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Telecom Regulatory Authority of India

Paper

Seeking suggestions/comments

On

Measures to Improve Telecom Penetration in Rural India – The next 100 million subscribers

16th December 2008

Preface

During the current decade, India has seen an exponential growth in the telecom especially wireless. The rate of growth of telecom penetration in urban India has been very high as compared to rural. Total subscribers as on September 2008 are 353.66 million, out of which only 29% is the contribution from rural India which constitutes 70% of the total population of the country. Rural teledensity has just reached the two digit level whereas the urban teledensity is heading towards the three digit level (As on Sep 08, the rural teledensity is 12.72 and urban teledensity is 72.47).

The Regulatory and policy changes that the Government of India introduced from time to time have ensured sustained growth in the telecom sector. Teledensity in the urban areas has reached satisfactory levels but the rural Teledensity remains a serious challenge. Though, the issues involved in spreading the telecom services to Rural India are complex and multidimensional and require special attention, however, the solution should no longer evade us. As urban areas reach saturation levels and the growth in these areas slows down, service providers are increasingly keen to move towards the newer markets in semi-urban and rural areas in search of subscribers and revenues. The marginal customers in urban India are also giving lower ARPUs and the fight for market shares has to settle through rural expansion.

There is recognition that operators may require support to reach these markets. There is a need for providing the policy and regulatory environment necessary to encourage service providers to move to these apparently less lucrative markets. Sustained growth will only come

about when both the operators as well as the users see a value in the proposition.

During the last 2-3 years, all the stakeholders viz. the government, the regulator, the telecom service providers, the vendors and content providers have been grappling with various measures to boost the rural telecom penetration. Every concerned part is trying its best to bridge the telecom divide. However, in spite of sincere efforts of all the stakeholders, desired results are yet to be achieved.

In this paper, TRAI has made an effort to bring out various constraints coming in the way of increasing rural telecom penetration and has suggested some of the possible strategies to overcome the same. This paper is an invitation to all the stakeholders to participate in a collective thinking process and come out with fruitful suggestions/ comments so as to stimulate rural telecom penetration.

The paper is available on TRAI's website www.trai.gov.in. The stakeholders are requested to send their comments on this paper by 5th January 2009. In case of any clarification/information, please contact Sudhir Gupta, Advisor (MN), Tel. No. +91-11-23220018 Fax No:- +91-11-23212014 or email-at advmn@trai.gov.in..

(Nripendra Misra)

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Chapter 1

Background

1.1 Gandhiji said “The Soul of India resides in Rural India”.

The gains from liberalization and economic development must percolate to all the segments in the country and every citizen has to be the beneficiary. Development of Telecommunication and the communications infrastructure is an essential precondition for making available the benefits of liberalization to the rural masses and for further powering the engine of growth of the nation. "Information is critical to the social and economic activities that comprise the development process. Telecommunications, as a means of sharing information, is not simply a connection between people, but a link in the chain of the development process itself." [Hudson 1995]. Telecom Regulatory Authority of India (TRAI) believes that every Indian should have the opportunity to connect with the world beyond their geographical boundaries, and is working to ensure that every individual has access to a dial tone wherever and whenever tapped.

1.2 The last five years, have seen a phenomenal spurt in the growth in tele-density in the country riding on the evolution of wireless technologies, policies of Government and the Regulator. The total subscribers as on September 2008 is 353.66 million compared to nearly 8 million in Mar 94. However, there is a huge digital divide between Urban and Rural. India is a vast country having an area of about 3,287,000 square kilometers with nearly 70% of its total population of about 1.15 billion, living in the rural areas. There are more than six lakh villages in the country. As of September 2008,

the urban teledensity (No of telephones per 100 persons) was 72.47 as against the rural teledensity of only around 12.72. During the last two decades, though several attempts have been made to extend the benefits of the telecom revolution to rural masses but the gap between urban and rural tele-density has widened.

1.3 According to the National Council for Applied Economic Research (NCAER), the country's urban growth and prosperity is beginning to percolate to the countryside. The Gross Domestic Product (GDP) of the country is approximately 1162 billion US dollars[1] out of which the share of the agriculture sector, which is mainly in rural India, is approx.17.5 %. India's rural majority today accounts for more than US$100 billion in consumer spending i.e. the largest buyers as a group in the country and contributing significantly to India's GDP. In 1990, for every $100 earned by a person residing in a rural area, a person in an urban area earned approx. $182. Today, this gap has been reduced to $56. Already, mobile-phone companies and consumer durable companies have become aware of the opportunity that exists in the huge rural consumer segment and have extensive marketing programs in place. Cell-phone makers are eyeing the rural markets to push growth beyond the present 7 to 9 million new mobile connections every month.

1.4 Around the world, governments, international agencies, and academics have recognized telecom as an enabling infrastructure – allowing the people it connects to reach out and communicate, seek business, and grow their knowledge. Rural India is still, unfortunately, on the wrong side of the digital divide, which prevents a significant portion of our population from attaining their

[1] Economic Survey 2007-08

full potential. Given that communication is a human need and right, and that a strong communications network enables commercial and social ties, it is essential that we bridge this divide between urban and rural India.

1.5 Rural development gets a boost by a reliable infrastructure of enhanced telecommunications. Participation by rural and poor segments of society in the information economy should be a strategic priority both for social reasons as well as for the reason of economic development being a goal in itself. Access to the telecommunication network drives economic growth and provides economic opportunity. Special emphasis needs to be placed on the role of telecommunications in enabling rural citizens to integrate effectively in the Indian economy and then to the new Global Economy. Successful systems require not just appropriate technology but primarily that all other elements like people, policies, processes, incentives, institutions, and infrastructure are present and work well. Special transition policies are required to give a fair chance and to help rural India to adjust to the new marketplace of telecommunications.

1.6 There is plenty of evidence to show that telephones have a high correlation with GDP per capita. Broadly we can say that if a country has a one per cent higher mobile phone subscription rate than another, its GDP per capita will be about $200 higher. Surveys and studies have repeatedly shown that access to information and communication technologies allows the benefits of information availability, business opportunities and social connections that translate into brighter education and economic opportunities.

1.7 Government of India had announced the National Telecom Policy (NTP) 1994 with a strong focus on ensuring telecommunication facilities being within the reach of all. The policy also visualized that the universal service (universal service is the provision of access to all people for certain telecom services at affordable and reasonable prices) covering all villages would be achieved as early as possible and the quality of telecom services would also be of world class standards. It aimed that by 1997, we should be able to provide telephones on demand and that all villages should be covered. However, against the NTP 1994 targets, the telephone connectivity to only 3.1 lakh villages (out of total six lakhs) could be achieved by 1997.

1.8 While evaluating the outcome of NTP 94, the Government of India recognized that the provision of world class telecommunications infrastructure and information is the key to rapid economic and social development of the country. It was critical not only for the development of the Information Technology industry, but it also has widespread ramifications on the entire economy of the country. Accordingly, a comprehensive and forward looking telecommunications policy which creates an enabling framework for development of this industry and, of the nation as a whole was put in place in 1999.

1.9 While formulating the policy, a balance was sought to be achieved between the provisions of universal service to all uncovered areas, including the rural areas, encourage development of telecommunication facilities in remote, hilly and tribal areas of the country, and to transform the telecommunications sector, in a time bound manner, to a greater competitive environment in both urban and rural areas. NTP 99 envisaged the development of telecom in

rural areas, making rural communication mandatory for all fixed service providers, making it more affordable by suitable tariff structure. NTP 99 sought to achieve the Universal Service Objectives of provision of Voice and Low speed data service to the balance 2.9 lakh uncovered villages by the year 2002, and achieve telephone on demand in urban and rural areas by year 2002. It aimed at increasing the rural teledensity from 0.4 to 4 by the year 2010 and to provide reliable transmission media in all rural areas. It is worthwhile to mention that the rural teledensity of 4 has been achieved in the year 2006-07 itself and the rural teledensity as on September 2008 is around 13. The year wise growth of rural tele-density is given in Table below.

Table 1- Urban-Rural Teledensity

Month	Total Tele-density	Urban Tele-density	Rural Tele-density
Mar-98	1.9	5.8	0.4
Mar-99	2.3	6.9	0.5
Mar-00	2.9	8.2	0.7
Mar-01	3.6	10.4	0.9
Mar-02	4.3	12.2	1.2
Mar-03	5.1	14.3	1.5
Mar-04	7.04	21.3	1.7
Mar-05	9.08	26.2	1.74
Mar-06	12.86	37.99	1.86
Mar-07	18.23	47.24	5.78
Mar-08	26.22	63.67	9.34
Sep-08	30.64	72.47	12.72

The quarterly net subscriber additions and growth rate of Rural and Urban Wireless Subscribers is given below:-

Figure 1- Quarterly Additions of Rural and Urban Wireless Subscribers.

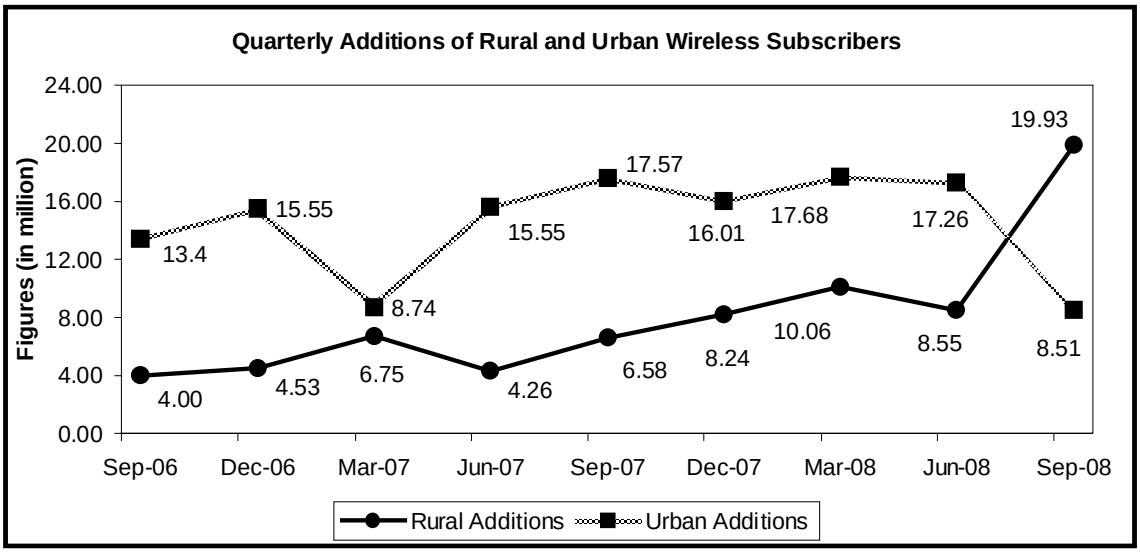
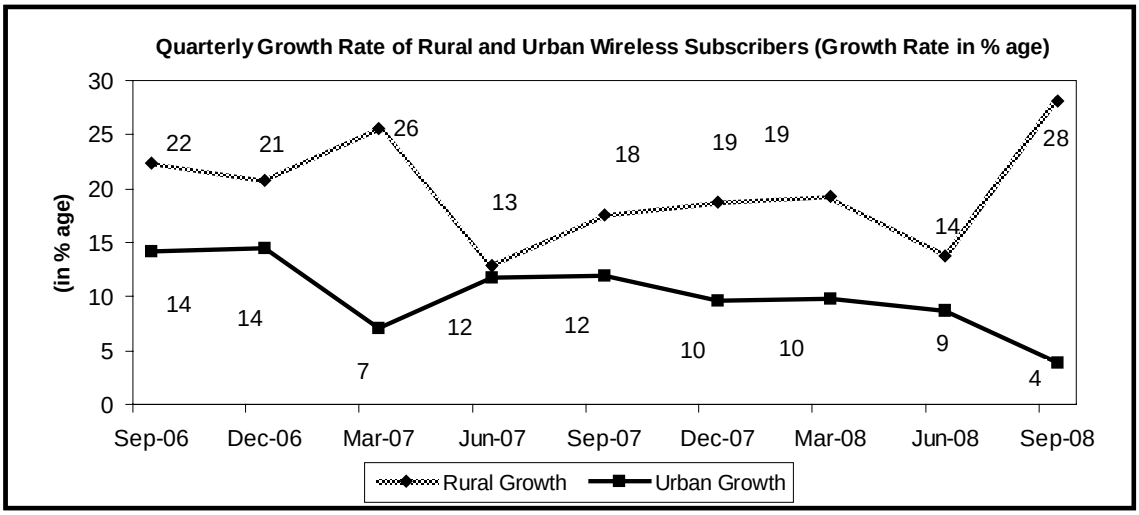


Figure 2 – Quarterly growth rate of rural and urban wireless subscribers



1.10 NTP 99 also provided that the resources for meeting the Universal Service Obligation (USO) would be raised through a 'Universal Access Levy' (UAL), which would be a percentage of the revenue earned by the operators under various licenses. The details of the activities of the Universal Service Obligation Fund (USOF) are

covered in chapter 4.

