

Japan International Cooperation Agency (JICA)

Ministry of Infrastructure (MOI)

Post and Telecommunication Authority (PTA)

THE MASTER PLAN STUDY
FOR
DEVELOPMENT OF RURAL TELECOMMUNICATION
SYSTEM
IN
MONGOLIA
FINAL REPORT
VOLUME IV
SUPPORTING

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FEBRUARY 2003

Japan Telecommunications Engineering and Consulting Service (JTEC)
and
Pacific Consultants International (PCI)
TOKYO, JAPAN

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CURRENCY AND EQUIVALENT UNITS

(As of July, 2002)

Currency Unit = Mongolian Tugrik (Tg)

US\$ 1.00 = Tg 1,099.47

Tg 1,000 = US\$ 0.9095

Currency Unit = Japanese Yen (JPY)

JPY 1,000 = US\$ 8.361

US\$ 1.00 = JPY 119.60

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PART-1

MASTER PLAN

ANNEX 1

MINUTES OF MEETINGS

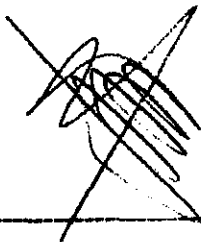
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Minutes of Meeting
On
The Inception Report of
The Master Plan Study
for Development of Rural Telecommunication System in Mongolia
Agreed Upon Between Ministry Of Infrastructure/ Post and Telecommunication Authority
and JICA Master Plan Study Team

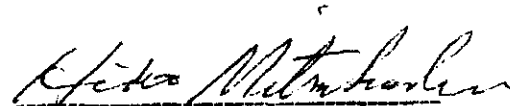
Ulaanbaatar 5th April , 2002



Mr. Kh. Amarsaikhan
Director General,
Department of Economic
Cooperation Management and
Coordination,
Ministry of Finance and Economy



Mr. G. BATTUR
Director General,
Post and Telecommunication Authority

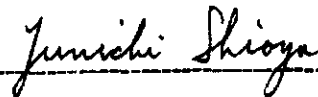


Mr. Hideo MITSUHASHI
Leader,
Master Plan Study Team of JICA

Witness:



Dr. J. Sereeter
Director General,
Policy and Coordination Department of Roads
Transportation, Information,
Communications & Tourism,
Ministry of Infrastructure, Mongolia



Mr. Junichi SHIOYA
Leader,
JICA Advisory Committee

Discussions on the Inception Report for the Master Plan Study for Development of Rural Telecommunication System in Mongolia were made from 1st to 4th April, 2002.

I. Contents of discussion and agreed items of the first meeting held on 1st April, 2002 are as follows;

1. Time and Date: 1st April, 2002
 - (1) 11:00 to 12:30 Presentation of Inception Report
 - (2) 14:30 to 17:00 Discussion on Inception Report
2. Venue: Conference Room of Post and Telecommunication Authority (PTA)
3. Attendees: See Attachment-1 List of Attendees
4. Summary of the Meeting

Key discussion items that are agreed upon by both sides for Inception Report

(1) Assignment of Counterparts of Mongolian Sides

Post and Telecommunication Authority assigned every counterpart of Mongolian sides and introduced the counterparts to Japanese sides, as listed in Attachment-2.

(2) Sites of the Study

As the results of discussion, both sides agreed that the number of Aimag and Sums necessary for the Study shall be 21 Aimags, including Bagannuur and Nalaikh satellite cities of Ulaanbaatar, and 356 Sums and equivalent governmental entity in order to achieve the aim of formulating the Master Plan for rural telecommunication system in Mongolia. The concrete name shall be identified in reference to City List of Mongolia through Mongolian sides.

In addition, HF or VHF Radio Transceivers that have been installed at Bag sites by JICA project should be studied for connection of the existing Public Switched Telephone Network (PSTN) in rural areas.

(3) Sites of Field Survey during the First Study in Mongolia

As the results of discussion, both sides agreed that the number of Aimag for the field survey shall be five (5) Aimags and the number of Sums to be surveyed should be 60-70 sums based upon tentative time schedules of field survey from 14th April to 31st May, 2002 by JICA Study Team members, Mongolian counterparts and local consultant, as shown in Attachment-3.

(4) Approval by Steering Committee

Both sides agreed that the reports of Inception, Progress, Interim, Draft Final and Final shall be evaluated for the final approval by the Steering Committee at every time of the submission when the Master Plan Study Team should prepare in due time, as described in Attachment-4. Attachment-5 shows the list of the Steering Committee members.

II. A series of discussions on the said Master Plan Study were made on 2nd and 3rd April, and the Inception Report was approved by the Steering Committee held on 4th April, 2002.

