider. Some regulators have estimated that the intangible benefits of USO provision (such as brand recognition, call revenue to low USO clients, positive publicity and marketing), though of uncertain size, are great enough to outweigh the tangible net costs. In any case, under this regime, typically USO providers are incumbents with high market shares of the fixed line market (often well above 80 per cent). Since contributions to shared US funding are proportional to market share, the additional financial support that the US provider would receive would likely be a small proportion of the calculated net loss. This may well be less than the overhead cost of running a shared fund, leaving aside the cost of calculating the amount of compensation that is due. Recently, where mobile operators have secured a much larger share of the total market and reached almost total ubiquity, the question of US is now subject to redefinition. Internet and

broadband development also requires the redefinition of US and how to achieve it, requiring likely a competitive allocation. For this and other reasons, the old order of estimating the cost and allocating responsibility for USOs to operators, remains an unfeasible or uninteresting proposition in the most advanced European countries.

The United States is currently reviewing its US funding system for high-cost areas. Over the past decade, total high-cost funding has tripled to USD 4 billion per year, and an emergency cap is now likely to be applied to limit further growth. As part of the review, the Federal-State Joint Board is considering introducing auctions, based on the experience of developing countries, but modified to suit the United States' conditions. This will determine the amount of funding that would be available. Many commentators believe that auctions are better than administrative approaches for this purpose [4].

Australia carried out a review in 2004, which led to a decision to base future US funding on estimates rather than on detailed modelling. The estimates are derived by applying cost element trends, generally an annual reduction of between 5 per cent and 10 per cent, to previously modelled cost totals. The figure below shows how the total subsidies are now being lowered. It also shows the growth in the proportion of the US subsidies coming from outside the main USO provider (Telstra); when last measured, this proportion had risen to 30 per cent. For more detail, see the reference document for the Australian case below.

Figure: Universal service subsidies in Australia



◂ **Figure: Universal service subsidies in Australia**

Source: Data from ACMA www.acma.gov.au/WEB/STANDARD/pc=PC_2483 and DCITA

Practice Notes

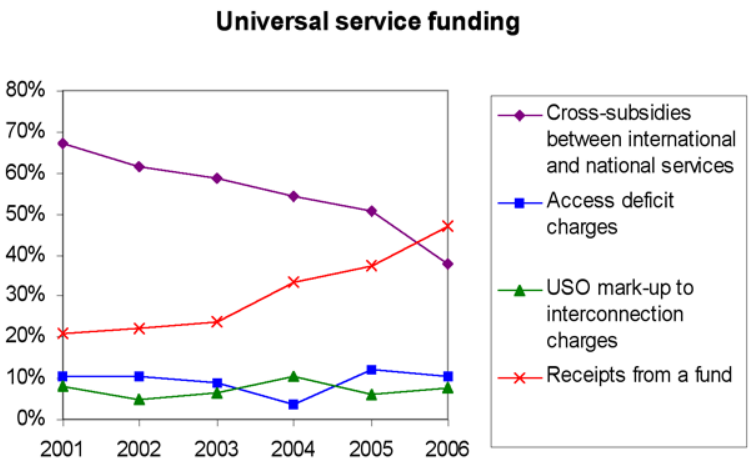
- **Potential advantages of being a USO provider**

Reference Documents

- **Review of the operation of the Universal Service Obligation and Customer Service Guarantee**

4.3.1.4 ACCESS DEFICIT CHARGES

Another traditional approach to universal service (US) funding has been access deficit charges. The term access deficit, is defined as the loss made by a telephone company on providing access lines if this is regarded as a stand-alone business. It is the difference between the fully allocated costs of providing access lines and the revenues attributed to providing access lines. Typically, this is calculated as regular line rentals plus installation charges.The figure shows the small proportion of countries that still use this funding method in the last six years.



◂ **Figure: Prevalence of different approaches to universal service funding**

*Source: Data from ITU World Telecommunications Regulatory Database*Note: Number of surveyed countries vary from year to year.

The need for tariff rebalancing to reduce access deficits

In the past, fixed line monopolies commonly set line rentals well below any reasonable estimate of the relevant costs. They recovered costs primarily through international call charges, which were commonly set well above cost. This charge structure was popular, especially during the mass market phase of network growth, when many middle-income people were subscribing to the phone for the first time. Higher regular charges would have deterred many of these people from signing up, but as new phone users, they were not yet used to making a lot of calls and could live with high call charges. New competitors usually targeted the high-margin markets of business customers as well as long distance and international calls first; this meant that the incumbent risked large losses unless it rebalanced its tariffs to be more in line with underlying costs. It was therefore necessary to raise line rentals to remove the access deficit while lowering call charges so as to compete with new entrants. Tariff rebalancing of this kind has taken place in most countries at varying speeds. It naturally favours users who make more calls and may lead to higher costs for people who make fewer calls. Slow rebalancing may be seen as necessary for political reasons, where a large number of voters risk ending up with higher bills. An approach favoured in some countries, has been to rebalance faster, while protecting specific small groups of low users with special low rentals.During rebalancing periods and while access deficits remain, some incumbents have successfully argued that new competitors should contribute towards funding the deficit. The resulting access deficit charges (ADCs) have usually been added to interconnection charges for call origination or termination on the incumbent's network, in recognition of the benefits that the competitors receive from that network.ADCs are now generally regarded as a poor idea because of the wrong incentives that they create [1]. They are being phased out in most countries where they were previously adopted. For example, in India, TRAI, the regulator, after a consultation, announced in 2007 a cut in the total revenue raised by ADCs from USD 800 million to USD 500 million, and stressed that the ADC regime has always been intended to have a limited life (from 2003 to 2008).

4.3.2 COMPETING FOR SUBSIDIES FROM UNIVERSAL ACCESS AND SERVICE FUNDS

This chapter presents a summary of key aspects of the competitive mechanism used to distribute subsidies from Universal Access and Service Funds (UASF). UASFs may go under different names of Universal Access Fund, Universal Service Fund or some other designation. Some examples of UASFs are:

- Peru's FITEL (Telecommunications Investment Fund);
- Uganda's RCDF (Rural Communications Development Fund);
- Mongolia's and India's USOF (Universal Service Obligation Fund); and
- Nigeria's USPF (Universal Service Provision Fund).

Almost all such funds have been created in emerging markets and developing countries, in the context of liberalized markets, to provide financial assistance for the following:

- Meeting regional and rural service targets for telephony and Internet services;
- Supporting key users, such as schools and health clinics to access the Internet in regional and rural areas;
- Supporting ICT projects by commercial and development organizations that provide national and local content, services and applications that stimulate Internet take-up and usage; and
- Supporting various activities related to regionally balanced network and service development, such as Internet

Exchange Points and regional Internet points of presence (POPs).

Section 3.2.1 describes the first generation of competitive UASFs that emerged in Latin America and which initially focussed on fixed-line service provision. **Section 3.2.2** presents the next generation of UASFs that take into account the wireless revolution and needs for Internet and backbone development. All UASFs use a reverse auction or minimum-subsidy auction (lowest subsidy demanded wins) mechanism. This mechanism, also known as Output-Based Aid (OBA), is defined as a strategy for using explicit performance-based subsidies to support service delivery in cases where the market is not expected to reach, but where policy concerns justify public funding or redistribution. OBA subsidies are provided to support the provision of services, for example, in rural areas where the cost of service provision combined with limited revenue potential might render service provision commercially unviable. A key requirement for OBA is that a one-time smart subsidy results in service provision that is ultimately self-sustaining and commercially viable. **Section 3.2.4** discusses UASFs' performance to date. OBA is now often the preferred method used to distribute one-time subsidies to network service providers in order to meet roll-out targets for voice and Internet services in certain designated remote areas and communities. The methodology is described in detail in **Chapter 6**, and **Section 3.2.3** discusses the advantages of the competitive UASF approach.

4.3.2.1 FIRST GENERATIONS OF COMPETITIVE UASFS – FIXED LINE SERVICES

The first generation of emerging market UASFs to distribute subsidies based on the principle of competitive tendering, were established in Latin America in the 1990's. The finance was made available under a reverse auction or minimum-subsidy auction (lowest subsidy demanded wins). These competitions were held in 1995, soon after the establishment (in 1994) of Chile's Fondo de Desarrollo de las Telecomunicaciones.
The Chilean case, and ones that followed soon afterwards, were unique in the sense that they were also used as a one-stop mechanism to enable potential new entrants to compete with the incumbent operator for universal access (UA) licenses in areas that were historically, poorly serviced but for which a subsidy was offered. The services provided were primarily fixed network payphones, using wireless access or satellite (VSAT) technologies, and were located in places that were at the time, far from areas expected to be serviced by mobile operators. The Practice Notes ***Chile: Fondo de Desarrollo de las Telecomunicaciones*** and ***Peru: Experience of the FITEL programme*** give insight into the details and lessons learned in the early stages of UASFs.

Five Latin American countries quickly licensed rural operators through such funds. The following table summarizes the funding activities of the first three funds. Several other funds were established (though not all became operational), e.g., Brazil, Argentina, Dominican Republic, Ecuador, Guatemala, Nicaragua and Venezuela, and can be seen in a Regulatel report on UASF funds [**1**].

Country	Name of Fund / Program Focus	Period	Localities Served	Maximum Subsidy Available (mUSD)	Subsidy Granted (mUSD)	Subsidy per Locality (USD)
Chile	Fondo de Desarrollo de las Telecomunicaciones (Government Budget)	1995-97	4,504	24.2	10.2	2,256
	Telephony	1998-99	1,412	14.4	9.8	6,919
	Telephony	2000	143	1.9	1.8	12,727
	Telecentres	2002	293	n/a	5.0	17,065
	Internet in rural schools	2004	667	n/a	6.5	12,727
	Fiber backbone	2007	n/a	n/a	2.7	n/a
Peru	Fondo de Inversión en Telecomunicaciones (FITEL) (1% Operator levy)	1998-2000	213	5.1	5.1	23,937
	Telephony	1999-2003	2,170	50.0	12.1	5,575
	Telephony	2000-2003	2,520	59.5	30.7	12,163
	Telephony	2001-2004	1,614	12.9	11.4	7,061
	Internet access	2006	68	1.43 (Pilot)	1.43	21,029
	Broadband	2007	1,050	9.0		
	Internet access, public telephony, residential telephony	2007	3,010 (Total)	18.6	15.1	5,104
			2,840 (Internet)			
			1,535 (Telephony)			
Colombia	Fondo de Comunicaciones (Compartel) (Operator levy & Government contribution)	1999	6,745	70.6	36.0	5,361
	Telephony	2002	3,000	47.0	15.0	5,033
	Internet	1999	670		7.0	9,781
	Community Access Centres					
	Internet	2000	270		8.0	30,242
	Community Access Centres					
	Broadband and Public Institutions	2004-2005	3,000 schools		102.7	27,213
			624 city offices			
			120 hospitals			

◂ **Table Summary of First Generation Latin American UASF Funds**

Source: *ITU-infoDev ICT Regulation Toolkit – UA Module*

As the above table shows, two of the early funds received finance directly from government contributions, while two used a levy on operators (one fund used both government contribution and operator levy). Other

early funds, such as Guatemala's, also secured finance from radio spectrum auction fees as well as operator levies. On average, the amounts of subsidy actually bid and granted for the telephony competitions in the first years, were less than half of the maximum subsidy offered by the funds. This was a benefit that resulted from the competitive mechanism used and the fact that competitions offered a chance for new entrants to secure their first operating licence and radio frequency allocations. However, there was a wide range of experiences, from zero subsidies in some of the early Chilean competitions up to almost 100 per cent of the offered amount in later rounds. While Internet access can undoubtedly be beneficial for communities, it should also be noted that later Internet access competitions resulted in much higher subsidy investments per community, and although data on offered subsidy amounts is not available, the reduction resulting from the tendering process is believed to be much less. This is also the case in all other subsequent UASF competitions elsewhere primarily due to the lower level of financial sustainability that can be achieved on Internet services. The numbers of initial Internet service users are typically lower than for telephony; a smaller proportion of the market can afford to own personal computers, take-up is slower and Internet services for the poorer parts of the country are generally considered to be a higher investment risk. More work is required in each country to develop sustainable models for public Internet access that entice people to use their services.