1.11 In 2005, the Govt. of India launched Bharat Nirman Scheme a time-bound business plan for action to promote rural infrastructure in the next four years i.e. 2005-09. Under this scheme, action is proposed in the areas of irrigation, road, rural housing, rural water supply, rural electrification and rural telecommunication connectivity. Specific targets have been set under each of these goals for accountability purposes. Under this programme it has been targeted that 66,822 revenue villages in the country, which have not yet been provided with a Village Public Telephone (VPT), shall be covered by November, 2007. Out of the above villages, connectivity in 14,183 remote and far flung villages will be provided through digital satellite phone terminals. Assistance for both capital as well as operational expenditure for these VPTs will be met out of the Universal Services Obligation Fund (USOF). As on 30-9-08, out of total 66822 uncovered villages, 55257 (82.69%) have been provided with VPT[2].

1.12 The last decade or so has seen a rapid increase in tele density largely as a result of liberalization of the telecom sector and creation of a market through appropriate policy and regulatory measures. These measures led to the achievement of price levels where the cost benefit ratio suited large masses of urban population. On the supply side the service providers ensured rapid growth of the network capacity to handle the increase in the subscriber numbers ensuring that a clear business case was established for them. In order to bridge the growing digital gap

[2] Source: DoT website

between the urban and rural India, it is necessary that a similar growth equation is created for rural India, both for the service providers as well as for users. However, unlike the urban masses who were familiar with the telephone even prior to liberalization, the majority of the potential hundred million new rural subscribers will be first time users and therefore, special efforts through awareness programme customized value addition, innovative marketing & pricing will be required so that they identify the telephone, as being in the category of other basic amenities like water, electricity, road etc.

1.13 To achieve this dream, all the stakeholders viz. the government, operators, equipment vendors and various local bodies would need to collaborate and work closely. At stake are several thousand crores of rupees in annual revenue- and significant growth and development. To quote from a market report "In 20 years the rural Indian market will be larger than the total consumer markets in countries such as South Korea or Canada today, and almost four times the size of today's urban Indian market. The estimated size of the rural market will be USD577 billion."[3]

1.14 Operators will need to collaborate with players in other industries, such as financial services and consumer goods, in order to develop innovative offerings and extend their reach beyond the outer limits of traditional distribution channels. Business model innovations must transform the economics of serving overlooked or neglected consumers and yield products and services that suit their needs. Business as usual will not reach these consumers. Instead, telecom operators will need to revise their organizations,

[3] McKinsey & Company, "The bird of Gold: The Rise of Indian Consumer Market", McKinsey Global Institute, May 2007

marketing, and distribution channels. They will also need to change their products.

1.15 An attempt has been made in the subsequent chapters to quantify the realistic targets for the mobile and broadband nos. for next 2-3 years, analyse the role of USOF till date and how it can be broadened further and identify the likely constraints and possible strategies to counter them.

1.16 For boosting rural telecom penetration, TRAI has taken a lot of initiatives like recommending bringing mobile services under the ambit of USOF, sharing of infrastructure to receive support from USOF, relaxation for deployment of towers upto 40 m in rural areas, discount in USO levy after sufficient coverage, supporting backbone infrastructure through USOF etc. The details of initiatives taken by TRAI and various NGOs, other bodies in India and internationally to promote Information & Communication Technology (ICT) in rural and less developed regions have been chronicled in the Annexure- A & B.

Chapter 2

Present Status

2.1 There are about 315.31 million wireless subscribers as on September 2008 of which, about 90.76 million subscribers are from rural India. To achieve the target of 500 million by 2010, it is imperative that 90-100 million new subscribers are from rural areas. Though presently, the rate of growth of rural subscribers is higher than that of urban (Figure-2), however to sustain and accelerate if further, there is a need for the creation of an ecosystem that encourages Service Providers to view the rural markets as an opportunity with potential for sustainable revenues, as well as, users to view the Telephone as not only a tool for communication, but also a tool to impart education, entertainment and the consequent network that grows out of the connectivity as a means/forum to promote common interests, ideas and goals. However, this would require a re-look at our traditional policies so as to create a conducive environment which will make the stakeholders start looking at "Universal Service Obligation" as "Universal Service Opportunity".

2.2 Presently, the rural tele-density as on September 2008 is around 13 (table 1) and the percentage of rural mobile coverage has reached 69% as on March 2008 (table 7). Out of 593731 inhabited villages, the service providers have reported that 407112 villages have already been provided mobile coverage. The challenge is to increase this mobile coverage and to further create the necessary infrastructure so as to reach the target of 500 million telephones and 20 million broadband subscribers by 2010. For any effective planning, it is necessary to quantify the likely share of

rural subscribers in the proposed target by taking stock of available resources which can be harnessed to achieve our goal.

Table 2- Resources inventory

Resources Inventory		
Sr No	Item	Numbers
General Resources		
1	Population (million) Dec'07[4]	1146
a	Rural (million)	802
b	Urban (million)	344
2	Number of District Hqs[5]	610
3	Number of SDCAs[6]	2,645
4	Number of blocks[7]	6,374
5	Number of Village Panchayat	2,65,000
6	Number of Villages (inhabited as per 2001 census)[8]	593,731
7	Number of Villages Electrified[9]	474,982
8	Primary Schools[10]	767,520
9	Middle Schools[7]	274,731
10	Higher Secondary Schools and Junior colleges[7]	152,049
11	Rural Primary Health Centers[11]	22,669
12	Post Offices[12]	155,204
a	Rural	125,439
b	Urban	29,765
13	Railway Stations[13]	7,137
14	Police Stations[14]	11,840
15	Area (SqKm)[15]	3,287,590
16	Literacy Rate[16]	
a	Total	64.8%
b	Rural	58.7%
c	Urban	79.9%
17	Number of Banks in Rural Areas (Year 2005)[17]	47586

4 Census commission
[5] http://india.gov.in/outerwin.htm?id=http://districts.nic.in
[6] http://www.aptsec.org/meetings/2003/seventh-ASTAP/ASTAP03-FR07-PL-15_TEC-Mr.N.K.Mangla.ppt#258,16,
[7] http://gov.ua.nic.in/NScheduleData/nv02.pdf
[8] http://demotemp257.nic.in/httpdoc/Census_Data_2001/Census_data_finder/A_Series/Number_of_Village.htm
[9] http://www.rggvy.gov.in/rggvy/rggvyportal/index.html
[10] Economic survey 2007-2008 Page no. A-121
[11] www.indiastat.com
[12] http://www.indiapost.gov.in/Report/annual_report_2007-2008_final.zip/
[13] http://www.indianrailways.gov.in/deptts/stat-eco/statistical-stmt-0607/st-9b.pdf
[14] http://bprd.nic.in/writereaddata/presentation/File13.ppt#269,21
[15] https://www.cia.gov/library/publications/the-world-factbook/geos/in.html
[16] http://www.censusindia.gov.in/Census_Data_2001/India_at_glance/literates1.aspx
[17] http://www.rbi.org.in/Scripts/BS_SpeechesView.aspx?Id=311

Table 3 - Telecom Resources (as on September 2008)

Telecom Resources (as on September 2008)		
1	Total Number of Telephone subscribers (Wire line + Wireless) (million)	353.66
a	Rural(million)	101.71
b	Urban (million)	251.95
2	Total number of Wireless subscribers (million)	315.31
a	Rural (million)	90.76
b	Urban (million)	224.55
3	Teledensity	30.64
a	Rural	12.74
b	Urban	72.47
4	Total Number of Telephone Exchanges of BSNL	38,202
a	Rural	29,492
b	Urban	8,710
5	BTSs	
a	Rural	1,06,518
b	Rural Shared	29,723
c	Total BTS including Urban	2,22,137
6	Connectivity of Rural BTSs	
a	No. of BTS on OFC/ UG Cable	21,795
b	Microwave	84,458
c	Satellite Link	265

Note- The figures at Sl no. 5 & 6 pertains to June 2008.

2.3 Following are the specific key issues which needs to be deliberated for formulating the strategy for promoting telecommunications in Rural India:

- Ø Should voice penetration be given priority to attain desired/pre-decided level and then push data or should both be taken up simultaneously?

- Ø The technological solutions to be adopted to provide voice and broadband at affordable rates? How should adoption of such technologies be promoted?
- Ø What would be the most effective business model for rural India?

2.4 Before reaching to any conclusion on strategy to increase the rural penetration, we need to analyse the targets for Rural Mobile phones as well as for broadband

Rural mobile phone target:

2.5 Unlike urban India, where mobile phones are considered personal communication devices, and hence it is not unusual for a household to have more than one or two mobile phones, in the villages, the mobile phone can at best be seen as a substitute for a fixed phone and therefore, to start with, targeting one phone per household can be a safe bet. With rural population expected to be 832 million (in 2010), the maximum number of rural subscribers on household basis can be expected to be around 180 million. There are presently around 100 million rural subscribers and therefore balance of around 90-100 million rural subscribers needs to be acquired in the next two years.

2.6 As per the data submitted by the service providers, there are already 106518 rural BTS, of which around 29723 are reported to be shared by more than one operator. After taking into account the installation of mobile towers targeted in the Phase I & II scheme of USOF (table 8), there will still be a requirement of an addition of around 11250 towers in the next two years in order to reach the desired target of additional 90-100 million rural subscribers.

Broadband target:

2.7 In May 2006, the Government announced its intention to provide broadband facility to all public health centers and all secondary and higher secondary schools by 2007. All Grampanchayats are also targeted to be covered by 2010. Though no perceptible progress has taken place till date, however, for defining the broadband target for 2010, we may include all schools-from primary to higher secondary, public health centers, police stations and post offices and branches of all rural banks. As all these institutions touch the life of a villager in some way or the other, therefore this target apart from providing a guaranteed market for the service providers, shall also act as a catalyst for the rural masses to go for individual broadband connections in the future. A rough estimate of the number of all these institutions translates into 1,706,208 broadband connections (Table 9).

The Needs of Rural Indian Subscribers:

2.8 As discussed earlier, unlike the urban masses, for the rural population, voice alone cannot be incentive enough to subscribe for a telephone connection even with the availability of low cost handsets and all the recent tariff initiatives introduced by the mobile service providers like lowering the entry barrier by offering the upfront discount of Rs. 50 and Rs. 25 in air time quarterly for three quarters. The initial acquisition including the activation expenditure incurred for a new connection is between Rs. 2000-3000. Though purchasing power may not be an issue, however, until and unless the villager is convinced that he is getting value for money, or the service being provided is almost essential for him, he would not want to subscribe to the service. Mere

availability of voice connection amongst his friends and relatives and occasionally with the Govt. officials in the Tehsil or Block Headquarters and Mandi may not be enough incentive for him. The mobile handset has to become a multipurpose instrument providing him entertainment, news, education, connectivity as well as a means to promote his financial and business interests. Radio and Television are popular with rural masses largely because they provide range of entertainment to the user. In the case of Telephony too, there is a need to provide other value added services viz. education, entertainment, tele-medicine, banking, IPTV etc. Some of these services can be provided through text messaging. However, in order to make up for the slow pace of development in the past and offer range of usage/application, it is necessary that both voice and broadband go hand in hand as far as strategy for rural India are concerned. Taking wireless as the preferred media to provide both the services, it can be safely assumed that basic infrastructure (in the form of mobile towers and the backhaul connectivity of the tower with BSC and the routers/servers) have been the main stumbling blocks for the proliferation of these services. Fortunately, today the same infrastructure can serve the major technologies providing all these services.

2.9 Along with the mobile phone and broadband connectivity, data based application services meeting the daily requirement of the villager will also need to be developed. Information can be a powerful economic leveler, and for many of the next 100 million new subscribers, the mobile handset and broadband will be the best vehicle for accessing it. In India the National Commodity & Derivatives Exchange, has launched a text–messaging alert services for farmers to track agricultural and commodity prices.

Recently a pilot project called Fisher Friend project has been launched in Tamilnadu and Pondicherry that enables fishing communities to earn their livelihood in a safe and proactive manner by leveraging 3G CDMA wireless and ICT technologies. Vital, real-time information is available to fishing communities anytime, anywhere at the press of a button. The project provides access to a menu of services uniquely focused on fishing communities including sophisticated technical information (e.g., sea wave heights, satellite scan data about fish shoals) which is processed to make it usable to non-technical users. Other, more ambitious projects are under way elsewhere. Internationally, to cite an example, in China, last year, one of the operator, China Mobile Communications, a wireless carrier, launched an integrated package that consisted of text-messaging services, voice services, and an Internet portal for rural areas. Farmers and fishermen can access the service to get weather forecasts, price information, and employment opportunities outside the agricultural industry. By the end of October 2006, the service had more than 12.7 million subscribers and daily traffic exceeding 1.6 million messages, 40,000 visits to the Internet portal and 20,000 voice calls[18]. New forms of mobile banking and commerce are the most obvious candidates to emerge in this realm. Rural India is primarily a cash economy because majority doesn't have bank accounts or access to other payment methods, the mobile handset can help make sophisticated banking and payment services available.

[18] Ringing in next Billion Mobile Consumers- BCG Report

Chapter 3

Constraints in the Penetration of Rural Telecom

3.1 In order to find ways and means to further accelerate the process of penetration of rural telecom, the Authority held a seminar on 6th June 2008 in New Delhi. The Seminar was primarily focused on identification of the impediments in the way of growth of telecom services in rural areas, the measures required to be taken to remove them and also to enthuse the service provider for the need to accelerate their foray in rural areas.

3.2 The deliberations in the seminar identified following reasons for low penetration of telecom services in the remote and far-flung areas:-

Acquisition of Land

3.3 The first major hurdle in the proliferation of towers in the rural areas is that acquisition of land for BTS takes very long time. In large number of the cases, as the land belongs to either forest deptt/tribal areas or gram panchayats, the formalities required to be completed for taking the land on lease or outright purchase takes a long time and involves lot of effort.