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Attachment-1 List of Attendees

Mongolian Side

1. Ministry of Infrastructure (MOI)
Mr. T. Naranmandah, Chief Officer
Mr. Amgalanbat, Officer

2. Post and Telecommunication Authority (PTA)
 - (1) Mr. G. Battur, Director General
 - (2) Mr. B. Davaatseren, Deputy Director General
 - (3) PhD. TS. Bold, Director of Network, Planning and Project Implementing Department
 - (4) Dr. N. Nansaljav, Senior Officer
 - (5) Mr. Ganbat
 - (6) Mr. Uskhbayar
 - (7) Mr. Davaajav
 - (8) Mr. Bilgee
 - (9) Mr. Ulziibayar
 - (10) Mr. Naranbaatar
 - (11) Ms. Togos
 - (12) Mr. Zolbayar
 - (13) Mr. Tseveenjav

Japanese Side

1. JICA Advisory Committee
 - (1) Mr. Shioya, Leader of Advisory Committee (MPHPT)
 - (2) Mr. Ishizuka, Member of Advisory Committee (MPHPT)

2. JICA Master Plan Study Team
 - (1) Mr. Hideo Mitsuhashi, Team Leader
 - (2) Mr. Suzuo Uchiyama
 - (3) Mr. Yasuo Ishihara
 - (4) Mr. Hideaki Ishigaki
 - (5) Mr. Katsuhei Kubo
 - (6) Mr. Yukio Negishi
 - (7) Ms. Sanae Abiko

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Attachement - 1

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Attachment-2

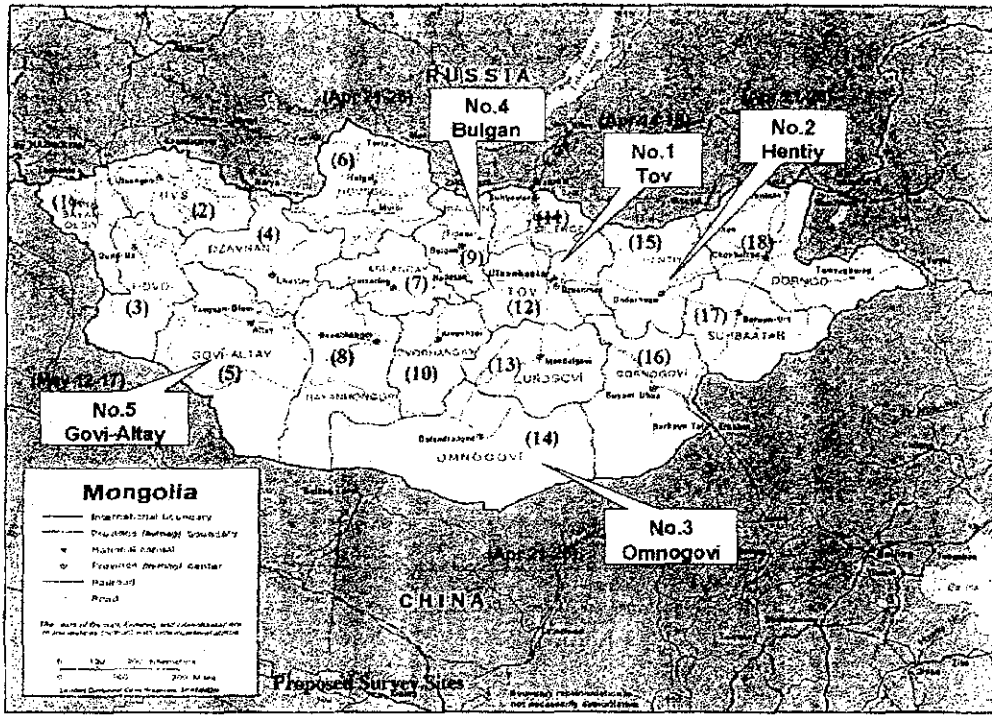
PTA/JICA Master Plan Study Team Counterparts List