Practice Notes

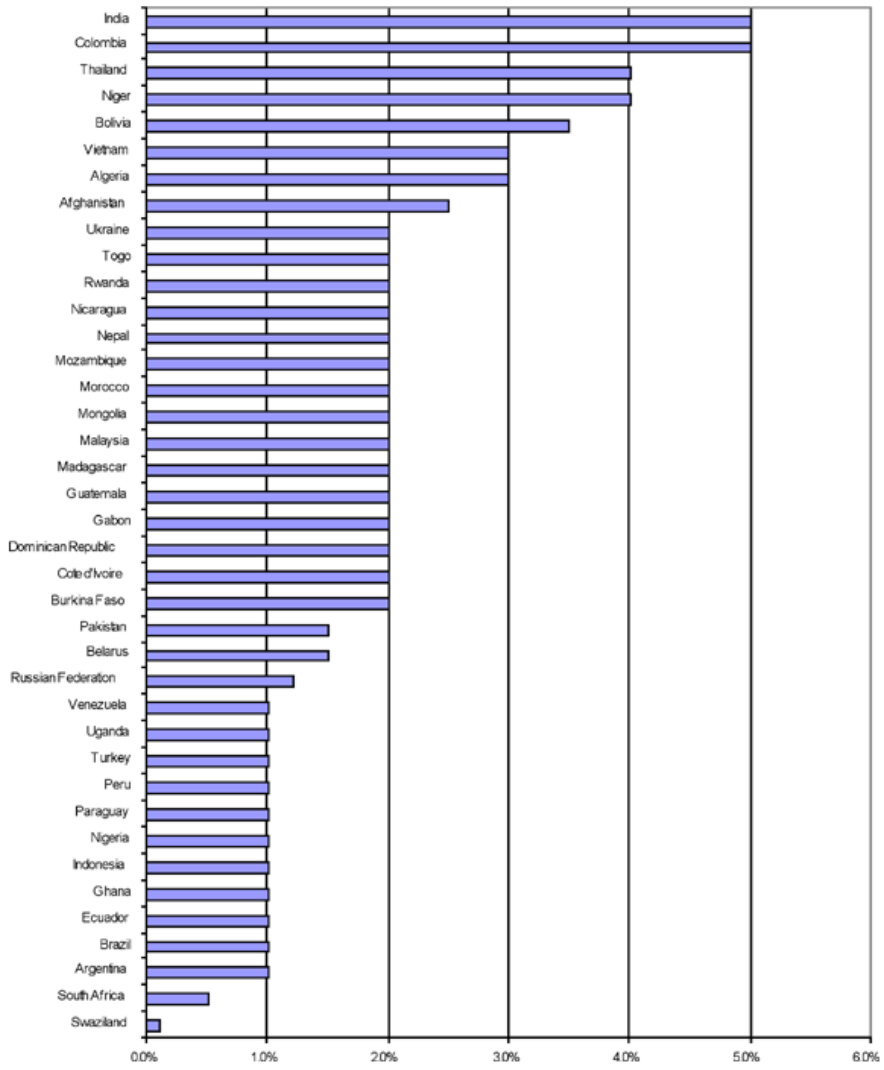
- **Chile: Fondo de Desarrollo de las Telecomunicaciones**
- **Peru: Experience of the FITEL payphone programme**

4.3.2.2 SECOND GENERATION OF UASFS IN EXISTENCE TODAY

Following the Latin American experience, a second wave of Universal Access and Service Funds (UASFs) occurred in Asia and Africa. Nepal (1998) and Uganda (2000) pioneered the concept, and several others, including Mongolia, Pakistan, Botswana, Burkina Faso, Malawi, Nigeria and Mozambique, are following in their footsteps. This is often with technical assistance from the World Bank or other international donors. The UASF concept has spread to approximately 46 countries by end of 2007 [1].Many of the latest UASF initiatives listed above are following Uganda's lead by holding technology neutral competitions, which are increasingly being won by mobile operators with existing licenses. These UASFs, as well as the early Latin American funds, are also applying their resources to the financing of Internet Points of Presence (POPs) in rural districts, telecentres and cyber cafés, school connectivity, and other ICT initiatives. Research indicates that at least 39 countries have already set operator levies as the main means of accumulating resources to their fund. These levies range from less than 1 per cent of operator revenues in South Africa, to 5 per cent in India and Colombia, and 6 per cent on certain revenues in Malaysia [2]. See figure below, Existing UASF Operator Levies. A few funds, notably those in India, Malaysia and the Russian Federation are still distributing the largest share of their resources to fixed line operators and some, notably India and Malaysia, initially used their funds as sources for distribution of access deficit awards to incumbent operators. However, as noted in **Section 3.1.4**, this practice is now disappearing. The Indian and Malaysian funds appear to be moving their focus onto mobile expansion, while all funds, including the Russian Federation's, fund Internet POPs and ICT development as well.The Practice Note Uganda's Rural Communications Development Fund showcases this country's best practice approach.

◂ *Figure: Existing or Planned UASF Levies*

Source: ITU-infoDev ICT Regulation Toolkit – UA Module



Practice Notes

- Uganda's Rural Communications Development Fund

4.3.2.3 ADVANTAGES OF UASFS AS COMPARED TO OTHER APPROACHES

A Universal Access and Service Fund (UASF) that adheres to best practice can provide a transparent means of allocating subsidies for the achievement of service targets in unviable areas.Fuelled by a few unfortunate and poor cases, there are some understandable concerns amongst operators over the principle of UASFs. Some operators express a preference for alternatives such as accepting reasonable rural build-out targets in their licence or negotiating specific rural universal access and service (UAS) targets in exchange for relief from UASF levies or taxes, a "pay or play" regime. However, there are certain potential advantages of UASFs if they are well-run, as described in **Chapter 5**.

These advantages include the following:

- **Transparency and Fairness**
  As stated previously, a UASF that adheres to best practice provides a transparent means of allocating subsidies for the achievement of service targets in unviable areas. The alternative of mandating targets in exchange for relief from UASF levies or taxes, runs the risk that it would be difficult to allocate fair targets for different operators in a competitive market. Furthermore, there is unlikely to be equity between fixed and mobile operators, both of whom should be contributing to UAS, unless subsidies are allocated competitively and in a technology neutral manner. The allocation of targets to operators also requires equal prior agreement and collaboration with government by all operators in order to be effective. Ease and cost of management and emphasis on least-cost solution A best-practice

UASF requires reasonable government targets based on national socio-economic goals and sound knowledge of the demands of the market and of general industry costs and trends. The targets and the maximum allowable subsidies are set independently, using published principles. Even if some operators have different technological or operating approaches from one another, the principle applied is one of technology neutrality, that is, efficiency and least-cost solution to the achievement of the targets. The alternative process for negotiating fair and equal contributions through a "pay or play" regime in a competitive environment is unlikely to be as simple. The valuation of the contribution of each operator towards UAS would require the regulator seek confidential financial information (revenue, capital and operating expenditure) from each operator, which would not be welcomed. This would be akin to the administratively heavy approach taken in traditional price regulation, or by some very high-cost and patently inefficient previous generation UASFs.

- **UASFs provide "pay or play" in practice**
  With a UASF least subsidy tender, no operator is forced to participate in the competition. On the output side, it is entirely voluntary, thus operators who are not interested in serving rural areas or providing public access are free to opt out, though they do have to contribute to the fund. The UASF can be a way of requiring that the industry at large finance the achievement of UAS, while only operators interested in expanding to rural areas will tender for the subsidies. The successful operators will, in fact, have a portion of the funds they contributed and maybe more, returned to them.UASFs can bring finance into the sector & reduce the cost to operatorsUniversal Access and Service Funds (UASFs) present a mechanism for government, or donors such as the World Bank, to contribute financially to universal access and service (UAS) in a liberalized market, without getting directly involved in less-efficient forms of project ownership or management, as in the monopoly era. This has resulted in a considerable amount of seed finance being contributed before the build-up of equity through operator contributions in some smaller markets.

  Examples of some USAF mechanisms are as follows:

  - In the first of such UASFs (Chile), the government contributed the whole amount and no levy was made on operators;
  - In Uganda, a World Bank contribution of over USD 7 million resulted in a much more rapid roll-out of the Rural Communications Development Fund (RCDF) programme than would otherwise have been possible. As a result, the leading GSM operator received subsidies amounting to more than its contribution to date. By 2007/2008, a similar contribution in Mongolia will result in similar benefits to the country, to operators and, of course, to the rural communities served;
  - and In Botswana, the regulator pledged part of its own finance collected from regulatory fees to a future UASF and the government is considering providing the finance for the first competitive UAS project.