Right of Way

3.4 In the rural area, for providing backhaul connectivity, if fibre or cable is to be laid then even though the laying is along kuchha roads or through forest, but as the route involves jurisdiction of multiple state and municipal agencies / panchayats, therefore to coordinating different agencies and getting the requisite permission

is time consuming. These state agencies involved in the process takes a long time in granting the right of way and have also started charging exorbitantly higher amount for the permission for the laying.

Backhaul connectivity

3.5 Unavailability of cheap and fast backhaul connectivity is one of the major hurdles in faster proliferation of telecom in rural areas. Unlike urban areas where optical fibre is largely deployed to provide the backhaul connection, about 80% of the rural BTS are on microwave system. Though, at many places OFC connectivity has been provided but the provisioning cost is prohibitory high and as discussed subsequently, providing backhaul using the satellite link is a cumbersome process.

Lack of Infrastructure sharing

3.6 According to industry estimate, cost of setting up a cellular tower (BTS) is varies from around Rs 3-4 million inclusive of equipment, power plant, etc. Though significant number of existing cell sites are already being shared by competing operators across the country, however, this is mainly in urban areas. In rural areas, sharing of infrastructure is yet to be attained at a significant level/rate.

Power Supply

3.7 In a number of villages the power supply is either not available or is available only for few hours. As a result even if battery back up is provided for the BTS, due to availability of electricity for a very short duration, the batteries are not able to get fully charged. Further due to frequent interruption of power supply the life of these batteries get shortened which in turn increases operational

cost to run services in rural areas. Unavailability of reliable power supply in semi-urban, rural and remote areas increases operational costs further because sufficient backup systems have to be maintained. As per the statistics, out of 5,93,731 inhabited villages (as per2001 census), 4,73,136 (almost 80 %) have been electrified upto March 2008. The remaining villages are to be covered by 2009 as per Bharat Nirman Programme under Rajiv Gandhi Grameen Vidhutikaran Yojna. However, in practice, the frequent and long interruptions in the electricity supply put a large number of these villages at par with the non-electrified ones.

Operation and Maintenance cost

3.8 Maintenance costs of the network in rural areas are high as compared to urban areas because of several factors such as poor transportation systems, difficulty in supply of spare parts and non availability of skilled manpower etc. Due to lack of reliable power in rural areas there is substantial increase in the cost of diesel for running of the engine alternators for keeping exchanges, transmission equipment and BTSs in the live conditions.

Low Average Revenue per User (ARPU)

3.9 As per the license conditions the service providers are mandated to provide service to all without any discrimination. All subscribers, big and small, rich and poor, are entitled to get the same quality of service, tariffs and other conditions. However it is seen that Service Providers do not fulfill this license condition or at least are reluctant to venture into the interior rural areas where expected ARPUs are low. The profit motive being of primary importance to all, the low ARPUs expected in the rural areas do not provide sufficient motivation for the Service Providers to provide service in these areas. At least initially, large call volumes cannot be expected

from subscribers in these areas and also the paying capacity being lower than in urban areas tariffs would also have to be kept at very reasonable levels. Until the Mobile Phone proves its utility to Rural India and a critical mass of subscribers and traffic is achieved Service providers would require incentives/support for venturing into these “non renumerative areas”. As on date, Urban India and the semi urban centres are still providing sufficient growth opportunity to mobile Operators and there is adequate demand in urban areas and therefore there has not been any reason for Operators to penetrate into the rural India.

Affordability of Services

3.10 Though the provisioning cost of telecom services has come down significantly in India, however in terms of purchasing power of individual, these are still high particularly in terms of cost of the end equipments i.e. Cost of handsets, Modem, PC, UPS etc. As a large proportion most of the rural population is having low income, the present cost of telecom services is still prohibiting to them.

Low literacy levels (Relevant mainly for Broadband)

3.11 The literacy levels are very low in rural India. No matter how wired or connected a rural community is, no matter GSM or CDMA, WiMax or 3G, broadband or dial-ups are in place, without appropriate literacy to utilize the technology or the value added services that it provides, the connectivity will have no value. Presently, more than 98% of computer work is done in English. Apart from the issue of lack of skills in English, a large percentage of the rural masses do not even have even sufficient reading and writing skill in their own language. In order to help develop the habit of using the opportunities that a Broadband offers, there is a need to develop content that is relevant, usable and

understandable by the local people. All the support and incentives offered for rural penetration would be of consequence only if the content provided is relevant and usable. It is therefore, of utmost importance that the contents developed should be in the vernacular language and the application software should largely be menu driven and graphic as far as possible in order to overcome the issue of illiteracy. In absence of these, there will be lack of demand generation in rural areas, leading to a failure of the entire initiative.

Unavailability of locally relevant applications (Relevant mainly for Broadband)

3.12 India being a multi diverse country has different requirement from one geographical area to the other area. However, the content being developed at present are meant to be used universally even though it fulfils the requirement of a particular geographic area and not all the whole country.. Therefore unless content developer understands the local requirement and develop customized contents, the demand for tele-communication will not increase. The processing of information and converting it in such a form which become useful to the end user and to transport such information through a reliable, accessible and convenient transportation system are two requirements which can help in generation of demand for telecommunications services and content services. As it is known that demand for telecom services is not a direct demand, but a derived one. Users of telecommunication services do not want to communicate per se, but to get and give information to others. Information is a valuable element, and telecommunication is just the channel through which information is made accessible and exploitable.

3.13 Although studies say that there is direct relationship between the telecom penetration nd the growth in economy, yet it is very difficult for the illagers to perceive how the spending of hard earned money on telecom will help them to boost their earnings.

Chapter 4

USO Fund

4.1 The Universal Service Support Policy came into effect from 1.4.2002. Subsequently, the Indian Telegraph (Amendment) Act, 2003 giving statutory status to both Houses of Parliament passed the Universal Service Obligation Fund (USOF) in December 2003. The Fund is to be utilized exclusively for meeting the Universal Service Obligation and the balance to the credit of the Fund will not lapse at the end of the financial year. Credits to the Fund shall be through Parliamentary approvals. The resources for implementation of USO are raised through a Universal Service Levy (USL) which is presently charged @5% of the Adjusted Gross Revenue (AGR) from all Telecom Service Providers except the pure value added service providers like Internet, Voice Mail, E-Mail service providers etc. In addition, there is a provision for grants and loans by the Central Govt.

4.2 Universal Service Obligation Fund is headed by the Administrator, USOF. His responsibilities include formulation of procedures for selection and approval of projects, disbursement from the fund and the overall implementation envisaged under USO to expand rural telephony. The Office of USOF Administrator functions as an attached office of the Department of Telecom, Ministry of Communications and IT. The pros and cons of this arrangement has been discussed separately.

4.3 On 30.10.2006, an Ordinance was promulgated to amend the Indian Telegraph Act, 1885 so as to enable support for mobile services and broadband connectivity in rural and remote areas of the country also from the USOF. The ordinance was subsequently regularized by passing an Act on 29.12.2006 as the Indian

Telegraph (Amendment) Act 2006 to amend the Indian Telegraph Act, 1885.

4.4 USOF Activities[19]: As per the Rules, the following services shall be supported by the Fund, namely:-

(i) Stream-I: Provision of Public Telecom and Information Services -

(a) Operation and Maintenance of Village Public Telephone in the revenue villages identified as per Census 1991 and Installation of Village Public Telephone in the additional revenue villages as per Census 2001. - For installation of Village Public Telephone in the revenue villages, identified as per 1991 Census, only the Operating Expenses and Revenue shall be taken into account for determining the Net Cost. For the additional revenue villages identified as per 2001 Census, Capital Recovery in addition shall also be taken into account for determining the Net Cost.

Provided that in the case of the Village Public Telephone which are still to be installed in the villages identified as per Census 1991, Capital Recovery shall also be taken into account while determining the Net Cost;

(b) Provision of additional rural community phones in areas after achieving the target of one Village Public Telephone in every revenue village. - Where in a village the population is more than 2000 and no public call office is existing, a second public phone shall be installed and for the purposes of determining the Net Cost, Capital Recovery, Operating Expenses and Revenue shall be taken into account;

[19] http://www.dot.gov.in/uso/usoindex.htm

(c) Replacement of Multi Access Radio Relay Technology Village Public Telephone installed before 1st day of April 2002. - Capital Recovery, Operating Expenses and Revenue shall be taken into account for determining the Net Cost.

Note - Unless otherwise specified by the Central Government, the Secondary Switching Area shall be taken as a unit for the purpose of arriving at the Net Cost for activities specified in items (a) to (e) of stream

(ii) Stream-II – Provision of household telephones in rural and remote areas as may be determined by the Central Government from time to time:

(a) For household Direct Exchange Lines installed prior to 1st day of April, 2002, the difference in rental actually charged from rural subscribers and rent prescribed by Telecom Regulatory Authority of India for such subscribers shall be reimbursed until such time the Access Deficit Charges prescribed by Telecom Regulatory Authority of India from time to time take into account such difference.

(b) For household Direct Exchange Lines installed after 1st day of April, 2002, Capital Recovery, Operational Expenses and Revenue shall be taken into account to determine the Net Cost.

Note - Unless otherwise specified by the Central Government, the Short Distance Charging Area shall be taken as a unit for the purpose of arriving at the Net Cost for activities specified in item (b) of Stream II.

(iii) Stream-III: Creation of infrastructure for provision of Mobile Services in rural and remote areas:

(a) The assets constituting the infrastructure for provision of mobile services shall be determined by the Central Government from time-to-time.

(b) A percentage of the Capital Recovery for the infrastructure for provision of mobile services shall be taken into account to determine the Net Cost.

(iv) Stream-IV: Provision of Broadband connectivity to villages in a phased manner.

A percentage of the Capital Recovery for the infrastructure for broadband connectivity shall be taken into account to determine the Net Cost.

(v) Stream-V: Creation of general infrastructure in rural and remote areas for development of telecommunication facilities

(a) The items of general infrastructure to be taken up for development shall be determined by the Central Government from time to time.

(b) A percentage of the Capital Recovery for the development of general infrastructure shall be taken into account to determine the Net Cost.

Note - Unless otherwise specified by the Central Government, the revenue district/ group of revenue districts shall be taken as a unit for the purpose of arriving at the Net Cost for the activities specified in Streams III, IV & V.

(vi) Stream-VI: Induction of new technological developments in the telecom sector in rural and remote areas

Pilot projects to establish new technological developments in the telecom sector, which can be deployed in the rural and remote area, may be supported with the approval of the Central Government.

4.5 Status as on 30th September, 2008

The status of utilization of fund and also total collection of USOF levy, and un-disbursed amount (as on 30.09.2008) is given in Table 4.

Table 4 : Status of USOF as on 30.09.2008

Sl. No.	Financial Year	Funds allotted	O & M of VPTs	Replacement of MARR VPTs	RCP	VPTs in Uncovered villages	RDELs (Prior to 01.04.02)	RDELs installed from 01.04.02 to 31.03.05	RDELs installed after 01.04.05	RDELs installed after 01.04.08	TOTAL
1	2002-03	**300.00**	236.63	63.37	NA	NA	NA	NA	NA	NA	300.00
2	2003-04	**200.00**	66.40	4.60	NA	NA	129.00	NA	NA	NA	200.00
3	2004-05	**1314.59**	65.13	72.09	NA	NA	1062.78	114.59	NA	NA	1314.59
4	2005-06	**1766.85**	83.39	108.17	31.89	29.86	NA	1393.44	120.10	NA	1766.85
5	2006-07	**1500.00**	81.54	106.19	41.72	55.40	NA	342.74	872.41	NA	1500.00
6	2007-08	**1290.00**	118.87	256.93	19.69	44.73	NA	122.10	727.69	NA	1290.00
7	2008-09		34.09	74.32	4.06	6.85	NA	25.09	105.18	102.49	352.08
	Grand Total		**686.05**	**685.67**	**97.36**	**136.84**	**1191.78**	**1997.96**	**1825.38**	**102.49**	**6723.52**

Note : **"NA" indicates that the Agreements for the respective USO activities were not signed during this period.**

Fund Position as on 30.09.2008

Year	Funds collected as USOF Levy in FY (Rs Cr)	Funds allocated & disbursed (Rs Cr)
2002-03	1653.61	300.00
2003-04	2143.22	200.00
2004-05	3457.73	1314.585
2005-06	3533.29	1766.85
2006-07	4211.13	1500.00
2007-08	5405.46	1290.00
2008-09	-	352.08 *(As on 30.9.08)*
Total	20404.44	6723.52

4.6 In order to evaluate the impact of USOF in rural areas, the details of physical and financial progress is given below:

Stream-I (a) Village public telephones - This was addressed in two parts. Firstly, the ongoing village public telephones were funded to cover the deficit between the operating expanses and revenue thus determining the net cost. The year wise disbursement under this category was as follows:

Sr No	Year	Amount
1	2002-03	236.63 crores
2	2003-04	66.40 crores
3	2004-05	65.13 crores
4	2005-06	83.39 crores
5	2006-07	81.54 crores
6	2007-08	118.87 crores
7	2008-09 (Till 30.9.08)	34.09 crores

Thus, a total amount of Rs. 686.05 crores was disbursed only to BSNL for maintenance of village public telephones which existed prior to 2002-2003. It was simply a transfer of fund from USOF to BSNL.