April 1, 2002

Master Plan Tasks	Name of Mongolia CP	Name of Japanese Members
Team-Leader/Telecommunications Service	N. Nansaljav (368417)o (362062)h (99121847)m	H. MITSUHASHI (99147111)m
Socio-economic/Financial Analysis	T. Ganbat (368417)o B. Tseveenjav (323723)o	K. KUBO
Rural Development	D. Naranbayar (MTC) (99262037)m (310902)o N. Baatarsuren (368417)o	M. KUSANO
Telecommunications Demand Forecast	Ts. Usukhbayar (368417)o (302519)h Ch. Davaajav (368417)o (99169336)m	S. UCHYAMA (99143993)m
Network Plan/Traffic Forecast/Switching System Facilities Plan	N. Bilgee (99169865)m (368417)o B. Altangerel (99173829)m Ch. Zolbayar (368417)o (99169336)m	Y. ISHIHARA (99110152)m
Radio System/International Telecommunications System Facilities Plans/Radio Frequency Management	M. Naranbaatar (304257)o	H. ISHIGAKI (99157997)m
Outside Plan/Access Network Plans	N. Bilgee (99169865)m (368417)o B. Altangerel (99173829)m B. Kharkhuu (364682)o	M. OKAMOTO (Mr. ISHIGAKI)
Transmission System Facilities Plan/Circuit Calculation	N. Baatarsuren (368417)o D. Naranbayar (MTC) (99262037)m (310902)o	T. HOSODA (Mr. ISHIGAKI)
Power Supply Facilities Plan	D. Agchbayar (361682)o	T. KASAI
IT Development Plan/IT Demand Forecast	Ch. Zolbayar (364682)o (99150547)m Ts. Usukhbayar (368417)o (302519)h	N. MIHARA
Operation and Maintenance Plan	T. Ochir(3003310)o (99195682)m	I. MARUYAMA
Organization /Institution/Human Resources Development Plan	Ts. Bold (368435) o (99198300)m B. Amgalanbat (MOID)	M. TANAKA
PTA Interpreter	Kh. Togos (369825)o	S. ABIKO
Coordination	D. Saranfuya	

Attachment - 2

Attachement-3 Field Survey Sites



Note Dates parenthesised show the field survey period to be conducted by the joint group of JICA Study Team, Mongolian counterparts and Local Consultant. The Local Consultant will continue additional surveys for two (2) weeks independently.

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Attachement - 3

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Attachement-4 Reporting Schedule

Item	Work Period											
	3	4	5	6	7	8	9	10	11	12	1	2
Work Schedule	[Gantt chart showing work periods for each item]											
Reporting	IC/R				P/R	IT/R			W/P	DF/R		F/R
Duty in charge	Name											
1	H. MITSUBASHI											
2	K. KUBO											
3	M. KUSANO											
4	S. UCHIYAMA											
5	Y. ISHIHARA											
6	H. ISIGAKI											
7	M. OKAMOTO											
8	T. HOSODA											
9	T. KASAI											
10	N. MIHARA											
11	I. MARUYAMA											
12	M. TANAKA											
13	S. ABIKO											
14	Y. NEGISHI											

IC/R: Inception Report, P/R: Progress Report, IT/R: Interim Report, W/P: Working Paper, DF/R: Draft Final Report, F/R: Final Report. Each Report to be approved by Steering Committee.

Work in Mongolia
Work in Japan

Attachment-5 List of the Steering Committee Members for the Master Plan Study for Rural Telecommunication System in Mongolia

Chairman:

Mr. Tsegmed TSENGEL, State Secretary, Ministry of Infrastructure, Mongolia.

Vice-chairman:

PhD. Javchig SEREETER, Director General, Policy and Coordination Department of Roads, Transport, Information, Communications & Tourism.

General Secretary:

Mr. T. Naranmandakh, Chief Officer, Policy and Coordination Department of Roads, Transport, Information, Communications & Tourism.

Members:

Mr. Kh. Amarsaikhan, Director-General, Department of Economic Cooperation, Management and Coordination, MOFE.

Mr. D. Tsogtbaatar, Deputy Director of Multilateral Cooperation Department, MOFA.

Ms. Gerelchuluun, Head of Foreign Relations Department, Ministry of Justice and Home Affairs.

Ms. Kh. Oyuntsetseg, Director, Trade and Cooperation, Ministry of Industry and Trade.

Mr. G. Basanjav, ITA Academician, Director, Policy and Coordination Department of Roads, Transport, Information, Communication & Tourism, MOI.

Mr. D. Naranpurev, Head of International Cooperation Division, MOI.

Mr. B. Battogtokh, Officer of Information, Monitoring and Evaluation Department, MOI.

Mr. G. Battur, Director General, PTA.

**Minutes of Meetings on
the Progress Report of the Master Plan Study
for Development of Rural Telecommunication System in Mongolia
between Ministry of Infrastructure / Post and Telecommunication Authority
of Mongolia and Japan International Cooperation Agency**

Japan International Cooperation Agency (JICA) Study Team (hereinafter referred to as "Team"), Ministry of Infrastructure (hereinafter referred to as "MOI") and Post and Telecommunication Authority (hereinafter referred to as "PTA") had meetings on June 28, 2002 through July 2, 2002 at the headquarters of MOI and PTA in Ulaanbaatar.