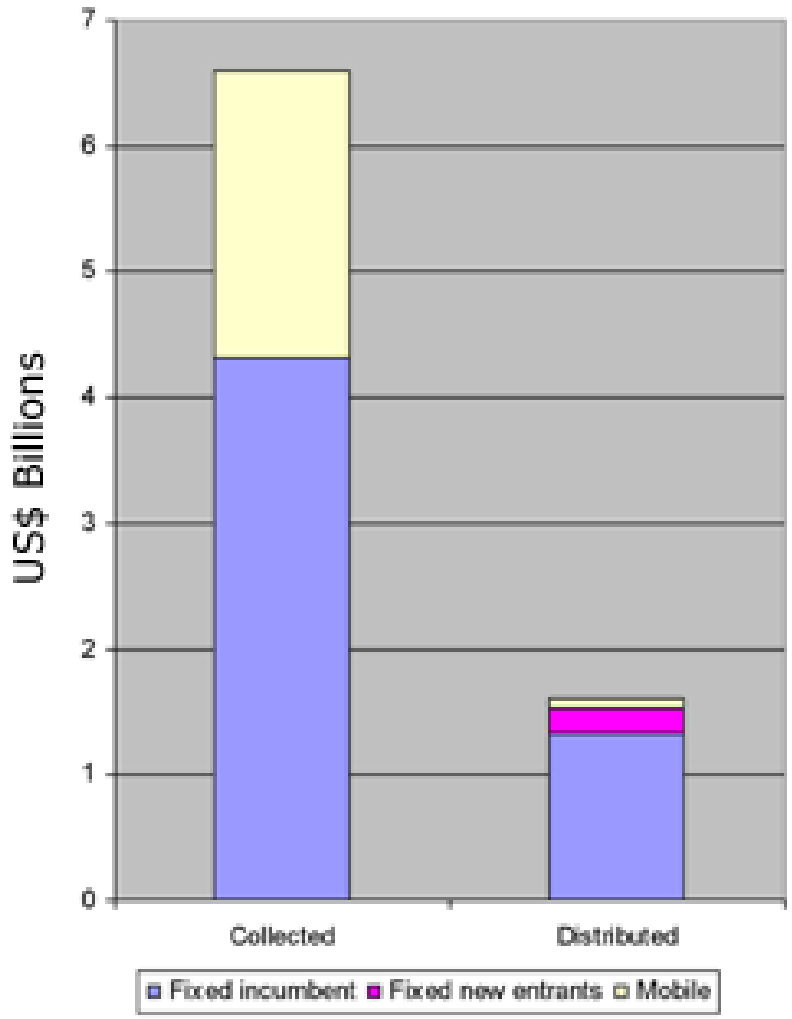
- **The public interest is explicitly served**
  The process of good governance typically requires an explicit determination of objectives and targets, a process of consultation, buy-in by all stakeholders, and satisfaction by consumer representatives that various power bases are balanced for the public good. This has been achieved reasonably well in the case of the best-practice UASFs currently in operation that held public tenders. It would be difficult to achieve the same level of confidence through a trade-off negotiation with operators, unless the UASF administration could clearly demonstrate the basis of the balance of interests and fairness achieved, with a high degree of transparency. This would, as previously stated, run the risk of incurring a heavier and more intrusive administrative bureaucracy.The concept of virtual funds exists since several years, however no country has implemented a virtual UAS fund. The advantage seen in virtual funds is mainly that the actual money of operator levies does not need to move into - and then later out of - a fund to the recipient, eliminating the need for actual fund management. A virtual fund would simply be an accounting system that records each operators' annual UAS levy. Against the levy, operators could set the costs of special UAS projects. But this still requires some independent cost accounting to ensure operators allocate their costs fairly and comparably. If a virtual fund is used with a competitive bidding mechanism, it could be challenging as the likely scenario could arise that one operator who lost in a competitive bid has to pay part of their UAS operator levy to the winning bidder.

4.3.2.4 PERFORMANCE OF FUNDS TO DATE

Best practice and a review of the performance of the largest Universal Access and Service Funds (UASFs) would indicate that the amount of levy should be calculated to meet only realistic and achievable targets and to be within the capacity of the fund's administrative apparatus to manage and monitor the distributions. A total of 15 funds in developing markets that are operational, had collected a total of approximately USD 6.2 billion from operators, beginning in the late 1990's (but mostly since 2001 and 2002) [1]. 78 per cent of the total collections (USD 4.8 billion) came from two countries (India

and Brazil), 9 per cent (USD 548 million) from Malaysia, and 2 per cent (USD 111 million) from Peru. The remaining 12 countries totalled less than 12 per cent (USD 725 million). The 15 funds have also received a relatively small additional contribution of USD 62.8 million from government and international donor sources. However, the latter came primarily from just three countries [2], thus the majority of resources have been contributed by industry.

◂ Figure: Performance of 15 Developing Country UASFs



By 2006, these 15 funds redistributed approximately USD 1.62 billion to the sector for universal access and service (UAS) projects; this represents just 26 per cent of the total collected. This was distributed in the following way:• 81.0 per cent to incumbent fixed line operators;• 11.7 per cent to new entrant fixed line operators bidding specifically for UA service;• 4.6 per cent to mobile operators; and• 2.7 per cent for ICT projects of various kinds.To date, the impact of these UASFs on UAS and progress towards it has been very mixed. One criticism levelled at USAFs is that they have contributed little to mobile expansion or penetration at the margins of those operators' commercial viability, even though mobile is typically the most effective means of reaching rural areas. Cases which stand out against this trend are Colombia, Mongolia, Uganda, and to a limited extent, Malaysia. Some funds experienced legal limitations to disburse funds, as their mandate had been defined too narrow, e.g., allowing funding only for pilot projects, etc.The primary characteristics, best practices, strategic planning and pitfalls of UASFs, in particular, the means of balancing resources with disbursements, and institutional concerns, are described in detail in **Chapter 5** to **Chapter 7** of this UAS Module.

4.3.3 NON-CENTRAL GOVERNMENT ACTORS IN UNIVERSAL ACCESS AND SERVICE

This section considers the role of private sector, non-government and local community (or municipal actors) in universal access and service (UAS). In most cases, these participants play a developmental role and, as such, represent bottom-up rather than top-down policy driven initiatives. However, non-government and local community participants are considered here because, to greater or lesser degrees, they have become significant contributors to the objective of reaching underserved populations and of bringing communications and improved livelihoods to the poorer segments of society.It is not practical to attempt to include all possible non-government linkages to UAS because of the risk of creating confusion

and reducing the impact of UAS policy, or indeed the responsibility of policy makers and regulators to establish and lead UAS policy. However, various trends are clearly significant and should not be ignored.

These are:

- Micro-finance and private entrepreneur led village phone initiatives, are discussed in **Section 3.3.1**;
- Community and municipal broadband networks, presented in **Section 3.3.2**; and
- Internet public access, telecentres, and cyber cafés experiences summarized in **Section 3.3.3**.

4.3.3.1 VILLAGE PHONE PROGRAMS

One approach to universal access (UA), which springs from the user side of the network—even though the first international case and several current initiatives involve leading mobile operators—is the village phone concept. This has emerged in several forms around the world, sometimes organized by a Micro-Finance Institution (MFI), sometimes by a private enterprise, or sometimes by the operator with financial partners.

The village phone concept began with the launch of the village phone programme in rural Bangladesh in 1997 as an initiative of the Grameen Bank. The Grameen Bank provides impoverished village women with financial support to develop sustainable income generating activities. In 2006, Muhammad Yunus, the founder of the bank, and the Grameen Bank itself, were jointly awarded the Nobel Peace Prize "for their efforts to create economic and social development from below."

Women clients of the Grameen Bank who show the initiative to become local Village Phone Operators (VPOs), receive training and are loaned funds to purchase a mobile phone set-up (phone with special in-built pricing software) suitable for rural areas, as well as airtime credits. Through the network of VPOs, vending affordable airtime denominations and facilitating individual calls, residents enjoy better access to communication services.

The success of the programme at generating sustainable business and social empowerment opportunities for women, and high performance in the recovery of loan disbursements, led to the replication (with variations) of Grameen's initial Bangladesh model, in the African countries of Nigeria, Uganda and Rwanda.

Essential featuresAt the core of a generic village phone programme is a viable business model for local entrepreneurs (women and increasingly men) to provide telecommunications services to their community. The entrepreneurs are offered a telephone operator business kit consisting of a mobile phone, external antenna (in the African cases), business management materials, a marketing poster, and usually some introductory training via the telecommunications service provider alone or in partnership with supporting organizations, which include microfinance entities, banks and non-government organizations (NGOs).

The entrepreneurs then buy discounted pre-paid airtime credits for resale at a profit and thereby offer an affordable public mobile phone service to their communities. They can typically also sell airtime top-ups for other mobile network private subscribers. Earnings from the business are then used to pay off the initial investment (typically in less than a year) and provide long term income for the entrepreneur.

For local residents, VPOs provide affordable access to the mobile communication services, where the cost of mobile handsets, hardware and account subscriptions have otherwise limited people's ability to use the existing telecommunications services. By establishing widespread communication access in impoverished areas, the village phone approach has been shown to empower the poor by enabling them to improve their livelihoods and generate income through reducing the opportunity cost of communication. The participants experience enhanced networking opportunities and access to knowledge, which is increasingly available through the text transmission services.

Various benefits of the village phone modelAs pointed out by the World Resources Institute in their NextBillion initiative to support widespread social entrepreneur opportunities to the poor, "Low-income populations have clearly benefited from access to mobile phones, which ease access to jobs, to medical care, to market prices, to family members working away from home and the remittances they can send, and, increasingly, to financial services." [1].

The village phone model facilitates delivery of core services and market expansion of the organizations involved, and this benefiting also governments, regulators, telecommunications companies, micro-finance institutions (MFIs) and development organizations. A village phone approach allows telecommunications providers to increase sales of airtime to a greater number of new users, as well as widely extending their service infrastructure to all clients (e.g., VPOs selling airtime, facilitating calls, product information, etc.) without the prohibitive costs of formal staffed facilities.

Operators active in village phone-type programmes also find that further market share can be leveraged through branding of the service via an expanded presence of dispersed VPOs [3]. MFIs can also expand the reach of their services and

empower clients with increased access to important communication resources and information that can be used to improve productivity and opportunities. For national governments with responsibilities for telecommunication infrastructure and regulation, a village phone approach can assist in meeting national universal access (UA) goals for optimal community coverage.

Key roles and alternative modelsKey organizational roles and responsibilities of this model include the following:

- **Finance/Development Organization** – Responsible for providing and managing financing, capacity development for potential client operators and expanding reach of VPO model as viable livelihood strategy. Traditionally, microfinance organizations such as Grameen Bank, are involved in this role;
- **Telecommunications Provider** – In charge of mobile network infrastructure, responsible for being compliant with regulatory and licensing issues, and supply of airtime credits for programme use. In Bangladesh, this role is carried out by Grameen Phone Company;
- **VP Company** – A distinct company usually created by the telecommunications provider to manage the village phone program, finances, partner liaison and expansion of the program. An example of a VP company is Grameen Telecom; and
- **VP Operator (VPO)** – An individual who participates in a village phone program and is established as a communication services business for the community where he/she lives. In Bangladesh, this refers to women clients of the Grameen Bank who are established in a business selling mobile phone services – call by call.

As demonstrated in the case of the village phone implementation in Uganda spearheaded by the mobile operator MTN, an alternative operational model has resulted in implementation successes beyond planned expectations; significant expansion and adoption of VPO businesses are occurring without formal intervention and loans from microfinance organizations. Details regarding the village phone implementation approach utilized in Uganda and implications for alternative village phone models are included in the Reference document *Review of Replicating Village Phone from Uganda and Bangladesh*.

Regulatory response to Village PhoneThe integration of a village phone approach in efforts to realize national universal access and service (UAS) goals requires complementary regulatory and operational structures to facilitate integration of policy with the dynamics of the competitive telecommunications market and required standards for quality of services.

For example, appropriate village phone tariff regimes should price services within reach of the intended beneficiaries while not undermining other telecommunications service providers' market. In general, regulators can be confident that the players involved can make use of existing competitive tariffs without intervention beyond that which may be required to monitor competition and ensure a level playing field and minimal dominance by the strongest operator(s).