(b) New village public telephones – USOF determined total of 66822 villages for provisioning of village public telephone. This work was mainly assigned to BSNL. As per the progress report up to 30.09.2008, a total of 54429 village public telephones have been provided, thus leaving a balance of 12393. The fund disbursed so far under this category is Rs. 136.84 crores.

(c) Under Stream-I it was also envisaged that villages with population of more than 2000 would be provided with second public phone in case public call office is not existing. The disbursement in this category is Rs. 97.36 crores from 2005-06 to 30.09.08.

(d) Replacement of Multi Access Radio Relay (MARR) related technology- In villages where public telephones were installed using MARR technology prior to 1st April, 2002, the USOF decided to fund the replacement of MARR technology to WLL technology. The total number of identified phones was 186872. It was later revised to 182766. The replacement has been reported for 180909 leaving a balance of 1857. The total fund disbursed under this head was Rs. 685.67 crores.

Thus total sum of Rs. 1605.92 crores was utilized under Stream-I which is 23.89 per cent of total disbursed fund. It may be appreciated that under Stream-I, no expansion of rural telephony in real terms was undertaken. It was basically revamping of the existing facility/technology. Only a provision of second public phone in villages having a population of 2000 could be interpreted as additional telephone capacity creation.

Stream II – Under stream II, total number of SDCAs identified for subsidy support for providing rural household direct exchange lines was 1685. These exchange lines were installed after 01.04.2005. Under this scheme, total number of RDELs provided was 3.857 million. The financial utilization from USOF was 1825.38 crores which is 27.15% of the total utilization of USOF.

Stream III – Under the stream III, in Phase I, the USOF had identified areas in 500 districts spread over 27 states, where there is no existing fixed wireless or mobile coverage. For providing mobile coverage in these areas, the USOF launched a scheme to provide subsidy support for setting up and managing 7871 number of infrastructure sites (towers) in these identified rural and remote areas. The infrastructure so created was planned to be shared by three service providers for provision of mobile services including other Wireless Access Services like Wireless on Local Loop (WLL) etc. The agreements effective from 01.06.2007 were signed with the successful bidders in May 2007. Mobile service through these shared towers was targeted to be made operational in a phased manner by May 2008.

Total number of telecom towers which were awarded to six different telecom service providers was 7871. Till 31st October, 2008 only 1934 towers have been installed thus the physical progress is 13.5 per cent. This is detailed in Table 5. USOF Administrator has announced the second phase for an additional 11049 sites for the installation of towers at identified places. These shall provide coverage to 242866 villages. There is no progress as the tenders are yet to be called.

Table 5- Service Provider wise breakup of commissioned towers.

S.No.	IP-1	Total Towers given in Phase-I	Commissioned Towers	Remarks
1.	GTL	421	390	
2.	QTIL	88	88	
3.	Vodafone	331	262	
4.	Reliance	472	251	
5.	KEC	384	153	
6.	BSNL	6175	790	Most of the remaining towers are planned to be installed by December 2008
	Total	7871	1934	Only 24.57 % completed

4.7 Stream IV – This involves the provision of Broadband connectivity to villages in a phased manner. The strategy for broadband penetration in rural area finalized by USOF is as below:-

- 25000 Common Service Centers (CSCs) to be covered by Wire line broadband by December 2008
- 25000 CSCs in 1000 blocks to be covered by Wireless broadband by March 2009
- 2 lakh villages in 5000 blocks to be given broadband by 2009
- Remaining villages to be given broadband in a phased manner by 2012

No physical progress has been reported in Stream IV.

Stream V – This involves the creation of general infrastructure in rural and remote areas for development of telecommunication facilities. The items of general infrastructure to be taken up for

development shall be determined by the Central Government from time to time. To begin with, a plan has been prepared to augment the OFC network between the Block HQs and the District HQs for creation of general infrastructure for development of telecom facilities. M/s TCIL has been entrusted with the work of compiling the details of existing network set up by the Service Providers and to identify where the OFC network is to be set up in rural areas. The beginning has been done from North-East states

No physical progress has been reported in Stream V.

Stream VI – This involves the induction of new technological developments in the telecom sector in rural and remote areas. Pilot projects to establish new technological developments in the telecom sector, which can be deployed in the rural and remote area, may be supported with the approval of the Central Government.

No physical progress has been reported in Stream VI.

4.8 Some urgent and immediate action points are suggested below:

4.8.1 In phase-I, the tendering process of USOF, right from calling of Expression of Interest (EOI) to finalization of tender and signing of agreement took 6 to 9 months.

* There is a need to modify the methodology so that this long lead time for launching the scheme can be cut short or completely cut out.

4.8.2 Today, there are around 12 to 13 CMTS/UAS licensees in each service area. Even if half of the service providers decide to go into a rural area for providing service, it will require a minimum of 2-3

mobile towers. Presently, in the USOF scheme, incentive is allowed to only one operator in an area. If the aim is to encourage as many operators as possible to go into rural areas, then there is a strong case for doing away with this condition of restricting subsidy for installation of mobile tower to only one operator.

* Allowing subsidy to any service provider who installs the tower in the identified SDCA shall induce competition amongst the operators as each one would want to have the first mover advantage.

4.8.3 Presently, the locations of the towers are identified by the USOF. Many service providers have opined that the choice of the location where the tower needs to be installed should be left to them. As there is a large gap between the capex required to erect towers and the average subsidy amount being given for the same (as per Phase-I), therefore, it can be argued that once the rural SDCAs have been identified where the mobile infrastructure needs to be installed, then the choice of location and the number of towers required in that area should be left to the discretion of the service providers. In view of the large gap, no operator would set up a tower just for the sake of subsidy.

4.8.4 One major lacuna in the scheme is that there is no support for providing back haul between the BTSs and the BSC.

* As is discussed subsequently in this Paper, there should be a separate facility based operator, who should be funded by the USOF and should be entrusted with the work of providing the fiber connectivity between the block head quarters upto the village Panchayat headquarters and then the same should be available to the licensed operator free of cost for at least 3-5 years.

4.8.5 To summarize, for expediting the infrastructure support in rural area, for the mobile and broad band services, the USOF should do away with the bidding process and only concentrate on planning and monitoring of the implementation of the scheme. Based on the experience of Phase-I, it should determine the subsidy support for setting up towers in different regions and any IP-I/CMTS/UASL operator, who sets up the tower in designated SDCAs should be paid subsidy, irrespective of whether the tower is used by one operator or more than one.

4.8.6 Some of the issues discussed above have already been raised by TRAI in its letters to USOF and Secretary, DoT. These letters are attached at Annexure D

Provision for backhaul

4.9 As given in Table 8, there is a requirement of additional 30,250 mobile towers (phase I, phase II and additional requirement) for facilitating the next 100 million rural subscribers. Apart from the requirement of additional towers, there will be a major requirement to provide backhaul for both voice and the broadband. However, in the USOF scheme, provision of backhaul for these towers is not clear.

* Inclusion of subsidy for the backhaul from these towers to the block headquarters to the entity installing the tower is necessary for the success of the project.

4.9.1 There is a need to have a multi-pronged strategy for providing backhaul in the short term and long term. As per the data provided

by the service providers, about 75-80% of their rural BTSs have microwave as the backhaul. Unlike spectrum for access service, spectrum for microwave is charged on number of links and in view of large distances in rural areas, the spectrum charges become considerable.

* It is feasible to defray the charges for spectrum used for providing microwave backhaul for rural BTS.

4.9.2 VSAT can be also used for quick provision of backhaul especially in hilly and difficult areas. However, presently there are a number of procedural delays in case an access service provider desires to lease backhaul connectivity from VSAT operators. Some of the steps where the delay occurs are:-

- Ø Each bandwidth increase/decrease to be applied for approval to Apex Committee.
- Ø Each Site shifting to be applied to Apex Committee for approval.
- Ø Each change as above needs to go through WPC/SACFA approval process.
- Ø Each shifted antenna to be re-tested by NOCC at very remote sites.

4.9.3 Though this could provide short term solutions to the immediate issues, in the long term, the bandwidth provided by Microwave or VSAT will not be sufficient to cater to the bandwidth hungry applications like entertainment, tele-education etc. For these applications an optical fiber network is required to be available upto the mobile towers. Currently around 6.7 lakh route kilometers of optical fiber is present across India. Out of the existing 29000 rural exchanges of the incumbent (BSNL) in the country, majority of them (around 70%) have OFC connectivity.

However, majority of this connectivity has very low bandwidth (8 Mbps) and therefore can not be shared.

* This bandwidth should be upgraded to STM-1 by USOF and BSNL should be mandated to share at least 2/3rd of the enhanced bandwidth with other service providers.

4.9.4 In addition to the above solutions, it is suggested that the USOF should separately identify few agencies for laying fiber between the rural towers and the block headquarters.

* The fiber laid should be given free of cost for next 5 years to any operator who desires to provide the services in the villages.

4.10 Financial incentives under USO Fund for larger coverage

4.10.1 The Authority in its recommendations on "Review of license terms and conditions and capping of number of access providers" had recommended that ".....a scheme of financial incentive for the spread of infrastructure in the rural areas may be considered. As per this framework the licensee who covers 75% of development blocks in any service area (excluding the four Metro service areas) should be eligible for a payment at a reduced scale towards Universal Service Obligation fee. Such a licensee shall be required to pay 3% instead of present 5% contribution to the Universal Service Obligation Fund (USOF). The verification should be based on installation of identified physical infrastructure in the development blocks. ..."

4.10.2 Accordingly, the DoT vide its letter no. 20-100/2007-AS-I Dated 1st October 2008 had issued amendment to the Basic, CMTS and UAS Licenses regarding the annual license fee. As per this

amendment, any licensee who covers 95% of the development blocks in a service area shall be eligible to get a reduction of 2% in its contribution to the USOF i.e. instead of 5%, the licensee will pay 3% of the AGR as its contribution to the USOF.

4.11 Broadening the Role of USO Fund

4.11.1 It is evident that the present organizational structure has not adequately served the goals of rural telephony. The organizational framework is weak. Today, it is seen as the adjuncts of the Department of Telecom, therefore, the decision making, criterion for tendering, allocation of projects, monitoring and evaluation remains typically departmental initiative.

* It is extremely important that the USO Administrator is empowered effectively in terms of administrative, financial powers and ultimate decision making.
* It needs to be separated from Department of Telecom and a framework on the lines of National Highway Authority should be considered.
* A High Power Governing Council comprising of the representatives from Department of Telecom, Information Technology, Education, Health and Rural Development could be constituted for necessary guidance and inter-ministerial coordination.
* It is important that the present USO Act/ Rule should be so amended that the funds accruing to USO through levy is directly managed by the organization and is not routed through the budgetary process of the Union Government.

The above recommendation was also the flavour of CAG recommendation as well. Today the programme is caught in a two way trap where DoT explains low physical performance because of budgetary constraints, i.e., lower provisioning and release of funds from the Finance Ministry and

the Finance Ministry has clarified that the lower provisions have been made taking into account the past performance. Once the funds are placed at the disposal of Administrator, USOF, the Wing of DoT dealing with the Accounts and Finance headed by Member (Finance) could provide necessary administrative support.

4.11.2 With this kind of a broad based approach and constitution of the USOF the role of the USOF would also need to be recast.

4.11.3 Thus it is felt that a total overhauling would add new dimension to the USOF and improve the performance.

* Apart from the implementation of specific projects, the role of the USOF could be enlarged and redefined in the following area:
    i) Prioritization of needs based on community perception and needs
    ii) Identification of trends, making projections, aggregating demand to build a viable business case and attracting investment.
    iii) Creating partnerships among community organizations – government, businesses, institutions.
    iv) Creating awareness – increasing uptake and usage of new services
    v) Selecting business model; technology selection, assessing financial implications, establishing timelines, implementations
    vi) Taking feedback and making course correction.

4.11.4 At present, the USOF is focused only on providing subsidy on the infrastructure creation in specified SDCAs. As discussed in the

preceding chapters, going forward as we try to bridge the digital divide the role and area of functioning of the USOF has to change. Unlike the Urban population which is exposed to international/global issues and enjoys global entertainment, is comfortable accessing content which is international in flavor, in Rural India there will be a need to ensure that there is a strong local content available. The success of any scheme in Rural India would depend upon the immediate relevance that it has to the everyday life of the people. The present content accessible may not really meet the requirements of the local people.

* In order that the penetration targets are met, in terms of both telephones as well as broadband, there is a need to develop local content in local languages.

The telephone and internet will become meaningful to the local people once the offering adds value to their lives.

4.11.5 As availability of relevant content in the vernacular language is a pre requisite for the growth of broadband and ICT with the rural masses, therefore apart from giving the subsidy to the infrastructure providers the content application providers should also be given incentives to develop the contents based on local requirements because it is observed that Rural ICT systems, where they exist are typically planned, designed and installed by technicians and engineers who rarely consult with rural stakeholders. As a result, systems are installed without envisioning the developmental objectives. If that be the case and the development of local content is accepted as essential to the success of any scheme to increase rural penetration, the logical next step is that in a country as diverse as India one size cannot fit all.

* The development of local content needs to be area specific and should address the local, immediate, needs of the people. This brings us to the question regarding the very structure of the USOF.