These are the tangible actions that policy and regulatory bodies can facilitate for village phone programs to thrive within, and complement, UAS programmes:

Policy and regulatory bodies can establish specific funding mechanisms or categories for village phone initiatives (for example in collaboration with financial institutions or under the universal access and service fund (UASF) programme) that supports any one or more of the following:

- assessment of village phone activities;
- training and capacity development;
- programme evaluation;
- start up financing options for VPOs; and
- working capital for village phone operators; and
- Regulatory bodies should streamline tariff and regulatory requirements appropriate to the scale of VPO service provision. Typically, VPOs make use of bulk discount tariffs available from the telecommunications operator, which enable them to retail their service at a profit while offering the end users an attractive price for calls compared to the price of calls under private subscription.

The future of Village Phone programmesThe village phone program in Bangladesh is experiencing a decline in profitability due to a combination of two factors:

- Increased numbers of VPOs: starting with 32 VPOs in 1997, the number reached almost 280,000 in 2006; this increased competition among VPOs is squeezing the profit margins to a minimum; and

- Increased affordability of mobile phones for individuals, leading to a decline of demand for public access village phones.

Bangladesh's village programme might become a victim of its own success and the success of the market. It and other programmes will only remain relevant for the future if they are able to integrate value added services into their offering, which could include, for example, mobile banking, mobile data, Internet and broadband services.

Reference Documents

- **Replicating Village Phone from Uganda and Bangladesh**
- **Village Phone Direct Manual: Enabling microfinance institutions to bring affordable communication services to the poor**

4.3.3.2 COMMUNITY AND MUNICIPAL BROADBAND NETWORKS

This section introduces and summarises community involvement in universal access and service (UAS) and provides an introduction to community networking and pre-conditions for success. There has always been overlap and interaction between UAS initiatives and ICT for development (ICT4D) initiatives. UAS initiatives have been primarily concerned with access to telecommunication infrastructure and services whereas ICT4D have focussed on the use of computers and the Internet to support development. The focus on community involvement is typically more prominent with ICT and broadband initiatives, also in developing countries.

Reasons for community involvement in UAS projects

Communities have a role to play in UAS for the following reasons:

- Some available low-cost communications technologies can work on a neighbourhood scale and are not too technically demanding, e.g. WiFi and VoIP, with free and open source software (FOSS);
- There is a recognition of the critical role local leaders have in tailoring ICT facilities and services to local needs as well as the importance of community ownership of ICT programmes, which is vital in working towards sustainability;
- Communities have a growing awareness that poverty is a complex phenomenon, stemming from a lack of power as much as from a lack of money, and that grass-roots initiatives, which build local competence and confidence, contribute significantly to poverty relief; and
- There is a rising popularity of development of multi-stakeholder partnerships, in which the public sector, the private sector and other interested parties work together, each contributing finance, skills or other resources. For good results, end-user communities should usually be development partners.

Community-based ICT supply is a recent trend, however there are a few established examples to turn to in order to assess success factors. Often, these examples are small-scale initiatives. Some are referenced in the Box Community networks in developing countries.

Organizing for community involvement to spread access to ICTs

Different types of organizations play a role in community ICT involvement, often in partnership with one another. They include the following:

- Formal co-operative societies have been in existence for rural telecommunications provision in the USA for a long time. Experience in the developing world has shown this to be largely impractical for voice communications at least, as they cannot be heavily subsidised as in the USA, which is also a high-income country. However, other forms of co-operatives or unions, such as in the agricultural producers' co-operatives, might become important sponsors of ICT and broadband networks. Several examples already exist, including the Peru co-operative mentioned below;
- Local governments such as municipalities (councils of small towns) with their own sources of finance;
- Schools and colleges, which may in turn be publicly or privately owned and operated and which are potential sponsors of telecentres and content initiatives;
- Private entrepreneurs and small businesses, sometimes with characteristics of social enterprise (with explicit objectives to contribute to local development as well as to make a profit);
- NGOs (often national or even international, rather than local, or in receipt of international funding). The Jhai Foundation in Cambodia is a good example of an organization with broad objectives that has attracted international support and developed a robust, cheap PC and communication system; and

- Community based organizations (CBOs) made up of groups of local residents who come together, often under the aegis of an NGO, for regular contributions to a savings account, mutual support and development efforts.

The Regulatel study of UAS programmes in Latin America identified ten specific initiatives of special interest or examples of good practice. Of these, at least seven include important elements of community participation. These include:

- A co-operative in the Chancay-Huaral valley, Peru, partly financed by users and run entirely by locals, which has an emphasis on training young people to operate and administer the network;
- Ruralfone, a small GSM enterprise in Brazil, staffed with locals and privately yet profitably run on low-cost principles which are similar to those advocated for Tanzania in Scanbi-Invest's report Profitable Universal Access Providers; and
- Non-commercial telecentres such as the LINCOS of Costa Rica and the Dominican Republic, generally run with financial support from governments (sometimes through Universal Service Funds).

Community networks in developing countries

The following provide some examples of active, successful community initiatives that influence or coordinate UA policy:

- Mahavilachchiya, Sri Lanka **http://www.mahavilachchiya.net** – a wireless mesh network linking home computers to the Internet. Initiated by a local teacher and now supported by ICTA, the official organisation for e-Sri Lanka;
- Myagdi District, Nepal **http://www.nepalwireless.net** – a wireless network linking scattered villages in a mountainous region. Led by Mahabir Pun, a teacher, who attracted international volunteers to help him;
- Air Jaldi, Uttaranchal, North India **http://drupal.airjaldi.com** – a collaboration between local NGOs and the University of California at Berkeley, providing fast wireless mesh connectivity to over 2,000 computers spread throughout several different institutions;
- Akwapim, Ghana **http://www.wirelessghana.com/node/3** – ten nodes over a 20 km range, offering connectivity to schools, businesses, and community activity centres throughout six towns in the mountainous Akwapim North district; and
- Agrarian information system in Chancay-Huaral valley, Peru **http://www.huaral.org/** – this links 14 telecentres; an indigenous information system in Chuquisaca, Bolivia, serving a population of 1,500; described in Annex 3 of Regulatel report at: **http://www.regulatel.org/miembros/ppiaf2.htm**

Pre-conditions for success of community networks

Although such networks now have growing chances of success, the community network solution can apply only to some developing world communities. Pre-conditions for success include the following:

- A minimum critical size – for example, a typical community network based on WiFi technology requires a population of around 15,000 with annual income per person of USD 500 to support itself [**1**]. As technology costs reduce further, this critical population will also shrink, still, many communities will be too small to support successful community networks;
- Communal consciousness or some level of organization enabling the population to function as a community, express its shared needs, and act in its own interests is necessary for community networks to succeed. This might be more likely, for example, in a self-contained rural settlement than in a peri-urban, or fringe settlement of the same population size, where there are people who have migrated from different parts of the country, who work in a nearby city and who may have less social cohesion than a rural village;
- Local leadership and, preferably, a core of committed people with a certain level of education and technical skills;
- Access to external technical and managerial support, especially if these skills are lacking locally; and
- A supportive political and regulatory environment that promotes community networks can help enormously.

Plainly, the above pre-conditions for community network success are much more likely to be met in more prosperous societies, particularly where household income is much higher; the minimum critical size of community can then correspondingly be much smaller. Currently, unserviced or grossly underserved poor communities do have an advantage in that the community network can capture most, if not all, telecommunications revenues, rather than sharing them with existing telecommunications operators and other competitors. However, community networking is growing faster in developed countries, bringing broadband connectivity for the first time to many rural and remote areas and often providing free publicly accessible broadband in urban areas (e.g. community hotspots, municipality broadband networks,

etc.). The desire for universal broadband access in developed countries (that are already close to universal telephone and narrowband Internet access) is leading the push for community initiatives.

Reference Documents

- **Community-based Networks and Innovative Technologies**

4.3.3.3 PUBLIC AND COMMUNITY INTERNET ACCESS, TELECENTRES AND CYBERCAFÉS

Community telecentres started in Scandinavia as "telecottages" in the 1980s and have since spread to many other developed and developing countries. A telecentre is a place where the public can access and use telecommunications. The term can mean anything from a single public phone shop to a fully equipped multimedia suite with dozens of individual workstations, office equipment and services, meeting rooms and related facilities. Although some exceptions exist, the term most commonly refers to a facility where the public can access the Internet and ICT services, as opposed to purely voice telephony services. While phone shops are invariably a potential component of universal access and service (UAS) telephony projects, ICT telecentres have also become part of UAS programmes and finance. Telecentres can be run commercially (often very successfully), primarily as cyber cafés with some non-commercial features, or they can be run primarily for community benefit as non–profit or locally subsidized facilities. In the latter case they are usually known as community telecentres or multi-purpose community telecentres. Telecentres may also be known by many other names, such as nanasala in Sri Lanka, community e-centre in Malaysia, and so on. This section provides an overview, through the experience and perspectives of several telecentre programmes, and commences with early cases proceeding to current knowledge.

Lessons of the first telecentres in developing countries

Three common lessons from early telecentre experience included problems with:

- Gaining sufficient high speed, quality and timely access to a communications circuit that would allow users to have an Internet experience that is relevant, worthwhile and which will engender ongoing interest in ICT and capacity development. This challenge led the planners of Uganda's rural communications development programme to focus on providing high speed Internet Points of Presence in district centres, where demand is most likely to exist and key users might emerge, ahead of focusing on telecentres. In several places, commercial cyber cafés emerged once Internet access was made available. These businesses could provide the experience as well as technical resources to support community initiatives or assist vanguard institutions such as schools, hospitals, community broadcasters and government offices. The practice of focusing first on Internet POPs has now become standard practice in many of the new generation of Universal Access and Service Funds (UASF) described in **Section 3.2.2**;
- A fundamental lack in the quality of business management and technical skills that are required to identify and understand user demand, run a telecentre facility successfully, keep records, provide service and support users. Development practitioners and policy makers now focus on this problem, along with developmental expertise, to ensure an optimal and complementary response to the availability of both network access and UAS funding; and
- Commercially run telecentres, as well as NGO or donor financed telecentres, struggle with sustainability. Often the cost of maintaining, upgrading and replacing equipment is underestimated, while service revenues are over-estimated. ICT services generally have a slower take-up rate than voice services, especially in rural areas and developing countries where more uptake barriers exist, such as general literacy and computer literacy.

Perspectives on how to approach telecentre development

These are issues to consider when developing a telecentre:

1. Telecentre planning needs to take into consideration a range of possible funding options and models that fulfil sponsors' objectives [*]; and

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Source: Commonwealth of Learning, Chapter 1 in Telecentres: case studies and key issues, 2001.

Diverse telecentre funding models

- Demand-driven models — Many early community telecentres started with over-investment in equipment, services and applications without proven demand; smaller telecentres or cyber cafés—commercial or community and non-profit based—expand and grow from modest beginnings if and when demand and affordability allow this. Good Internet access is essential.
- Commercial models — Telecentres planned and run on a commercial basis and managed by local entrepreneurs, are

capable of developing business plans and management systems. Commercial operators can establish a network of telecentres through the involvement of national telecommunication firms, Internet players or other technically competent organizations.

- UASF funding for telecentres — The prime funding policy instrument can provide smart subsidies (ideally limited to the range USD 15-25,000 on a matching basis) for small, manageable commercial telecentres in rural areas to help offset large start-up costs, or may be used to subsidize telecentres on an ongoing basis in areas that are beyond commercial viability.
- Other funding options for telecentres — Small loans and seed finance are two examples of options that international aid agencies and organizations can offer. Small loans (e.g., up to USD 15,000) can be made to local entrepreneurs or phone shop operators wishing to start a telecentre business and purchase computer equipment and other advanced ICT equipment to establish small privately owned and operated telecentres, and seed finance can be provided on a matching basis for qualifying national or regional private sector players wishing to establish or extend a larger-scale telecentre operation into rural areas.
- Contracting telecentre facilities — International development NGOs and institutions, and local governments, can be major users of telecentre facilities and services if they involve the telecentre in, for example, educational outreach, rural development, public governance or health programmes. Rather than attempting to implement these facilities themselves, contracting a commercial or semi-commercial telecentre to provide certain public services brings the agencies cost-efficiency gains, while at the same time providing these businesses with additional revenue.
- Multi-sector support: International development NGOs or agencies, that focus on any sector's development which uses ICT, can align themselves with a national telecentre initiative and can sponsor services and applications that are not self-supporting, though developmentally useful, while the profitable services are commercially run and managed.

1. Identify success factors and best-case characteristics of telecentres. The UNESCAP Guidebook, based on the Malaysian experience, provides an example in the box below.

Source: *Guidebook on Developing Community E-Centres in Rural Areas: Based on the Malaysian experience*, UNESCAP, 2006

Success factors for community e-centres (CeCs) in Malaysia

- Focus on people, organization, content, and processes rather than on the technologies;
- Research the actual needs and socio-economic goals of the community;
- Provide ICTs and services via the CeCs which are relevant to community needs;
- Find local champions who can motivate and mobilize the community;
- Community participates capitalizing on local strengths and resources in the development (planning, implementation and operation, evaluation, monitoring) of the CeCs;
- Sound business plans and sustainability models ensure CeCs' continuing existence and growth;
- On-going monitoring and evaluation of CeCs' performance;
- Foster and develop smart partnerships (government, industry, NGOs, and community) for strategizing and translating CeCs' goals into action; and
- Continue to train and educate the CeCs' personnel and community.

Lessons from many years of telecentre experience, are condensed into key characteristic of "Telecenter 2.0" (Second Generation, 2.0):

Source: adapted from APDIP e-note 14, Roger Harris 2007.

Characteristics of mature telecentres (Telecenter 2.0)

Policy Government policy recognizes the role of ICTs in poverty reduction. Telecenter 2.0 is an instrument for achieving national e-inclusion, which goes beyond mere access to technology and addresses the underlying socio-economic disparities of the poor and under-served.

Regulations Telecentre 2.0 operates in a deregulated telecommunications environment, in which increased competition is encouraged and licensing requirements are relaxed. This will significantly contribute to successful telecentres. A Universal Access and Service Fund (UASF) assists with infrastructure development in poor rural areas considered un-commercial.

Partnerships Telecentre 2.0 is formed and/or operates within a national alliance. Although there is no single dominant model of Telecenter 2.0 ownership or operation, all implementations fall under a form of multi-stakeholder participation that includes government, NGOs, civil society organizations, the business sector, academia and practitioners. Each partner in the national alliance, in conjunction with the communities that they work with, evolves its own model.

Funding Telecentre 2.0 is funded and sustained by a mix of investment, subsidy and its own revenue. Government pays for services that benefit the poor, just as it does with services that benefit all citizens regardless of income, such as libraries, education, transportation and health care. At the same time, local investors are mobilized by the opportunity to make profits. Telecenter 2.0 is not donor funded.

Content and Services Telecentre 2.0 provides/handles Internet content that is relevant to local needs and which promotes local development. Content and services are produced largely within the partnership arrangements of the national alliance.

Staff Telecentre 2.0 is staffed by local people with skills in community development. It is probable that the staff includes women. Local staff members are able to organize community discussions and focus groups that reveal the informational needs of the community, which the telecentre can provide. Local staff is able to promote the use of the telecentre for business development and other schemes that benefit the community.

Evaluation Telecentre 2.0 programmes are evaluated; the results indicate the extent to which local development has been stimulated, and in which women, the poor and other under-served groups are well represented. The results of the evaluation are used to advise further development of the programme of which it is a part.

Networked Telecentre 2.0 belongs to a national and/or international network of telecentres, which facilitates the sharing of experiences and resources. Personnel meet regularly at district, regional and/or national gatherings in which they learn from each other and resolve problems of common interest.

Details on specific telecentre initiatives in developed countries are summarized in the Practice Notes *The Western Australian telecentre network* and *Canada's Community Access Programme*. For experiences in developing countries the Practice Notes *Colombia's Compartel programme* and *FITEL's telecentre experience in Peru* discuss two examples that involve Universal Access and Service Funds (UASFs).

Practice Notes

- **Canada's Community Access Program (CAP)**
- **Colombia's Compartel programme**
- **FITEL's telecentre experience in Peru**
- **The Western Australian Telecentre Network**

Reference Documents

- From the ground up.
- Guidebook on Developing Community eCentres in Rural Areas

4.3.4 OPEN ACCESS, SHARED ACCESS AND ICT BACKBONES

This section outlines the trends and options for improving access to, and construction of, broadband backbone networks as well as models for infrastructure sharing.

These options include:

- Opening networks of monopoly or dominant operators to competition and wholesale service provision, as discussed in Section 3.4.1. Non-discriminatory access to incumbent networks in developing countries is vital. The enforcement of open access is a pre-requisite to further progress in network development and universal access (UA) even if requiring incumbent operators provide open access, or any access to wholesale customers, might deter some commercial investors during a privatization process. The extent to which investor discouragement would happen on a more general basis, is central to discussions in the EU about Next Generation Networks (NGNs) [1];
- How Universal Access and Service Funds (UASFs) can enhance backbone network development, is described in Section 3.4.2. Until recently, backbone networks have not necessarily been considered part of a UA programme, but with the increased importance of broadband, the funding for backbone enhancement is now increasingly, and quite reasonably, expected to come from UASF resources.
- Emerging alternative network options, specially constituted network operators and network operators in a consortium, which are discussed in Section 3.4.3, Section 3.4.4 and Section 3.4.5; and
- Infrastructure sharing aims to extend networks to areas where service provision is commercially viable if several operators share the costs of infrastructure such as towers, is discussed in Section 3.4.6.

These options support UA and remove barriers to ICT development or market efficiency (See also Section 1.3.3); Section 3.4.7 presents the funding options available for backbone initiatives.

Reference Documents

- Best Practice Guidelines on Infrastructure Sharing

4.3.4.1 INCUMBENT NETWORK ACCESS

One way of fostering competition is to ensure that new entrants can use the infrastructure of existing operators. These new entrants, such as ISPs and other network operators, then become wholesale customers of the existing operators. The new entrants and the existing operators might compete with one another for the same retail customers, setting up a scenario where existing operators might seek to discriminate against the new entrants and act in favour of their own retail arms. The regulator needs to prevent discrimination to make service-based competition effective. This regulatory intervention is often most critical to ISPs that may feel that the incumbent is both overcharging for the national backbone and acting in an anti-competitive manner in its retail pricing for Internet customers.Incumbent operators may lack interest in serving wholesale customers on a non-discriminatory basis and may point to the investment made in network facilities and the economies of scale and scope due to their vertically integrated operations. Incumbents may even have genuine technical difficulties in avoiding discrimination because of their vertically integrated operations.Under good regulatory practice, operators should be prevented from discriminating against wholesale customers that are also their competitors, especially in cases where incumbents have monopoly or dominant powers or have used public funds in constructing their networks.

These are the ways a regulator can ensure fair and non-discriminatory functioning of the market:

- **Interconnection and price regulation** – The regulator can enforce wholesale access and regulate the prices operators are able to charge (e.g., for E1 and sub-E1 transmission bandwidths, or for local loop facilities). Ideally the prices are based on costs (cost plus). However, even defining how costs should be calculated (and calculating them), e.g. using bottom-up Long Run Incremental Cost (LRIC) models, requires time and effort. Until the operator is able to demonstrate its incremental costs in an acceptable manner, the regulator must resort to other approaches. The regulator sometimes imposes international benchmarks, based on interpretation of best practice and similar country cases, or requires wholesale prices to be based on retail prices (retail price minus).
- **Accounting separation** – This can be used to make the operator with significant market power (SMP) identify costs and revenue streams for unbundled products and services and sell them on a non-discriminatory basis. It has been practised for many years in conjunction with interconnection and price regulation;

- **Functional or operational separation** – This can be used to make the wholesale arm of the operator treat the retail arm of the operator just like any other wholesale customer. The retail arm must use the same systems and processes as other wholesale customers, and the retail arm cannot receive information from the wholesale arm about other wholesale customers. This can be difficult to achieve because the operator has typically integrated systems and processes constructed over many years. Many issues need to be considered such as the impact on investment incentives, before functional or operational separation can be required and it is therefore considered a last resort [1]. Nonetheless, because separation of accounts and interconnection and price regulation are not always sufficient, functional separation is gaining some international interest The UK has adopted functional separation in the access networks for local loop unbundling, and backbone transmission, and Sweden, Italy and Poland are likely to follow. (It is sometimes also called structural separation, but here this term is used for an even more interventionist way of preventing discrimination); and
- **Structural separation** – This involves turning the operator's wholesale and retail arms (or, sometimes, the network and service parts of the operator) into separate, independent companies. This scenario presents all the difficulties of functional separation as well as the problems and costs that arise when a large company demerges. Structural separation also tends to be associated with the view that the wholesale company should have a monopoly. When this happens, the wholesale company may well behave in the unresponsive manner characteristic of many incumbents. Both Mongolia and New Zealand (by the incumbent as a preferred alternative to functional separation) have proposed structural separation. The Practice Note *Structural separation explained and applied* provides a useful background to recent trends towards separation in OECD countries, covering its benefits, risks and limits. Where network operators are less powerful or privileged in relation to their wholesale customers, regulation will be less necessary. In principle, if wholesale customers can take their business to several, equally strong, competitive network operators, wholesale customers are less likely to suffer from discrimination, and the regulator is better able to monitor the market. The regulator then needs to intervene only under exception circumstances or in cases where one or more operators appear to be abusing a dominant position.