Chapter-5

Possible Strategies

5.1 As per the data provided by the service providers, around 407112 villages are having mobile coverage i.e. about 69% of villages are having the coverage. Taking around 180 million as the targeted rural subscribers in the country, as on Sep 2008, there are 90.76 million rural subscribers. Therefore, there is a need to plan for converting an additional 90-100 million population as subscribers.

5.2 The strategy for increasing the telecom penetration in rural areas can be classified in two categories:

a. Areas without mobile coverage
b. Areas already having mobile coverage

a. Areas without mobile coverage

5.3 As far as the first category is concerned, the major requirement is to provide the requisite infrastructure like mobile towers, spectrum, backhaul facility and the customer premise equipment (CPE). Some of these have already been discussed in the earlier chapters and the issues of CPE and content development have been discussed subsequently in this chapter.

b. Areas already having mobile coverage

Below are some strategies to overcome the constraints discussed in chapter 3.

Affordability of Services

5.4 As compared to urban population, rural people are more cost conscious and demanding as far as getting value for their money is concerned. Taking Rs 1000- 1500/ as the minimum cost of a handset, the cost for owning a mobile connection works out to be around Rs 1500-2000/-. As the reasons for owning a mobile phone in urban and rural areas are very different, therefore for attracting rural people to subscribe to mobile phones, there is a need to increase its cost effectiveness. Some of the methods could be:

5.4.1 Lowering the cost of the handsets Although the service providers do not have direct control over handset costs, they can and should work with manufacturers to ensure that handsets are both economical and practical for the rural consumers. The following practices, some of them already in use, will help bring costs down as well as impart additional usefulness to – handsets:

- Evaluate the design and specifications of handsets to ensure that they meet the needs of the rural masses and do not contain extraneous features that push up their cost. Electricity is unavailable in a number of villages; therefore, the handsets should have long-life batteries, built in flashlights and capability to charge the batteries from alternate sources such as tractor batteries and generators.
- Reduce complexity – and subsequent servicing costs – by relying on standardized keypads, screens, and other parts.
- Bundling of handsets— A large number of the rural population does not have a steady employment, therefore there is a need to lower the upfront cost of mobile acquisition. This can be achieved by bundling the hand set along with the connection or offer handsets on an

installment plan that increases over a period of time along with the benefits to the user. In large number of countries, it is a normal practice. However, in India, as the annual license fee is on the AGR of the service provider and the cost of the handset is also taken as a part of the AGR, therefore the service providers are not too keen to bundle the hand set along with the connection.

USOF should look into this aspect and in consultation with DoT should devise a scheme for setting off the cost of the bundled handset provided to rural subscribers from the AGR.

5.4.2 Incentivising a new mobile connection subscription

Telecom service providers should come up with innovative concessional schemes for new subscribers.

5.5 Providing Locally relevant applications on Mobile This could include applications on mobile regarding health, education, farming and other local trade. With proper communication infrastructure, it may also be possible to move business processes to rural regions. This should open up the growth potential of rural Indian economy. This issue has been dealt in detail in chapter 4.

5.6 Mobile Banking for Rural India:- In many developing countries, lack of banking facilities in the rural area combined with a proliferation of mobile services has created a unique opportunity for providing financial services over the mobile network. Mobile phones are being used to transfer funds between people. These applications are working in countries like Philippines, Kenya, South Africa, Tanzania etc. These applications are driven by rural people who are looking for:

a) A safe place to keep money

b) Accessibility / liquidity – The ability to turn electronic money into hard cash and vice versa at convenient locations (agents / ATMs)

c) Ability to transfer money – to and from the financial institution, to make payments and to remit money to friends and relatives.

5.6.1 Similarly in India also due to high cost of operation, a large portion of rural population does not have access to basic banking facilities. RBI is working on formulation of guidelines to use mobile banking to create a system of financial inclusion to reach out to the unbanked population of the country. Primary objective of this model is to offer or give access to basic banking facilities to the unbanked and rural population by means of an easy to access affordable delivery channel i.e. mobile phone.

* The banking sector with active participation of the telecom service providers acting as the delivery channel should try to proliferate this facility as far and as deep as possible as this will be the major catalyst for the rural masses to subscribe to the mobile phones.

5.6.2 As per a report published by the Boston Consulting Group in December 2007, “operators and banks should not see each other as adversaries. Players from each industry can share portions of their offerings and value chains in ways that provide mutual benefits- specifically more attractive, targeted products and lower costs. To be sure, operators still have work to do and regulatory reforms to advocate before they can price comprehensive banking services. If they succeed in creating a competitive mobile banking

offering, however, they could find themselves on the verge of explosive growth resulting from a confluence of factors.

- Ø The growth of mobile subscribers is outpacing the growth not only of banking customers but also of personal computers and internet users.
- Ø Many telecom consumers have few links to financial institutions. As a result, telecom providers will not have to battle incumbents head on to win the banking business of many subscribers.
- Ø Mobile banking will boast much lower costs and greater convenience than traditional banking products, making this option economical and attractive for both users and providers.
- Ø India's vast market presents an opportunity to create unparalleled scale, which telecom companies could use to pry open other emerging markets – and eventually enter developed markets. If it were to launch a comprehensive mobile banking product, a pioneering telecom player could transform the landscape of retail banking not only in India but also around the world.

5.6.3 Recently the Reserve Bank of India (RBI) has issued the guidelines for mobile banking (Annexure E).

5.7 Overcoming the language barrier The literacy levels are very low in rural India. Majority of the handsets are in English.

* There is an urgent need to use the local language in the mobile handsets.

5.8 Tie-up with Department of Post.

5.8.1 Increasing the customer outlets for mobile payments /

recharging: Rural post offices should be allowed to work as customer outlets for the telecom companies.

- A major hurdle in the expansion of Telecom Services to Rural India (as reported by the service providers) is non availability of skilled and trained manpower.

* Local schools and community centers can provide the training needed to help local residents and businesses in rural areas and take advantage of new information technology.

5.8.2 The Ministry of Communications has with it a huge resource available in the form of the network of Post Offices spread out across the length and breadth of the country. The Department of Posts (DoP) runs a network of over a hundred thousand Post Offices, both Departmental as well as Extra Departmental some of which, in the remotest parts of the country, may well be the only source of contact with the outside world.

5.8.3 As the DoT tries to make greater inroads into Rural India through the USOF and attempts to increase the teledensity there, to close the gap between Urban and Rural Teledensity numbers, the Post Offices and the infrastructure and experience of the Dept of Posts in the remotest parts of the country could become of great value in helping the DoT achieve its targets.

5.8.4 The Dept of Posts has a presence in every corner of the country. The Postman is a known and recognized entity in even the smallest of human settlements. He personally knows every resident of his Beat, and in smaller towns/villages, probably is familiar with the people, their financial status, their needs, and requirements for communication services based on the letters / money orders being

sent/received. In areas where the literacy rates are low the Postman is often the letter writer and the letter reader and is therefore familiar with every aspect of the villagers' lives. In addition to the fact that the Postman knows the needs of the people in these far flung areas, there is also the fact that he in turn is a well respected person, and by virtue of holding a position in the Government, is seen as reliable and responsible person.

* The Postman can therefore be effectively used to educate the potential Customers and First-Time Users about the uses and benefits of the Services being offered. Also, there can be no better system for address verification and credit verification than the Postal Dept and more specifically the Postman himself. No agency can claim a similar level of familiarity with the Local residents and this knowledge that the Postman has built over many years of doing his Beat can never be replicated. This makes him the ideal agency for any kind of verification.

  As far as DoT is concerned, verification by the DoP is the ideal verification- the Postman being highly dependable, being a Govt employee himself, or having a close linkage with the Govt (in case of Extra Departmental Post Offices).The Department of Posts can be compensated on mutually agreed rates based on Marginal Costing.

5.8.5 Additionally, the Dept. of Posts has an existing infrastructure that can be used by the Telecom Service Provider to sell his products. The Post Office already handles Government Cash transactions and the staff/personnel is well versed with the entire process. Selling products and accounting for the sales is an everyday job at the Post Office and very little additional training would be required to enable sale of Telecom Products in these

Offices.

5.8.6 The Department of Posts already has the infrastructure existing to enable sales and acquisition effort at the most cost effective rates. The Dept of Posts can also be compensated for its efforts based on Marginal Costing. In order to ensure that a Critical mass of subscribers do come onto the Network of the Service Provider the USOF could consider wholly or partially subsidizing this Customer Acquisition Cost payable to the Dept of Posts.

5.8.7 Over the last few years the Dept of Posts has also started looking for new Revenue Streams in line with the Govt of India's objective to reduce budgetary support to zero. Partnering the DoT and the USOF in the effort to increase Teledensity in Rural India would be a unique opportunity for the Dept of Posts (DoP) in addition to earning additional revenue for reducing its budgetary deficit.

5.8.8 To summarize, we can say that DoP can participate in helping the service providers in their endeavour to increase rural penetration by -

- Working as sales outlet of telecom service providers
- Bill Collection centres based on mutually agreed commission
- Telecom service providers can offer some commission for bringing in new subscribers

5.9 Incentives to MVNOs

5.9.1 The Authority recently has given recommendations to DoT on the issue of introduction of Mobile Virtual Network Operator (MVNO) in India. In the recommendations it is envisaged that the MVNOs will

be permitted to operate services using the Mobile Network Operator (MNO) infrastructure. MVNO will be required to pay an entry fee and licensed fee including USO fund contribution.

5.9.2 In order to supplement the Government's efforts to increase the penetration of telecom services in rural areas, one way could be that the Government permits the MVNOs to operate exclusively in the rural areas. Though, traditionally, MVNOs is an urban phenomenon, but if certain incentives are extended to them then local entrepreneurs who have a better understanding of the needs and habits of the people of their area can develop customized applications and products and create a success story. The incentives can be considered in terms of reduction in license fee and the changes in specifications. However, it needs to be ensured that such MVNO operate exclusively in rural area under their brand names.

5.10 While liberalizing the access segment, post NTP 1994, specific VPT roll out obligations were specified in the licenses. However, these commitments remained largely unmet. At that stage, the markets were in nascent stage and service providers main interest was on lucrative segments. Today when the markets are mature with some segments reaching saturation levels, perhaps there is a case for regulatory expectation of rural roll-out obligations in the access segment.

Annexure - A

TRAI initiatives for Rural Telecom Growth

Recommendations on 'Growth of Telecom services in rural India' dated October 3, 2005

- TRAI recommended that the mobile services should be under the ambit of USOF. The infrastructure for the mobile telecom in rural areas should be shared by service providers to receive support from USOF and the funds collected as Universal Access levy should be made available to USOF. There should be no requirement of SACFA clearance for deployment of towers upto 40 m in rural areas.
- All the operators who have optical fibre connectivity in rural areas should be mandated to provide leased lines to other operators who are rolling out their networks in rural areas and such bandwidth owners shall get an incentive of 10% on the ceiling tariffs specified by TRAI from USOF for facilitating mandatory sharing. This connectivity should be provided with a discounted price at the rate of at least 30% and difference between ceiling specified by TRAI and the discounted price should be supported from Universal Service Obligation Fund (USOF). Thus bandwidth users shall get a discount of 30% on the ceiling specified by TRAI. Bandwidth owners should also get an incentive of 10% on the ceiling tariffs specified by TRAI from USOF as an incentive for necessarily providing leased line. Thus the bandwidth owner will not only get the reimbursement of 30% discount which is being offered to the operator in rural areas but also 10% incentive will be on top of specified ceiling tariff.

- TRAI is of the view that in the interest of growth of such services, WPC spectrum charges on VSAT should be lowered. It is therefore, recommended that there should be a single rate of WPC fee and the present ceiling of 4% should be lowered to 1% to cover administrative charges only.
- VSAT is one of the effective means of telecommunication in rural and remote areas. Therefore, it is recommended that concession in Annual License Fee to VSAT services linking it with the number of VSAT terminals installed in rural/remote areas should be provided to VSAT operators. The location of VSAT terminals is already available with WPC as well as with NOCC (Network Operation Control Center) and therefore, there will be no problem in verification of VSAT terminals installed in rural/remote areas. This concession could also be like the earlier concession suggested in access provider license fee, depending upon number of VSAT locations in rural/remote areas. However, the details could be worked out in consultation with VSAT operators once these recommendations are accepted in principle by the Government.
- State Governments and local authorities should also facilitate deployment of telecommunication networks in rural areas by not levying Right of Way charges for deployment of wired cable or optical fiber networks in rural areas, etc. on restoration basis.
- Niche Operators should be eligible for subsidies from the Universal Service Fund on the same lines as that available to the other access providers. Scope of the Universal Service Fund should be expanded to include Niche Operators.
- It is recommended that Niche Operators should not be levied any spectrum charges.

Niche Operators
To increase penetration of telecom services in rural / remote / backward areas from telecom point of view, Authority recommends that SDCAs where fixed rural tele density is below 1% shall be area of operation for Niche Operators. Niche Operators shall be permitted to offer fixed telecom services including multimedia, Internet telephony and other IP enabled services only in these SDCAs. These operators shall however, be permitted to use wireline/fixed wireless networks. This definition of niche operators shall be reviewed depending upon market conditions and development of various technologies and various applications. (*TRAI recommendations on Unified Licensing dated 13th Jan 2005*)

Rccommendations on Allocation and pricing of spectrum for 3G and broadband wireless access srvices dated 27th September 2006

- Roll out obligations in the 2.1 GHz band, should be as follows:

Category of circle	At the end of 3 years	At the end of 5 years
Metros	-	90% of metro area
A, B, and C	30% of the DHQs or cities in the circle out of which at least 10% should be rural SDCAs	50% of the DHQs or cities in the circle out of which 15% should be rural SDCAs

- Since spectrum in the 450 MHz band is allocated mainly for rural deployments, the roll out obligations in this band could include specific conditions to ensure that rural areas are covered by the operators. For the operators in the 450 MHz band, the roll out obligations should be as follows:

Category of circle	At the end of 2 years	At the end of 5 years
Metros	-	90% of metro area
A, B, and C	20% of the rural SDCAs	50% of the rural SDCAs

- For BWA spectrum, the Authority recommended the following roll out obligations:

Timeline	License area	Metros	Category A, B & C circles	Local operators/captive networks
2 years		-	25% rural SDCAs area coverage	-
5 years		90% area coverage	50% rural SDCAs area coverage	90% area coverage

Recommendation on Infrastructure Sharing dated 11th April 2007

- Considering the importance of backhaul sharing for provision of mobile services in rural and far flung areas, licensing conditions of UASL clause no 33 (ii) and CMTS clause no 34 (ii) should be amended to allow service providers to share their backhaul from BTS to BSC only. Such sharing is permitted on optical fiber as well as Radio medium at port size E1 and multiple there of (nxE1). No sharing of spectrum at access network side is permitted.
    - Subsidy for erecting the tower should also be made available to service providers not beneficiary under USOF scheme to maintain level playing field. The subsidy should be provided from USO Fund to service provider/ Infrastructure category I to erect tower and share it with service providers as per the following scheme: -
    - The subsidy shall be provided only to those service providers/ Infrastructure providers' category I who are not the beneficiary of USOF scheme within that particular SDCA.

- The mobile tower design should have capacity to accommodate at least three service providers to be eligible for availing subsidy under the proposed license. The passive infrastructure has to be created within one year from the date of registration with USOF administrator to make him eligible for subsidy. No subsidy shall be paid if such infrastructure is not setup to roll out mobile services within one year.
- The service provider/infrastructure provider Category I who is not beneficiary under USOF scheme, erects the tower and share it with three service providers (Not beneficiary of USOF scheme in that SDCA) to roll out mobile services shall also be entitled to subsidy from USO Fund equal to 80% of the amount decided under USOF scheme based on the bidding process, from the date of roll-out of mobile service using this tower.
- If only two service providers not being beneficiary in USOF scheme, share newly erected tower and roll out mobile service, then amount of subsidy payable from USO Fund to service provider/infrastructure provider Category I who erects the tower shall be proportionally reduced compared with amount when tower would be shared between three service providers.
- No subsidy shall be paid if newly erected tower is not shared. This is to encourage concept of infrastructure sharing in rural and remote areas.
- The burden of having mutual agreement for sharing passive infrastructure would be left to the infrastructure provider category I/ service provider who is setting up passive infrastructure. The need is not only to encourage creation of such towers but it has to be achieved within a specified time frame. To ensure this, an infrastructure provider Category I or service provider who is not beneficiary of USOF scheme has to register with USO fund

administrator along with commitment letters from other service providers (Not beneficiary of USOF scheme in that SDCA) who wish to share the tower. The passive infrastructure has to be created within one year from the date of such registration to make him eligible for subsidy.

- A scheme based on the framework envisaged above would be needed to support erection of towers in rural areas not covered under USOF scheme. This will provide level playing field, enhance competition and extend better mobile services in rural areas.
- DoT to evolve a policy to promote the use of non conventional energy sources and a scheme of subsidy per BTS site to service providers using such energy sources.

Recommendations on Growth of Broadband dated 2nd January 2008

- In order to increase the competition, more than two service providers seeking minimum subsidy should be identified. Rollout obligation should be prescribed to ensure the establishment of network and USO subsidy to be provided in a phased manner based on roll out aspect

- To provide connectivity at affordable prices and to encourage use of advanced wireless technologies such as Wi-Max, spectrum in 5.7 GHz, 3.5 GHz and 700 MHz frequency range should be de-licensed or made available at nominal charges. Government's broadband policy mentions that alternative spectrum bands, which are not in high usage and could be deployed for Broadband services shall also be explored and identified. It is recommended that further spectrum should be identified for allocation as de-licensed bands.

De-licensed bands should be technologically neutral. This is in keeping with current trends in international spectrum policy.

- It is recommended that no spectrum fee shall be levied on the usage of CorDECT and similar other technologies in rural/remote areas. Microwave links/any other wireless connectivity in rural area should not be charged any spectrum fee.

- It is recommended that for 450 MHz spectrum usage, the spectrum charges (% revenue share) level should not be increased. For example, before usage of 450 MHz spectrum if the operator was paying X% of AGR as spectrum charges then even after allocation of 450 MHz spectrum the operator should continue to pay same percentage of AGR as spectrum charges. Due to increased revenue base the spectrum charges will be more in absolute terms and this will help in penetration of telecom services deeper into rural areas.

Annexure - B

Other Initiatives in the National and International Area

Apart from TRAI and Government of India, a number of Companies, State Governments and NGOs have also undertaken several rural initiatives of different scales based on the traditional as well as latest technologies. A few projects of such types are discussed below:

ITC e-Choupal

This is a profit driven project run by Indian Tobacco Company (ITC). ITC has initiated an e-Choupal effort that places computers with Internet access in rural farming villages. The e-Choupals serve as both a social gathering place for exchange of information and also an e-commerce hub.

n-Logue

n-Logue is a profit driven project. It currently relies on cor-DECT (cordless-Digital Enhanced Cordless Telecommunications), a fixed Wireless Local Loop (WLL) technology, to provide the backbone to its IP network. Its low costs, ease of deployment, and minimal maintenance requirements make cor-DECT ideally suited for rural use.

DakNet11

DakNet uses wireless technology to provide broadband connectivity. Developed by MIT Media Lab researchers, DakNet has been successfully deployed in remote parts of both India and Cambodia at a cost much less than that of traditional landline solutions.

Bhoomi Project of Karnataka State Government

The Bhoomi project has revolutionized the way people access information of land records. Several of the 7,00,000 land records are available online for banks, judicial courts and hundreds of village kiosks all across the State.

Initiative of Tamilnadu state government

So far 26 software and hardware offerings have been certified which conform to the standards and have been authorized for use in Tamil Nadu Government and its institutions. A “Tamil Software Development Fund” has been set up to encourage the development of innovative Tamil software – the fund has supported seven projects till date.

Gyandoot in Madhya Pradesh

The Gyandoot project was started with the installation of a low cost rural Intranet covering 31 village information kiosks in five Blocks of the district. Villages that function as Block headquarters or hold the weekly markets in tribal areas or are located on major roads (e.g., bus stops) were chosen for establishing the kiosks. Each kiosk caters to about 25 to 30 villages. Each kiosk was expected to earn a gross income of Rs. 4,000 per month.

Rural “e-Seva” (in east Godavari District of A.P.)

The project is a tool to bridge the digital divide in the rural areas and has used Information Technology for providing access to various services to the people living in rural areas. Under this project web enabled rural kiosks termed eSeva centres have been established at the mandal (a sub district unit of administration) level. The project is based on BOOT (Build Operate Own Transfer) Model.

Fisher Friend

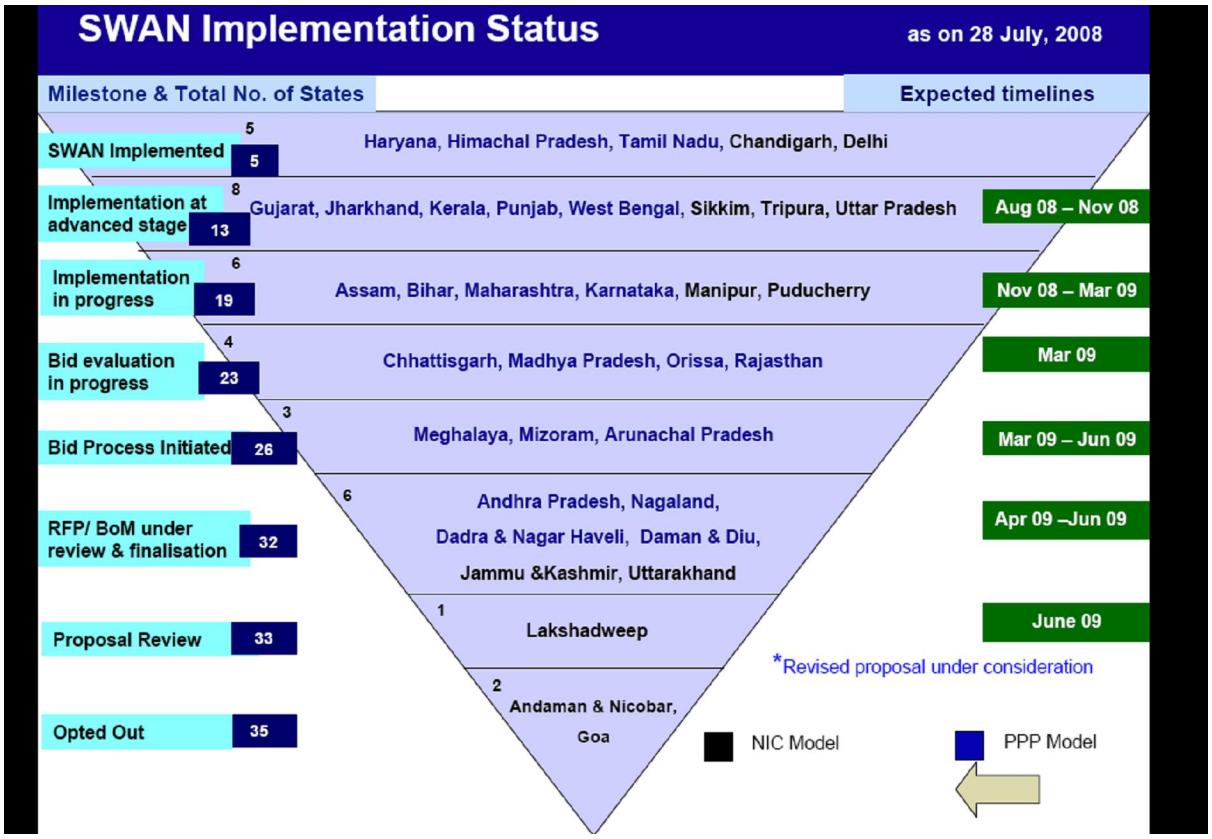
Qualcomm’s Wireless Reach Fisher Friend project is a partnership with MSSRF, TATA Teleservices and Astute that enables fishing communities to earn their livelihood in a safe and proactive manner by leveraging 3G CDMA wireless and ICT technologies.

Fisher Friend is an application that runs on 3G CDMA phones and empowers fishing communities with real-time access to market data. It can

- Save Lives by providing timely weather alerts to survive danger at high seas
- Enhance Livelihoods by providing real-time data on fish migration and market prices
- Increase Knowledge Base by providing updates on government schemes, policies and developments of interest to fishing communities

State Wide Area Network (SWAN)

All the states are developing their own state wide area networks , popularly known as SWANs. The current status is as below :



International Experience

USA:

The FCC (Federal Communication Commission) has taken some steps to encourage the deployment of advanced telecommunication services to rural communities. Some of its program are discussed below:

- Rural Health Care Pilot program

  Under this pilot program, all public and non-profit health care providers may apply for funding to construct a dedicated broadband network that connects health care providers in a state or region. This program will provide funding for up to 85 percent of an applicant's costs of deploying a dedicated broadband network.

- Rural Development Telecommunications Programs of USDA

Apart from FCC, the Rural Development Telecommunications Programs at the USDA (Department of Agriculture of USA) offer a wide array of Loan and Grants designed specifically to facilitate the construction and deployment of advanced, high-speed telecommunications and data networks in rural America.

Malaysia

Some pilot projects are:

- e-Bario Project

  Bario is a remote village in Malaysia. Its objective is to empower the Kelabit community of Bario through ICT. It also aimed at to reduce digital gap between urban and rural communities.

- e-Taninet Project

  The objective of this project was to provide online information and services on agriculture and biotechnology. The main challenge was that only about 15% of target community owned a PC and 20% were computer literate. The project was fully successful and it was declared a success story by international institute for communication and development and world banks information for development.

Kenya

The linked local learning (LLL) process emerged as a response to helping farmers, far-flung habitats, NGOs, Govt. ministries and departments with the massive changes being imposed on the district and village level of their society through policies of decentralization. LLL's main aim was to assist the rural masses to

get some support through linkages and ICT. To develop this network help from various telecom operators was taken.

Korea's KII Project

The Korea Information Infrastructure (KII) was established in Korea (Rep.) in 1995.Under this project, broadband was to be provided to 13.5 mn subscribers with average speed of 20 mbps. To achieve this, government funding was done. A large part was kept for rural and remote areas. Major rural fund was utilized to cover infrastructure building in rural areas.

The Rural – Enlacs project in Chile

This project is a part of an ICT policy to improve education in 3600 rural schools. This involves providing computers and broadband communication. It aimed to improve the rural community standards through education and telecommunication.

Project Rabta Ghar in Pakistan

To provide latest telecommunications and Internet facilities in rural and far-off areas, Pakistan Telecommunication Authority (PTA) has launched a Telecentre project called Rabta Ghar all across the country. In the 1st Phase of the Project, PTA with the support of telecom operators, will establish 400 Rabta Ghar all over the country and the equipment worth Rs. 50,000/- each will be provided free of cost.