Practice Notes

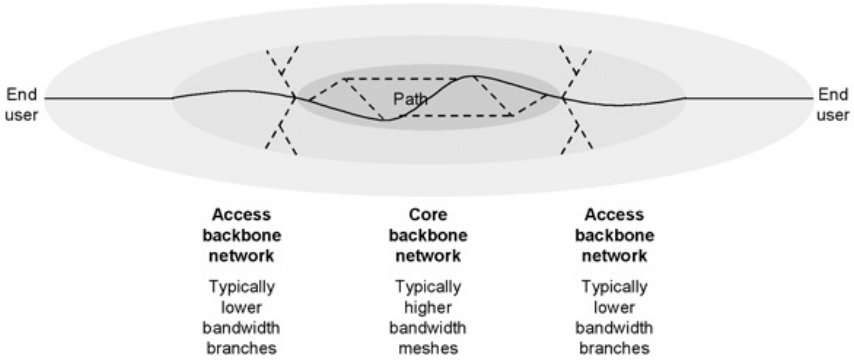
- **Structural separation explained and applied**

4.3.4.2 BACKBONE NETWORK ENHANCEMENT

A challenge that must be faced when considering backbone network enhancement, is that there is more than one motivation driving the demand and investment in main transmission facilities; these are basically network reliability/redundancy and capacity. Policy makers and regulators cannot act in isolation from these or imagine that even an expensive new investment in a third party network operator would be fully utilised or beneficial unless the present and future needs and economic motivations of the existing operators are fully understood and taken into account. Links that are closer to the centre of a network carry more traffic. Failure of these links is therefore more serious than failures further out from the centre. The links nearest the centre are therefore typically made redundant, so that if one link fails then an alternative route between its end points can be used instead. The following distinctions between backbone and access networks should be made:

- The core backbone network (often called the core or backbone network) comprises a mesh of links with at least two routes between any two major nodes. Many incumbent operators' networks incorporate alternative routes, sometimes showing a Figure 8 structure (i.e., two separate national ring routes) linking the key switching and traffic points. In a mobile network also, the redundant links or rings are those between the key mobile switching centres (MSCs) or linking the network's base station controllers (BSCs) to the main MSC. The investment decisions related to these links are very commercial in nature and rarely, if ever, are influenced by universal access (UA) policy or funding; and
- The access backbone networks (often called the aggregation of distribution network), which include the connections to small communities and retail customers, typically comprise a large number of branch links. Typically, access backbone networks connect to a single base station or small fixed network switch (e.g., in a small town or rural area). Many mobile base stations may be connected to a BSC by a non-redundant link. Since the economics of these links may be less certain or marginal, investment decision may be influenced by the availability of UA funding.

The distinction between core and access backbone networks is illustrated in principle in the figure below, although there may be many exceptions and nuances to this simple representation in individual network cases.



◂ Figure: Schematic physical network connectivity

Incumbent fixed network operators often have fibre in their backbones, or at least between main cities and switching centres. Amongst mobile operators, a stronger business case can be made for choosing microwave links rather than for optical fibre links, especially where towers are already installed and can be utilised for base stations. For this reason, some policy makers consider the backbones of mobile operators to be less relevant to broadband traffic. However, chances are that bandwidths are sufficient for current demand and can be economically enhanced when justified by sufficient external demand. Also, many mobile operators are bound to upgrade their backbone networks for expected 2G and 3G service large-scale up-take by consumers. Typically, investment decisions relating to the core backbone network may well relate to introducing redundancy rather than increasing capacity. However, a motivation based on universal access and service (UAS) requirements might focus on increased bandwidth capacity, so that other operators and Internet service providers can be more readily accommodated. Large increases in capacity may be commercially justified only after data services are very well established. In summary, because the motivations for UAS and broadband build-out do not usually coincide with operators' motivations, the availability of subsidy may not necessarily influence the timing of core backbone network investments. However, access network extensions, which are more often easily identified with UAS targets, will always have some limited backbone extension associated with them, and the availability of subsidy for them is more influential on the operators' decisions.It is normal for UAS tenders to include open access requirements on access backbone links so that service providers, other than the initial subsidy recipient, have use of the facilities. This has been for example the case in Nigeria, Uganda and Mongolia. Such forms of mobile infrastructure sharing are increasingly becoming an accepted norm, as noted in **Section 3.4.6**.

4.3.4.3 EMERGING ALTERNATIVE NETWORK OPTIONS

In some countries, several complete or partial backbone networks may exist as well as those of the incumbent. All of these can be considered part of the country's backbone resource. The following are relevant:

- Competitive network operators (usually the mobile operators) might have built optical fibre links and/or microwave links to avoid relying on connections leased from incumbent network operators. This has been the case for mobile operators in several African countries; most developing countries have at least one mobile operator that possesses an extensive network. Mobile network operators tend to start with microwave links (which can conveniently use many of the towers for base stations), but turn to optical fibre links when capacity requirements grow. This pattern is strong in Nigeria [**1**]. In fact, in many countries the backbone networks of the mobile network operators are now more extensive than those of the incumbent network operator, even if they do not use optical fibre links in their core networks until justified by their own internal economics [**2**];
- Some specialised network operators might have constructed optical fibre links or microwave links purely to sell transmission and other network capabilities to service providers and to large companies. In developing countries such network operators are unusual, though there are examples of them of in Kenya [**3**] and Malawi; and
- Electricity, gas and railway companies increasingly have optical fibre links for their own purposes (or rights of way that permit them to provide optical fibre links), which typically carry important but rather small amounts of traffic. These links could be made available for public traffic if regulation permits. In Algeria, the state-owned oil and gas extraction company, and electricity and gas distribution company, have a joint venture to sell their excess transmission capacity [**4**]. But because these optical fibre links have usually been designed to satisfy internal company requirements, not national requirements—railway coverage, in particular—geographical limitations to these links may limit the contribution to existing telephony networks to very few routes. Nonetheless, as noted in **Section 1.6.3**, at the very least, electricity supply and telecommunications can be co-ordinated, as power poles and ducts can carry optical fibres with low marginal costs.

Encouraging and allowing companies to make their networks available for wholesale and public retail business is an important step in enhancing backbone networks because it increases competition and stimulates investment. There might

be a need for safeguards, to prevent cross-subsidy, especially when the companies are dominant in their own main markets. However, mobile network operators in particular, may not feel that they would benefit from selling transmission and other network capabilities to potential competitors. In this case, regulators may consider open access regulation to ensure that backbones do become available.

4.3.4.4 SPECIALLY CONSTITUTED NETWORK OPERATOR

Special backbone network initiatives – as opposed to the creation of open access to existing networks – have become a focus for possible universal access and service (UAS) programming over the last few years. Proponents of such initiatives believe that the main operators will not have enough backbone to match the country's needs and demand for ICT bandwidth. Considering the challenges and complexities involved, special backbone network initiatives require very careful evaluation as to whether or not this is a worthwhile option for an individual country. A separately owned network operator must be constituted so not to compete with, or discriminate against, its customers. It is controlled by the investors that contributed the funds, possibly with other stakeholders including community interests. Having a specially constituted network operator is most appropriate when the network being managed is being constructed using funds independent of any existing network operator. Section 3.4.4 and **Section 3.4.5** discuss alternative ownership and operating modes, which might be more appropriate in certain situations. Typically, broadband networks developed with public funds, are required to operate by specially constituted network operators and to offer open access, e.g., different Internet service providers may use the broadband links. The Practice Note *Public intervention to support broadband deployment in the EU* gives examples of where this has been done. The Reference Document The Alberta SuperNet: An Axia Breakthrough Solution to removing the Digital Divide refers to a Canadian initiative where an open access backbone network has been commissioned to reach all communities above a certain size, and which is managed by a private sector company under contract. In such cases, the backbone network may ultimately be transferred to the funders under a build-operate-transfer or build-transfer-operate arrangement.

The challenge for such projects is to determine whether the motivation and economic justification for the backbone projects is:

- To increase basic network reach into new regional or rural areas that are, to date, not reached (but that may be increasingly served by mobile operators);
- To increase bandwidth capacity on main routes, thereby encouraging and enabling advanced ICT applications and independent Internet points of presence to grow (this will gradually take place as demand is proven); or
- To support the growth of existing and future competitive operators who might consider the non-availability of an independently owned, open or shared access backbone to be a constraint.

Building a new national backbone is unlikely to be justified by capacity requirements alone, although it may be justified if the existing networks have extremely limited network coverage, organizational capability, and commercial acumen or management capacity. On balance, these situations are terminating where policy environments are truly liberalized, and encourage competition and investment. Hence other alternatives discussed in previous and following sections might, in the end, prove to be more realistic.

Practice Notes

- **Public intervention to support broadband deployment in the EU**
- **The Alberta SuperNet experience**

Reference Documents

- **The Alberta SuperNet**

4.3.4.5 NETWORK OPERATORS IN A CONSORTIUM

Within consortiums, network operators might still compete with one another, but they will work together in a consortium for a specific backbone or other initiative of common interest. The consortium has limited functions—typically to serve the aggregated demand of the network operators—so it does not inhibit competition.The consortium is formed and funded privately by certain network operators, with government as a potential partner, and network capabilities being managed by the consortium might be open only to participating network operators, resulting in the risk of restricted market access and market dominance. This scenario differs from having a specially constituted network operator as outlined in **Section 3.4.4**. If there is to be open access to the network facilities, which is preferable, other operators must be able to join the consortium on fair terms. These terms would include admitting all network operators on payment of fees related mainly to

the resources that they require or contribute.An Internet eXchange Point (IXP) is an example of several investments already managed by a consortium. There is an introduction to the practicalities of setting up such an IXP in the Reference Document Via Africa: Creating local and regional IXPs to save money and bandwidth. The consortium might have a less formal structure. A good description of the structural choices that need to be made is at **www.euro-ix.net/ixp/startingixp/** and a fairly formal management structure (for an IXP in the UK) is described in the documents at **www.linx.net/govern/**. An IXP might also act as a trade association representing Internet service providers to the government and the public (as KIXP in Kenya), or to the providers of international bandwidth in order to secure buying power and economy of scale. The consortium does not necessarily pose a barrier to market entry and success of non-members, as there can be alternatives to joining the consortium (such as bilateral peering and transit arrangements). Long distance transmission cables: A network operators' consortium is also a way of funding the construction of national or regional long distance cables, both overland and undersea. The members of the consortium may have major shareholders in common, as in Russia for example [1]. Sometimes though the consortium mandate is not to provide open access and subsequently enjoys a monopoly or duopoly position, effectively preventing other network operators from entering the market.

Reference Documents

- **Via Africa**

4.3.4.6 CURRENT AND EMERGING FORMS OF MOBILE NETWORK SHARING

In many countries that have mobile operators as the dominant service providers, at least one mobile operator may have a near-ubiquitous national transmission network that has potential usefulness beyond the narrow needs of mobile service provision. This network could include the provision of digital backbone facilities from widely dispersed POPs for ISPs. Even if the existing capacity is limited for broadband, an upgrade to provide broadband may be significantly more economic than a completely new network. In mobile networks, infrastructure sharing might include some physical resources (such as towers and buildings), whole transmission links, or sharing coverage areas (so that different network operators provide equipment in different areas with the understanding that retail customers of the other network operators would be allowed to roam there). Because of the cost savings, infrastructure sharing may be a pre-requisite for receiving Universal Access and Service Fund (UASF) support into new areas. This is seen in several recent UASF subsidy competitions where bidders were required to provide sufficient bandwidth capacity and access to radio towers on any new backbone link financed by the subsidy.