Grameen Telecom in Bangladesh

Grameen Telecom (GTC) is a company dedicated towards extending the benefits of the information revolution amongst the rural people of Bangladesh. Currently GTC provides the GSM 900 cellular

mobile phones to the villagers. Grameen Telecom holds 35% share of GrameenPhone Ltd., the company which was awarded a nationwide license for GSM 900 cellular mobile phone services. Grameen Bank provides necessary organizational & infra-structural support to Grameen Telecom towards selecting the Village phone operators from amongst its members and also by collecting the phone bills.

A Grameen Bank member obtains ownership of the phone and provides the services to the people in the adjoining area. GTC supplies necessary hardware and training for operating the phone. The price of phone and the connection fee is paid by GB to GTC while the member pays it back in installments to GB. Unit Office of Grameen Telecom is responsible for the Village Phone operation in the field.

Annexure - C

Tables

Table 6 - Rural vs Urban Telecom Statistics (As on June 08)

Rural vs Urban Telecom Statistics

State / License Area	Wireline Subscribers		Wireless Subscribers		Population#		Teledensity#	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Delhi	0	2437217	0	17464104	1297818	24149597	0.00	82.41
Maharashtra	1246817	2270173	6003522	31459260	60163498	49951168	12.05	67.52
Gujarat	602373	1622080	5657622	13023385	34771949	22670051	18.00	64.60
Andhra Pradesh	966920	1684938	5934383	16681669	59833291	22809376	11.53	80.52
Karnataka	683323	2143369	4075948	14431645	36793332	20967001	12.94	79.05
Tamil Nadu	822476	2961801	4799798	22719697	32437783	35120884	17.33	73.12
Kerala	2496663	1157980	4547705	8164215	25213416	8675584	27.94	107.45
Punjab	620641	1050477	3591127	8867629	16950362	11130638	24.85	89.11
Haryana	364298	552446	2651074	4335403	13852811	6609244	21.77	73.95
Uttar Pradesh including uttranchal	640220	2157357	10008466	22726341	153484162	43018035	6.94	57.84
Rajasthan	583176	1144732	6349475	8832415	49458372	15447628	14.02	64.59
Madhya Pradesh including Chattisgarh	349208	1411530	2703074	12004613	68349524	24153476	4.47	55.55
West Bengal	574568	2057702	5477813	13761304	62861544	24869123	9.63	63.61
Himachal Pradesh	321763	82691	1532259	891395	5909279	708055	31.37	137.57
Bihar including Jharkhand	499690	916771	2916892	10318705	107566850	16854817	3.18	66.66
Orissa	293836	475017	2314852	3470288	33294465	6483868	7.84	60.85
Assam	120251	300965	1171470	3193622	25304501	4256832	5.10	82.09
North East	96451	238144	424164	1907337	10282455	3085211	5.06	69.54
Jammu & Kashmir	46462	202002	671412	1781645	8334979	2974355	8.61	66.69
All India	11329136	24867392	70831056	216034672	806160391	343934943	10.19	70.04

Approximate Coverage of Mobile and Electricity in Rural

Table 7- Approximate Coverage of Mobile and Electricity in Rural (As on March 08)

Sr No	State / Service Area	Total No. of Districts	DHQ Covered by Mobile	Total No. of inhabited Villages (2001)	Villages Covered by Mobile	Villages Covered by electricity	% Rural Electric coverage	% rural Mobile coverage
1	Andhra Pradesh	23	23	26613	19393	26565	100	73
2	Assam	23	23	25124	10041	19081	76	40
3	Bihar including Jharkhand	59	59	68369	48050	26892	39	70
4	Delhi	9	9	158	158	158	100	100
5	Gujrat	28	28	18159	11856	17940	99	65
6	Haryana	20	20	6764	6764	6759	100	100
7	Himachal Pradesh	12	12	17495	8370	16891	97	48
8	Jammu and Kashmir	14	14	6417	3018	6301	98	47
9	Karnataka	28	28	27481	25000	26771	97	91
10	Kerala including Lakshdweep	15	15	1372	1372	1372	100	100
11	MP including Chhattisgarh	66	66	71861	23928	69006	96	33
12	Maharashtra including Goa	37	37	41442	16386	40351	97	40
13	North East	52	30	14803	2506	10119	68	17
14	Orissa	30	30	47529	28000	37663	79	59
15	Punjab	21	21	12301	10845	12228	99	88
16	Rajasthan	32	32	39752	26835	37276	94	68
17	Tamil Nadu including Puducherry	34	34	15492	15492	15480	100	100
18	U P including Uttaranchal	83	83	113703	112761	70173	62	99
19	West Bengal including Andaman & Sikkim	24	24	38896	36337	32110	83	93
	Total Number	610	588	593731	407112	473136	80	69

Table 8 - Towers required for rural area

Calculation of towers required for Rural area in 2010 (All figures are in million)				
	Item	Jun-08	2010	Remarks
1	Total Population	1150	1189	
2	Urban Population	345	357	30 % of total population
3	Rural Population	805	832	70 % of total population
4	Total subscribers	287	500	DoT Target -500 million
5	Total urban	244	321	Assuming Urban teledensity 90 % in 2010
6	Total rural	43	179	total - urban (Rural teledensity will be 21.5 %)
7	Total wireless subscribers	287	460	DoT Target -500 million in which it assumed 40 million are wire line
8	Rural wire line	12	12	Assuming no net decrease
9	Urban wire line	28	28	Assuming no net decrease
10	Urban wireless	216	293	total urban - urban wire line
11	Rural wireless	71	167	wireless total - wireless urban

Total Projected Rural Wireless Additions from Jun 2008 to 2010=167-71=96 million

Assumption-35.5 million (Half of June 2008) rural wireless subscriber will be added by sharing present rural towers

The targeted rural customers derived in terms of estimated households of rural population can be seen at Table 9

Total additional BTSs required for Rural areas	60500	Assuming 1000 subscriber per BTS
Total additional towers required	30250	Assuming two operators share a tower
Towers Initiated by USOF	19000	Both phase-I and phase - II
Net additional towers required in rural areas to meet target of 500 mn phones in 2010	11250	

Table 9 - Targets

	Targets		
Target for Mobile Wireless subscribers			
a	Total Population	1,150	million
b	Rural Population	805	million
c	Approx.Rural House holds (Average 4.5/ household)	179	million
d	Present rural wireless subscribers	91	million
e	Target rural wireless subscribers (c-d)	88	million
Target for Rural Broadband			
a	All the schools /Jr collegs (appx.)	900,000	
	Assumption		
	80% of Primary Schools, 70% of middle Schools, 60% of secondary / Junior colleges are in the rural areas		
b	Rural Primary Health Centers	22,669	
c	Rural Post Offices	125,439	
d	Rural Railway stations	4,996	
	Assumption		
	70% of total railway stations are in rural areas		
e	Rural Police Stations	59,373	
	Assumption		
	Presence of one police station in every 10 villages		
f	Gram Panchayat/	265000	
	(Total inhabited villages as per 2001 census)		
g	Common Service Centers	328,731	
	Target connections for rural Broadband	1,706,208	

भारतीय दूरसंचार विनियामक प्राधिकरण
ए–2 / 14, सफदरजंग इन्क्लेव, नई दिल्ली–110029
फैक्स : 91-11-26103294

TELECOM REGULATORY AUTHORITY OF INDIA
A-2/14, SAFDARJUNG ENCLAVE, NEW DELHI-110029
Fax : 91-11-26103294

File No. 101-19/2006-MN

Date: 25.05.2006

To

Mr. Ashok Kumar
Joint Administrator (Technical),
Department of Telecommunications,
Office of the Administrator (USF)
Room No.706, Sanchar Bhavan
20, Ashoka Road
New Delhi – 110 001.

Subject: Ninth Meeting of Inter-Ministerial Advisory committee on Universal Service Obligation Fund.

This has reference to your letter no. 30-9/2006-USF (Vol.II) dated 18.05.2006 forwarding the "Record Note of Discussion" of the abovementioned meeting.

2. In this regard, please note that the "Record note of the Discussion" mentioned above, does not include TRAI's views on subsidy for providing mobile services in rural areas. A copy of the written views of TRAI (copy enclosed) submitted during the meeting may be included in the above mentioned "Record note of the Discussion".

(S.M Sharma)
Deputy Advisor (MN)

TRAI's views on subsidy for providing mobile services in rural areas

Office of the Administrator, USO Fund vide their letter dated 10.04.2006 has informed TRAI that the ninth meeting of the Inter-Ministerial Advisory Committee on Universal Service Obligation Fund shall be held under the Chairmanship of Administrator, USO Fund, Department of Telecom on 21st April, 2006.

2. Agenda for the meeting is as follows:
   a. Presentation on ongoing activities of USOF.
   b. Presentation on shared infrastructure for provision of cellular mobile service in rural areas.
   c. Provision of Broadband connectivity in rural areas
   d. Any other point with the permission of the chair.

3. Regarding cellular mobile services in rural areas, the background material for the meeting mentions that a proposal is under active consideration of the Government to provide support for shareable infrastructure to the eligible access service providers and infrastructure service providers and to access providers for installing non-shareable infrastructure for providing cellular mobile services in rural remote areas of the country.

4. To enable such support, a bill to amend the Indian Telegraph Act is proposed to be introduced during the Budget Session 2006. Rules governing the implementation of USO shall also undergo a change subsequently. TRAI in its recommendations on "Growth of telecom services in rural India" has deliberated on this issue and decided that to cover mobile services under the ambit of USOF support, the amendment of Telegraph Act is not necessary and the objective could be achieved by defining basic services in UASL and cellular license agreements in accordance with WTO definitions. However, if the DoT is of the view that to enable support to mobile services from USOF, amendment in the Indian Telegraph Act is required then it is requested that the entire process must be expedited to enable the implementation of the proposed scheme at the earliest.

5. In the abovementioned background material for the meeting, salient features of the model for giving subsidy support to mobile services in the rural areas is also discussed. As per the proposed scheme, Infrastructure Providers shall be eligible to bid for shareable components- Part A: land, tower, boundary wall, security cabin, electrical load, power back up) whereas Access service Providers shall be eligible to bid for - Part A as well as non-sharable components - Part B(outdoor BTS equipment with antennae and a portion of the backhaul).

6. While preparing the recommendations on 'Growth of Telecom Services in Rural Areas' the involvement of infrastructure providers for giving subsidies was also thought of. However, after intensive deliberations, it was decided that as the service is to be provided by the access providers therefore only they should be involved and in case they desire, they can subcontract the installation of passive infrastructure to the infrastructure providers and also pass on the subsidy.

7. In case the proposed scheme is to be implemented, DoT is requested to address the following issues while designing the bidding rules and the mechanism so that the objective of providing telecommunication facilities in the rural areas is achieved and there is no loss to the government exchequer:

i) It is possible that till the period when the bidding process of subsidy disbursement is completed, some of the identified uncovered areas are covered by the service providers. In such eventuality there is possibility that time and money involved in the process may go waste.

ii) There is a possibility that successful the bidder for Part A of the subsidy completes the work but the operator of Part B does not starts the installation. In such an eventuality, to safeguard the payment made to the bidder A, it is necessary to ensure that the PBG of Operator B should be more than the upfront payment made to bidder A.

iii) Criterion for short listing of the infrastructure providers should be clear and transparent.

iv) It is understood that the approximate location of the towers will be decided by the USF and the successful bidder shall cover the complete area within 12 months period. It is possible that the priority for network roll out of the access provider may not match with the priorities of the infrastructure provider and this could lead to delay in the roll out.

v) As per the scheme, electrical load and power back up are shareable components to be provided and maintained by the successful bidder for part 'A' of the subsidy support. In case the successful bidder for part 'A' and part 'B' are different then there is a strong possibility of conflicts between them relating to proper operation and maintenance of these components.

vi) There is a possibility of cartelisation amongst service providers during bidding for non-shareable components, which may lead to high bidding amount. While designing the bidding mechanism this possibility should also be kept in mind so that the bidding amounts are not unreasonable high.

vii) It should be ensured that the towers are installed outside the municipal limits of the cities/towns.

21-04-06

Sudhir Gupta
Advisor(MN)
TRAI

NRIPENDRA MISRA
Chairman
TELECOM REGULATORY AUTHORITY OF INDIA

DO No.101-19/2006-MN

69

Date 14.11.2006

Dear Shri Mathur,

Infrastructure sharing in telecom is an important measure to reduce costs. It is useful in the start up phase to build coverage quickly and in the longer-term scenario to build more cost effective coverage in un-serviced areas. In the Indian context both in urban and rural areas infrastructure sharing should be adopted as an imperative for sustaining telecom growth. The present scheme of infrastructure sharing framed by USOF was briefly discussed with the administrator-USOF. TRAI has certain concerns regarding the structure and also implementation. It is being enumerated through this letter

2. The DOT has launched a scheme for extending financial support from Universal Service Obligation Fund (USOF) for setting up of infrastructure for mobile services in rural and remote areas of the country. The support from the scheme has been structured in two parts:

(a) Passive infrastructure comprising of shareable components like Land, Tower, Electrical connection, Power backup (for 3 operators), Boundary wall and Security Cabin.

(b) Active infrastructure comprising of non-sharable components like Base Transceiver stations (BTS) equipment with associated antennas and part of the backhaul.