Bidders also had to guarantee non-discriminatory open access (on commercial terms) [1]. A Reference document providing a typical Request for Proposal (RFP) and technical specification for this requirement is provided in **section 7 of this Module, Competing for UAS Subsidies**. In some countries obtaining construction permits for masts, ducts and buildings can be difficult for a variety of reasons, from the purely bureaucratic to environmental policy perspective. Certainly, sharing towers and buildings is often considered desirable for environmental or aesthetic reasons. There might be advantages for regulators requiring that network operators have sharing agreements in place so that these forms of infrastructure can always be open to other network operators, thereby making second and third applications for permits unnecessary. The government and regulator of India, engaged in a comprehensive economic analysis and industry consultation regarding the potential need and benefits of mobile infrastructure sharing. The regulator, TRAI, published its recommendations on infrastructure sharing in April 2007 [2]. An overview of the underlying analysis and outcomes of the initial subsidy competitions are provided in Practice Note "**Sharing Mobile Network Infrastructure in India**".

Another option is to allow national roaming, where coverage is shared. This is for example the case in India: India has auctioned mobile licences on a regional basis (called circles) and national roaming is crucial for customers travelling outside of their providers' licensed area. However, where roaming call charges are relatively high, this might not serve customers well. The scenario of operators continuing to generate revenues from expensive calls may act as a disincentive to network expansion unless regulation is enacted to limit retail call charges and enforce coverage obligations. However, in scenarios where one network operator is more dominant, national roaming may give the less powerful network operator an opportunity to compete in areas it has not covered itself yet.

National roaming might be only required for a limited period of time until networks are more evenly built-out. In several countries, e.g., Austria and Australia, national roaming has been used to support market entry by a 3G network operator that had no 2G network – the 3G network operator has the right to negotiate temporary national roaming agreements covering access to the 2G networks of the network operators that have both 2G and 3G networks. Without such agreements, the 3G network operator would have very limited coverage. With these types of agreements, the 3G network operator can have national coverage but can be motivated to enlarge its own coverage by the potential economies of scale. The Practice Note **"Debates about National Roaming in the EU"** discusses this incentive structure.

Practice Notes

- Debates about National Roaming in the EU
- Infrastructure Sharing in India – An Imperative for Sustained Growth
- Mobile Sharing in the European Union
- National Roaming
- Sharing Mobile Network Infrastructure in India

Reference Documents

- Commission Decision of 30 April 2003 relating to a proceeding under Article 81 of the EC Treaty and Article 53 of the EEA Agreement
- Commission Decision of 16 July 2003 relating to a proceeding under Article 81 of the EC Treaty and Article 53 of the EEA Agreement
- India -- TRAI's Recommendation on Infrastructure Sharing
- O2 (Germany) v. Commission

4.3.4.7 FUNDING OF BACKBONE INITIATIVES

Like universal access and service (UAS) itself, a national backbone, whether it extends and connects existing networks or is a separate new network, may need to be a candidate for non-commercial funding. This funding may be through a variety of financing mechanisms (Government funding, Universal Access and Service Fund (UASF), public-private partnership (PPP), etc.). The options for funding backbone initiatives are similar to those for funding UAS in general. They include the following:

- **Part of obligations in UAS licences or other regulatory instruments.** Network operators obliged by winning UAS tenders to provide UAS into new areas must extend their backbones to reach certain areas. As noted in Section 3.4.6, this is illustrated in several recent UAS subsidy competitions, where the bidders were required to provide sufficient bandwidth capacity and access to radio towers on any new backbone link financed through the subsidy, and to guarantee non-discriminatory open access (on commercial terms) [1]. A Reference document providing a typical Request for Proposal (RFP) and technical specification for this requirement is provided in Chapter 8 Competing for subsidies.Depending on the case, these may be minor branch links or quite significant sections of transmission route; or even include core network enhancements. The Nigerian Universal Service Provision Fund is a case where several transmission links of up to 200 km in length, together with customer services – Internet POPs and local access for voice services – are being financed competitively by UAS subsidies .
- **Allocations from public funds.** Network operators could request and receive funds to make their backbones reach certain areas. When more than one network operator competes for funds for the same area, objective methods (auctions) or subjective methods ("beauty contests") can be used to decide between them. Public funds might not be earmarked only for telecommunications, e.g., universities and other technical institutions may have operating functions and applications that require substantial data traffic and might seek funds from agencies that are specifically concerned with education or even just with National Research and Education Networks (NRENs). These funds are not usually intended for creating physical infrastructure though they might be suitable for buying capacity on existing networks.

The Reference Document More Bandwidth at Lower Cost provides recommendations on how universities can work together to obtain more capacity at lower costs, through demand aggregation and other planning actions, which create economies of scale indirectly affecting the cost of UAS.

Reference Documents

- More Bandwidth at Lower Cost

4.3.5 OTHER APPROACHES AND INITIATIVES PROMOTING UAS

In addition to the main approaches and initiatives for universal access and service (UAS) presented and discussed in the previous sections, there are some other approaches, models and experiences, that might be less known. This Section summarizes these approaches. While not widely spread, co-operatives are providing communications services in some rural and remote areas. Moreover, there are considerations in the development community, whether co-operatives might be the model to deliver broadband to rural and poor areas.

Experiences to date, success factors and prospects of the co-operative model are discussed in **Section 3.5.1**.**Section 3.5.2** discusses some examples from various countries, presenting key challenges of rural and regional operators, but also provides the context in which a regional or rural licence strategy could be successful and beneficial, also for broadband.

Section 3.5.3 is dedicated to reviewing experiences with local or community radio stations. Rural radio is not only important for UAS to broadcasting services, but it can also play an important role in spreading the benefits of Internet access.

4.3.5.1 RURAL CO-OPERATIVES

There are a handful of countries with co-operative models for telecommunications services – Argentina, Bolivia, Poland and the United States of America. It is important to note that all these co-operative models began operating before the introduction of cellular technology, when fixed lines were the norm. For example, most of Argentina's approximately 300 co-operatives have been operational since the 1960's. Co-operatives emerged primarily in rural and remote areas where existing national carriers clearly were disinterested in serving those areas because they were considered unprofitable. Many of the Argentinean co-ops are in small, isolated communities in the south (Patagonia) where the two operators at the time, had openly expressed they did not want to serve those communities. Even in the United States, independent telecom providers serve less than 5 per cent of the United States' phone subscribers; 225 co-operatives are a sub-group of independent telecom providers. However, while representing a very small percentage, in these cases rural co-operatives are important to reach and serve these small communities.Poland is an exception to the fact that co-operatives typically serve areas no other operator is interested. In Poland, a new telecommunications act (1990) created 44 local licence areas to compete with the government-owned incumbent operator TPSA. Not all of these local areas were rural areas only though, they included urban and semi-urban areas. Some of the local licence holders were co-operatives, set-up with the assistance of the National Telecommunications Cooperative Association (NTCA) and USAID of the United States. Typical subscriber size is around 8,500. Two co-operatives are known to be still operational and profitable and have added additional services such as Internet, broadband, radio and TV. Looking at the co-operative experience, the following factors allowed co-operatives to be sustainable and in some cases even profitable:

- Providing multiple services – many co-operatives in the United States also own cable TV or cellular subsidiaries, while the Polish co-operatives added Internet service, broadband and in some cases radio and TV. Argentina's co-operatives often provide other services such as water and power, and in 2007 they have been authorized to provide mobile telephony service;
- Favourable interconnection agreements or subsidies – Poland's co-operatives have been established with substantial donor funding and managed to negotiate reasonable interconnection agreements with the incumbent fixed network operator. In the United States the rural operators, including co-operatives, receive subsidies for serving high-cost areas – in 2006 alone, this amounted to USD 4.1 billion;
- De-facto monopoly position – historically, most co-operatives started out as the sole telecom provider in their serving area, which meant that they captured all potential demand and did not need to operate under competitive pressure. With the advent of expanding cellular technology, the sole-provider position is often severely eroded;
- Medium-income countries and service to households – countries with co-operatives are low-middle income (Bolivia), upper- middle income (Argentina and Poland) and high income (United States). Co-operatives provide service to households and they would not be sustainable in communities where only a minority can afford private service; and
- Infrastructure and resource sharing – as many co-operatives also provide other services such as power and water, they have invoicing, accounting and collection mechanisms, and human resources already in place, reducing overhead costs. The sustainability of co-operatives is further increased through management often working without any payment.

Whether co-operative models have a role in future universal access and service (UAS) policies depends on various factors and specific circumstances of the country considering these models. Co-operatives are considered by some as potential model for providing broadband services to communities. A recent example in the United States is the Mid-Atlantic Broadband Cooperative (MBC), created in 2003 by a group of regional leaders whose purpose was to revitalize the regional economy of Southside Virginia. In 2004, MBC created a plan to build over 700 miles of new fibre-optic infrastructure and own the facilities and infrastructure. The project started with USD 6 million in grant funding from the US Department of Commerce Economic Development Administration (EDA) along with additional funding of USD 34 million from the Virginia Tobacco Commission (VTC). Today, the 700-mile fibre network is operational. MBC is an established wholesaler of broadband services, providing the infrastructure necessary to attract businesses to rural Virginia. MBC and the VTC are funding last mile pilot projects in five different Virginia towns. Businesses and residents throughout Virginias are benefiting from MBC's initiative [1].Some factors e.g., the sustainability issues discussed above

and other factors are elaborated in regards to community networks and community involvement in **Section 3.3.2**. It appears that co-operative models might be preferable for communities or areas not served by commercial providers (who are not enticed by subsidies through a Universal Access and Service Fund [UASF]) or in areas that are served extremely poorly. Co-operatives might not be appropriate if there are viable alternatives within the market and with commercial providers.

4.3.5.2 REGIONAL OR RURAL OPERATOR LICENSING

Rural or regional licensing emerged in Latin America in the mid-1990's as a result of the first generation of universal access and service funds (UASFs), as described in **Section 3.2.1**. These often used VSAT or fixed-wireless technology. The main challenge of these rural operators today is the encroachment of cellular operators competing with them in areas where they had once been the only service provider. Also, in some remote communities served by VSAT, the operating and maintenance costs outweigh the revenue received and subsidies bid for. It was known, even before mobile phone expansion, that some of these rural operators are not commercially viable [**1**]. A later example of rural operators can be found in South Africa. Starting in 2002, the Universal Service Agency focused on funding newly awarded Underserved Area Licensees (USALs), previously called SMME – Small, Medium and Micro Enterprises. As the name implies, these operators are licensed to provide voice and data services in under-served rural districts with less than 5 per cent fixed tele-density. Out of 27 potential licence areas, seven USALs have been receiving grants of SAR 5 million each upon licensing from the Agency and commitments of interest-free loans of up to SAR 10 million over the first three years. Several of the USALs have moved to offering service by reselling mobile services from one of the established mobile operators. The main challenge of the USAL concept is that it has been designed with a fixed-line market environment in mind and then has been overtaken by increased liberalization measures implemented by the government, improving the overall sector environment and speeding market expansion including by mobile operators, but granting less protection to the subsidised USALs. Some of the challenges for smaller rural or regional operators can be summarized to be the following:

- **Purchasing power** – big equipment vendors might give little attention or support to a small operator, and prospects of volume discounts are slim;
- **Attracting finance** – rural and small operators are typically challenged to raise finance, as their business case might be only marginally profitable and investors might have less confidence and appetite. Thus, some of the early rural operators where actually subsidiaries of VSAT or rural telecom equipment vendors;
- **Attracting human resources** – given a choice, skilled staff and management might be less attracted to small rural operators preferring to work in larger centres;
- **Economies of scale** – the cost of standard elements for a communications service provider, e.g., billing software, are proportionally higher than for a national operator, though software advances, new technologies and customisation might mitigate that;
- **Negotiating interconnection agreements** – smaller operators are in a less powerful position and are not a priority when negotiating agreements with bigger national operators; and
- **Competitive pressure and increased liberalization** – smaller operators are less able to withstand the competitive pressure once the larger national operators expand over time into the least served rural areas i.e., there is no level playing field between an operator holding a national licence and an operator with only a rural licence. Therefore, rural operators typically require a higher degree of regulatory protection, which often complicates the regulatory regime as special tailored regulation is required for rural licensees and goes against the grain of increased liberalization.

Venezuela is an interesting example where regional licences were introduced without a minimum subsidy auction. Due to the fixed-line incumbent CANTV's inability to meet its rural obligations, three regional rural operators were licensed in the mid-1990's, each in a different region of the country. The existing operators were not allowed to tender for licenses. The operators were required to initially meet rural roll-out targets before being permitted to expand their services into urban areas. The regional operators were required to provide service in rural areas – including public phones and fixed or mobile lines – not covered by CANTV. Over a five-year period after receiving the licence there were operator specific build-out targets for the rural operators ranging from 17,000 to 42,000 lines. Only a small number of main lines had actually been rolled out by the end of 1999. Later, to make the rural licenses more attractive, licenses permitted the operators to offer fixed access, long-distance, international, mobile and multimedia services. In 2006, the two regional operators Digicel and Infonet (both GSM), were bought by Digitel, the third regional operator, to create a national GSM operator. Data on the actual success of these regional licences is limited. In general, rural telephony and Internet penetration in Venezuela is still considered low. Lessons to be drawn from this experience, also in light of possibly adopting a rural or regional licensing strategy for broadband development, are:

- There is an inherent market tendency for rural or regional operators to become national operators, either by being bought by a national operator or their own drive to grow and become a national operator. Thus, regional or rural operators might be a temporary phenomena; and
- Introducing regional operators can be an effective tool for introducing new entrants and more competition. If a regional licence is focussed on less well served areas and coupled with the incentive of being converted into a national licence within a reasonable amount of time, it can have the triple results of:
- increased service in previously un-served areas,
- increased competition, and
- a period of time to prepare and adapt to increased competition for the existing player(s).

4.3.5.3 COMMUNITY RADIO AND LOCAL RADIO

Community radio or local radio can play an important role in a universal access and service (UAS) policy and programme, especially if the UAS policy covers broadcasting services as well. While there are no fixed definitions of what UAS means in the broadcasting field, there is a certain consensus on what its key dimensions are. These include:

- Reach – UAS requires nation-wide service to be provided to the entire population, including the rural and remote population. Typically, public broadcasters are mandated to provide national broadcast reach. Private broadcasters do not necessarily need to reach the entire nation (though it is beneficial) as long as the population has also access to other local broadcasting media.
- Affordability – This relates to the affordability of the actual broadcasting receiving device (e.g., a radio or TV). In many developing countries, rural citizens can only afford radio receivers as TV sets are often too expensive. Considerations and discussions about TV access on a community basis do exist, and there are promoters of multi-media community centres that include TV (e.g., UNESCO).
- Local media, plurality and diversity – This is the strongest dimension of UAS in the context of broadcasting. It is considered essential to ensure that all citizens have access to a local radio station as a forum for local debates and cultural expression. It is important that local media provide a diversity of content and plurality of information and opinions. Because of its higher costs and greater technical needs, local television is far less of a UAS priority.

Thus, in terms of UAS for broadcasting, the following are main requirements:

- Nation-wide service by the public broadcaster and/ or private broadcasters; and
- Access to a local radio station (community or private with public service obligations).

Consequently, many countries believe that local community radio stations are essential. In the developed world, Germany, France, Canada and the United States, all have specific policies for rural broadcasting and community/ local broadcasting stations. The Practice Note *Different local radio models in France* gives an example of a local radio policy. Peru, Bolivia, Colombia, Venezuela, Argentina and Ecuador are all countries that have good broadcasting legislation for rural, indigenous, educational or community radio. In Africa, some of the countries with the best policies for rural radio include Mali, Benin and South Africa. The Practice Note *Rural Community Radios in Mali* give an African example of community radio. Local or community radio stations are even more important in conjunction with Internet access. In many cases, successful use of the Internet for development requires community intermediaries which can overcome issues of illiteracy, lack of ICT training and language barriers of the Internet. Local rural radio, which has Internet access, is emerging as one such successful intermediary because it is accessible, affordable and cheap to produce. Further, radio is a mass and an oral medium that promotes community interaction and social communication processes. Radio and Internet can benefit from each other in the following ways:

- Internet resources for radios to exchange information and programming, such as InterWorld Radio, providing access to a huge range of journalists' reports on a variety of topics; and
- Radios using the Internet to provide a variety of information to their listeners; a well-known example is the UNESCO-supported Kothmale Internet Project in Sri Lanka.

Definitions

In South Africa, a "community broadcasting service" is defined in the Broadcasting Act 4 of 1999 as a broadcasting service which:

- Is fully controlled by a non-profit entity and carried on for non-profitable purposes;

- Serves a particular community;
- Encourages members of the community served by it, or persons associated with or promoting the interests of such community, to participate in the selection and provision of programmes to be broadcast in the course of such broadcasting service; and
- May be funded by donations, grants, sponsorships or advertising or membership fees, or by any combination of the aforementioned.

In France, in addition to local community broadcasting, the regulator, Conseil Superieur de l'Audiovisuel (CSA), distinguishes between three types of local radios:

- Community local radio;
- Commercial local radio service without national programming; and
- Commercial local radio service that also broadcasts national programming.

Whether or not the local station is a community station, an important part of its mandate is to provide a local forum and it is therefore desirable that it be locally owned and that it meet certain obligations regarding community access and local production. Without these obligations, they could be 100 per cent repeater stations for programming coming from the capital, at the expense of local access.

Funding and sustainability

There is a range of funding options for local community radio stations. Most often, community radios finance themselves through a combination of national and international donations, advertising, sponsorship and membership fees. However, in developing countries membership fees are very rare. Examples of funding models that have been mandated by government policy include the following:

- In Colombia, the Universal Access and Service Fund (UASF), Compartel, is managed by the Ministry of Communications, and has a joint programme with the Ministry of Culture and a special government fund for Development Projects known as FONADE. The fund provides partial financing for community radios under a programme called "Comunidad". Currently, Compartel has financed between two to six community radios in approximately 25 departments of Colombia. Compartel receives its money from a levy mainly targeting telecommunications operators, though commercial broadcasters must also pay into the fund. The Practice Note *Colombia's universal access to community radio* gives more details about Colombia's model. However, Colombia's specific programme for community radio is an exception among UASFs. The UASF in Peru is only occasionally funding pilot projects that have some community radio element, but are focussed on the Internet. Ghana's UASF, GIFTEL, is authorised to fund community media projects that combine Internet and community broadcasting;
- Other governments, such as South Africa and Mali, provide no particular financial support to the community radios, thus they have to finance themselves. In some poor communities in South Africa, this policy is creating problems as the people do not have the advertising expenditure to support a community radio station. While Mali has over 300 community radios, a number are struggling. This situation is complicated even more in instances where old equipment needs to be replaced;
- France has a special fund for local community broadcasters, which is sourced by a special tax levied on radio and TV advertising expenditures and paid by advertisers. Qualified stations can receive partial funds to assist with the initial installation, to subsidise some of their operational costs and to subsidise equipment purchases. However, the community radio stations must fulfil certain criteria which determine if and how much funds they receive, and meet specific criteria for accepting the funds. These criteria include the community stations' capacity to secure some local funds, and the quality of their programming. Conditions include a ceiling of 20 per cent of advertising of their total annual turnover, and broadcasting four hours of local programming daily;
- In some countries (e.g., the United States, Chile, Mexico and Brazil), governments impose restrictions on community radio stations in regards to advertising. These restrictions are either absolute, such as no advertising allowed, or there may be a ceiling, such as no more advertising above a certain limit (see the France example above). Botswana is unique in that the acceptance of national and international donations by community radio stations, are only allowed in the first years of the organization's establishment. Lastly, restrictions can be content-related, such as no sponsorship from political parties or only local advertising; and
- In South Africa, community radio stations receive preferential tariffs from Sentech, the signal distribution company, based on a review from Sentech, itself, and the Department of Communications. Previously, community stations were not using Sentech because they could not afford it and had reverted to their own signal distribution. This resulted in inadequate coverage. More details about the South Africa experience is contained in the Practice Note

Rural community radio in South Africa.

In conclusion, some partial funding of local community broadcasting stations is clearly beneficial, and can be sourced from both government funds and a small levy on advertising revenues. However, it also seems important that community stations should be required to raise some funds themselves and apply for funds. These terms are necessary since not all stations may need support. Moreover, the inclusion of application criteria would establish some minimum quality controls in the distribution of assistance. It is proposed that the criteria should not necessarily involve judging the content of programming, but rather focus on indicators such as:

- The amount of local programming;
- The amount of support the radio station receives from the local community it serves; and
- The amount of community participation and/or involvement in the programming.

In addition, it appears crucial that community stations, while being non-profit, should have the opportunity to generate their own funds by as many means as possible. Restrictions on their ability to generate revenue, if imposed, need to be carefully selected. An example of a positive restriction would be the limiting of political party sponsorship during non-election periods.

Enabling support, especially through regulation

The review of various case studies of community radio clearly indicates that enabling support and good regulation for local community radio stations is important for their success. Key features of good regulation and enabling support are as follows:

- Waving or limiting payment for radio spectrum to a minimum e.g., paying USD 20 annually for frequency allowance (Colombia, Mali);
- A special support office within the Ministry of Communications dedicated to assist community ratio stations (Colombia);
- Simplified procedures for obtaining community radio broadcasting licences (Colombia, Mali), including the elimination of unnecessary engineering studies;
- Making technical expertise available to community radios (considered in Colombia);
- In South Africa, France and Mali, development of national associations of rural community stations which are dedicated to supporting and lobbying for rural community stations. Also, they are often better able to attract national and international funding for training programmes etc.;
- No licence fee requirements (Mali);
- Clear regulation from the outset - in South Africa, the Independent Broadcasting Authority issued community broadcasting licences starting in 1994 but only clarified the regulatory framework for these licences in 1997, which caused many community stations to operate in uncertainty and on temporary licences;
- Sufficient capacity of the regulator to handle community radio applications (South Africa); and
- Sufficient licensing length - initial temporary licences such as those in South Africa are clearly not advised. In France, community stations receive licences for five years, and can apply for renewal after five years.

Practice Notes

- **Colombia's universal access to community radio**
- **Different local radio models in France**
- **Rural community radio in South Africa**
- **Rural community radios in Mali**

Reference Documents

- **Community radio social impact assessment**
- **Making waves**

Next: 4.4 Universal Access and Service Policy ➔

The ICT Regulation Toolkit is a joint production of infoDev and the International Telecommunications Union (ITU).