3. USOF Administrator has sought expression of interest for setting up and managing passive infrastructure (Part A). It is understood that process for part 'B' would soon follow. It is a welcome step for boosting penetration of telecom facility in rural India. However, there are few areas of concern which need to be addressed for a successful implementation of this scheme:

I. The successful bidder in the tender for passive infrastructure will have full control on the implementation of the scheme. If the winner of works is not able to execute the passive infrastructure in a prescribed duration, the entire scheme could be delayed. This is particularly relevant as not only telecom service providers but also infrastructure providers have been made eligible for undertaking passive infrastructure works

II. The tender process for part 'A' i.e., shareable passive infrastructure and part 'B' i.e., non-sharable components (mainly active) have been structured separately. This could lead to a coordination problem both in terms of timing and activisation of the facility particularly where detailed modalities for sharing of the towers with telecom service providers is an open ended agenda depending on negotiated terms and conditions of sharing.

III. The present scheme envisages participation of three services providers. In many telecom circles more than three service providers could be seeking presence in rural areas. It may raise the issue of level playing field. Therefore, alternative opportunities of similar nature should be available if the broader objective of infrastructure sharing is to be ensured.

IV. A major hurdle faced by the service providers in expanding their network in rural and remote areas is absence of backhaul connectivity. Setting up of backhaul connectivity from the towers (BTSs) to the BSCs apart from being a time consuming process is a high cost exercise, as the returns on the capital are initially quite low. It is assumed that BSCs to MSC connectivity already exists as both are located in urban areas. The proposed scheme of USOF Administrator has taken into consideration only part of the backhaul (as per the information available from USOF, only a single wireless hop is being considered in the proposed scheme). Since the cost of installing backbone infrastructure in semi-urban and rural areas for a service provider can be substantial, this may act as a deterrent to the service providers to go into remote rural areas.

V. Currently, there are around 29000 rural exchanges in the country and most of these exchanges are connected through optical fibre cable. Being used for connecting the rural exchanges, it can be safely presumed that this fibre is heavily underutilized and by investing some incremental amount this national resource can be gainfully used for providing the backhaul connectivity from the BTSs to BSCs in the proposed scheme. This, apart from being cost effective measure will also save unnecessary duplication of infrastructure by the service providers. The service provider owning the optical fibre (in most of the cases, it is BSNL) can be provided an incentive to lease the fibre and also to charge a discounted price from the service providers seeking the connectivity. The expenditure incurred on providing this incentive to the optical fibre owner can be funded from the USOF.

VI. It is noted that the infrastructure provider is required to arrange land on lease for a minimum period of 5 years. This period appears short as renewal could create problems in the context of conflicting local interest.

VII. The commitments sought from infrastructure provider who will maintain the created infrastructure, is for a minimum period of 5 years. This is also very short. It may lead to disagreement in the 6th year as the commercial considerations of the infrastructure provider and telecom service provider may not match.

The final implementation of the present scheme may take anything from 6 to 9 months. roll-out in the interim period in rural areas may be adversely affected. Therefore, it is felt that ıe operators who have already rolled out their network and /or who roll out in future on their ı in rural/remote areas and share the infrastructure with other service providers should also be ible for financial subvention from the USOF(may be at reduced scale).

With kind regards,

Yours sincerely,

(Nripendra Misra)

D.S Mathur,
etary,
artment of Telecommunications,
char Bhavan, New Delhi.

Annexure E

Mobile Banking in India - Operative Guidelines for Banks

1. Introduction

1.1 Mobile phones as a medium for extending banking services have off-late been attaining greater significance. The rapid growth in users and wider coverage of mobile phone networks have made this medium an important platform for extending banking services to customers. With the rapid growth in the number of mobile phone subscribers in India (about 261 million as at the end of March 2008 and growing at about 8 million a month), banks have been exploring the feasibility of using mobile phones as an alternative channel of delivery of banking services. Some banks have started offering information based services like balance enquiry, stop payment instruction of cheques, transactions enquiry, location of the nearest ATM/branch etc. Acceptance of transfer of funds instruction for credit to beneficiaries of same/or another bank in favor of pre-registered beneficiaries have also commenced in a few banks. In order to ensure a level playing field and considering that the technology is relatively new, Reserve Bank has brought out a set of operating guidelines for adoption by banks.

1.2 For the purpose of these Guidelines, “mobile banking transactions” is undertaking banking transactions using mobile phones by bank customers that involve credit/debit to their accounts.

2. Regulatory & Supervisory Issues

2.1 Only banks which are licensed and supervised in India and have a physical presence in India will be permitted to offer mobile banking services.

2.2 The services shall be restricted only to customers of banks and/or holders of debit/credit cards issued as per the extant Reserve Bank of India guidelines.

2.3 Only Indian Rupee based domestic services shall be provided. Use of mobile banking services for cross border inward and outward transfers is strictly prohibited.

2.4 Banks may also use the services of Business Correspondent appointed in compliance with RBI guidelines, for extending this facility to their customers.

2.5 The guidelines issued by the Reserve Bank on 'Risks and Controls in Computers and Telecommunications' vide circular DBS.CO.ITC.BC. 10/ 31.09.001/ 97-98 dated 4th February 1998 will apply mutatis mutandis to mobile banking.

2.6 The guidelines issued by Reserve Bank on "Know Your Customer (KYC)", "Anti Money Laundering (AML)" and Combating the Financing of Terrorism (CFT) from time to time would be applicable to mobile based banking services also.

2.7 Only banks who have implemented core banking solutions would be permitted to provide mobile banking services.

2.8 Banks shall file Suspicious Transaction Report (STR) to Financial Intelligence Unit – India (FIUIND) for mobile banking transactions as in the case of normal banking transactions.

3. Registration of customers for mobile service

3.1 Banks shall put in place a system of document based registration with mandatory physical presence of their customers, before commencing mobile banking service. Reserve Bank would consider relaxation in specific cases while approving the proposals of banks.

3.2 On registration of the customer, the full details of the Terms and Conditions of the service offered shall be communicated to the customer.

4 Technology and Security Standards

4.1 Information Security is most critical to the business of mobile banking services and its underlying operations. Therefore, technology used for mobile banking must be secure and should ensure confidentiality, integrity, authenticity and non-repudiability. An illustrative, but not exhaustive framework is given at Annex-I.

5. Inter-operability

5.1 Banks offering mobile banking service must ensure that customers having mobile phones of any network operator is in a position to avail of the service. Restriction, if any, to the customers of particular mobile operator(s) is permissible only during the initial stages of offering the service, up to a maximum period of six months subject to review.

5.2 The long term goal of mobile banking framework in India would be to enable funds transfer from account in one bank to any other account in the same or any other bank on a real time basis irrespective of the mobile network a customer has subscribed to. This would require interoperability between mobile banking service providers and banks and development of a host of message formats. To ensure inter-operability between banks, and between their mobile banking service providers, banks shall adopt the message formats like ISO 8583, with suitable modification to address specific needs.

6. Clearing and Settlement for inter-bank funds transfer transactions

6.1 To meet the objective of a nation-wide mobile banking framework, facilitating inter-bank settlement, a robust clearing and settlement infrastructure operating on a 24x7 basis would be necessary. Pending creation of such a national infrastructure, banks may enter into bilateral or multilateral arrangement for inter-bank settlements, with express permission from Reserve Bank of India, unless such arrangements have been authorized by the Reserve Bank under the Payment and Settlement System Act, 2007.

7. Customer Complaints and Grievance Redressal Mechanism

7.1 The customer /consumer protection issues assume a special significance in view of the fact that the delivery of banking services through mobile phones is relatively new. Some of the key issues in this regard are given at Annex-II.

8. Transaction limit

8.1 For the present, banks are permitted to offer this facility to their customers subject to a daily cap of Rs. 5000/- per customer for funds transfer and Rs.10,000/- per customer for transactions involving purchase of goods/services.

8.2 Banks may also put in place monthly transaction limit depending on the bank's own risk perception of the customer.

9. Board approval

9.1 Approval of the Board of Directors (Local Board in case of foreign banks) for the product, as also the perceived risks and mitigation measures proposed to be adopted must be obtained before launching the scheme.

10. Approval of Reserve Bank of India

10.1 Banks wishing to provide mobile banking services shall seek prior one time approval of the Reserve Bank of India, by furnishing full details of the proposal.

Annex- I

Technology and Security Standards

1. The security controls/guidelines mentioned in this document are only indicative. However, it must be recognised, the technology deployed is fundamental to safety and soundness of any payment system. Therefore, banks are required to follow the Security Standards appropriate to the complexity of services offered, subject to following the minimum standards set out in this document. The guidelines should be applied in

a way that is appropriate to the risk associated with services provided by the bank and the system which supports these services.

2. Banks are required to put in place appropriate risk mitigation measures like transaction limit (per transaction, daily, weekly, monthly), transaction velocity limit, fraud checks, AML checks etc. depending on the bank's own risk perception, unless otherwise mandated by the Reserve Bank.

3. Authentication

Banks providing mobile banking services shall comply with the following security principles and practices for the authentication of mobile banking transactions:

a) All mobile banking shall be permitted only by validation through a two factor authentication.

b) One of the factors of authentication shall be mPIN or any higher standard.

c) Where mPIN is used, end to end encryption of the mPIN is desirable, i.e. mPIN shall not be in clear text anywhere in the network.

d) The mPIN shall be stored in a secure environment.

4. Proper level of encryption and security shall be implemented at all stages of the transaction processing. The endeavor shall be to ensure end-to-end encryption of the mobile banking transaction. Adequate safe guards would also be put in place to guard against the use of mobile banking in money laundering, frauds etc. The following guidelines with respect to network and system security shall be adhered to:

a) Implement application level encryption over network and transport layer encryption wherever possible.

b) Establish proper firewalls, intruder detection systems (IDS), data file and system integrity checking, surveillance and incident response procedures and containment procedures.

c) Conduct periodic risk management analysis, security vulnerability assessment of the application and network etc at least once in a year.

d) Maintain proper and full documentation of security practices, guidelines, methods and procedures used in mobile banking and payment systems and keep them up to date based on the periodic risk management, analysis and vulnerability assessment carried out.

e) Implement appropriate physical security measures to protect the system gateways, network equipments, servers, host computers, and other hardware/software used from unauthorized access and tampering. The Data Centre of the Bank and Service Providers should have proper wired and wireless data network protection mechanisms.

5. The dependence of banks on mobile banking service providers may place knowledge of bank systems and customers in a public domain. Mobile banking system may also make the banks dependent on small firms (i.e. mobile banking service providers) with high employee turnover. It is therefore imperative that sensitive customer data, and security and integrity of transactions are protected. It is necessary that the mobile banking servers at the bank's end or at the mobile banking service provider's end, if any, should be certified by an accredited external agency. In addition, banks should conduct regular information security audits on the mobile banking systems to ensure complete security.

6. For mobile banking facilities which do not contain the phone number as identity, a separate login ID and password is desirable to ensure proper authentication.

Annex-II

Customer Protection Issues

1. Any security procedure adopted by banks for authenticating users needs to be recognized by law as a substitute for signature. In India, the Information Technology Act, 2000, provides for a particular technology as a means of authenticating electronic record. Any other method used by

banks for authentication is a source of legal risk. Customers must be made aware of the said legal risk prior to sign up.

2. Banks are required to maintain secrecy and confidentiality of customers' accounts. In the mobile banking scenario, the risk of banks not meeting the above obligation is high. Banks may be exposed to enhanced risk of liability to customers on account of breach of secrecy, denial of service etc., on account of hacking/ other technological failures. The banks should, therefore, institute adequate risk control measures to manage such risks.

3. As in an Internet banking scenario, in the mobile banking scenario too, there is very limited or no stop payment privileges for mobile banking transactions since it becomes impossible for the banks to stop payment in spite of receipt of stop payment instruction as the transactions are completely instantaneous and are incapable of being reversed. Hence, banks offering mobile banking should notify the customers the timeframe and the circumstances in which any stop-payment instructions could be accepted.

4. The Consumer Protection Act, 1986 defines the rights of consumers in India and is applicable to banking services as well. Currently, the rights and liabilities of customers availing of mobile banking services are being determined by bilateral agreements between the banks and customers. Taking into account the risks arising out of unauthorized transfer through hacking, denial of service on account of technological failure etc. banks providing mobile banking would need to assess the liabilities arising out of such events and take appropriate counter measures like insuring themselves against such risks, as in the case with internet banking.

5. Bilateral contracts drawn up between the payee and payee’s bank, the participating banks and service provider should clearly define the rights and obligations of each party.

6. Banks are required to make mandatory disclosures of risks, responsibilities and liabilities of the customers on their websites and/or through printed material.

7. The existing mechanism for handling customer complaints/grievances may be used for mobile banking transactions as well. However, in view of the fact that the technology is relatively new, banks should set up a help desk and disclose the details of the help desk and escalation procedure for lodging the complaints, on their websites. Such details should also be made available to the customer at the time of sign up.

8. In cases where the customer files a complaint with the bank disputing a transaction, it would be the responsibility of the service providing bank, to expeditiously redress the complaint. Banks may put in place procedures for addressing such customer grievances. The grievance handling procedure including the compensation policy should be disclosed.

9. Customers complaints / grievances arising out of mobile banking facility would be covered under the Banking Ombudsman Scheme.

10. The jurisdiction of legal settlement would be within India.