A list of participants for the meetings is given in Attachment to this Minutes.

In the meeting on June 28, 2002, the Team submitted 20 copies of the Progress Report for "The Master Plan Study for Development of Rural Telecommunications System in Mongolia" (hereinafter referred to as "the Study") to MOI and PTA.

Through a series of meetings, MOI and PTA and the Team discussed the contents of the Progress Report.

1. The following matters in the Progress Report were explained by the Team mainly:
 - (a) Field survey (rural development, socio-economic, telecommunications facilities, data/collection and its analysis).
 - (b) Demand forecast for the fixed and mobile telephones (national level demand forecast method and demand distribution method to Aimag level)
 - (c) Development framework, target and strategies to formulate the Master Plan Study up to the year of 2020.
 - (d) Policy and procedures for the selection method of the candidate priority projects for the Feasibility Study.
 - (e) On-the-job trainings, including the workshops.
 - (f) Proposed schedule for the preparation of the Interim Report and the Feasibility Study.

2. The following matters were concluded through the discussion between MOI/PTA and the Team:
 - (a) Demand forecast method and the further actions.
 - (b) Framework, target and strategies and the further actions.
 - (c) Network migration and the further actions.
 - (d) Selection procedures of the candidate priority projects and the Feasibility Study projects and the further actions.

3. MOI and PTA expressed their intention to finalise urgently the following matters




through frequent communication with the Team for the preparation of the Interim Report in consideration of the progress of the back-bone transmission projects (between Aimags and the capital of Ulaanbaatar):

- (a) Selection of the candidate Aimags and priority projects for the Feasibility Study.
 - (b) Demand distribution to Sum level.
4. Finally MOI and PTA appreciated the Team's efforts to the preparation of the Progress Report within a short period of about three months.

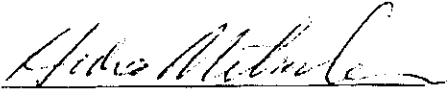
The foregoing matters of the Items 1 to 4 were explained to the Steering Committee and approved by the Committee on July 2, 2002.

Suggestions and opinions on the significance to take into consideration of the national plans such as the ICT development and the realization of the solar and wind power generation till the year 2010 for the preparation of the Master Plan were addressed to the meeting. The Study Team thanked to the comments and opinions and replied that those comments and opinions should be taken into account in the preparation of the Interim Report.


Ulaanbaatar July 3, 2002.




Mr. Kh. AMARSAIKHAN
Director General
Department of Economic
Cooperation management and
Coordination, Ministry of Finance and Economy



Mr. Hideo MITSUHASHI
Leader,
Master Plan Study Team of JICA



Mr. G. BATTUR
Director General
Post and Telecommunication Authority



Dr. J. SEREETER
Director General
Policy and Coordination Department of
Roads, Transportation, Information,
Communications & Tourism, Ministry of
Infrastructure

Attachment-1 List of Attendees

Mongolian Side

1. **Steering Committee Members**

- (1) Mr. Ts. Tsengel, Chairman, State Secretary, MOI
- (2) Mr. G. Basanjav, Member, ITA Academician, Director, Policy and Coordination Department of Roads, Transport, Information, Communications & Tourism, MOI
- (3) Mr. T. Naranmandakh, General Secretary, Chief Officer, Policy and Coordination Department of Roads, Transport, Information, Communications & Tourism, MOI
- (4) Mr. L. Chuluun, Member, Senior Officer, Department of Economic Cooperation, Management and Coordination, MOFE
- (5) Mr. S. Badral, Member, Adviser to Director of Multilateral Cooperation Department, MOFA
- (6) Mr. Bayanmunkh, Member, Officer of Foreign Relations Department, Ministry of Justice and Home Affairs
- (7) Mr. U. Odgerel, Member, Director of Information, Monitoring and Evaluation Department, MOI
- (8) Mr. G. Battur, Member, Director General, Post and Telecommunication Authority

2. **Attendance of Meeting at PTA on July 28, 2002**

- (1) Mr. T. Naranmandah, Chief Officer, Ministry of Infrastructure
- (2) Mr. G. Battur, Director General, Post and Telecommunication Authority
- (3) Dr. N. Nansaljav, Senior Officer, Post and Telecommunication Authority

Japanese Side

1. **JICA Master Plan Study Team**

- (1) Mr. Hideo Mitsuhashi, Team Leader
- (2) Mr. Katsuhei Kubo
- (3) Mr. Makine Kusano
- (4) Mr. Yasuo Ishihara
- (5) Mr. Hideaki Ishigaki
- (6) Mr. Masazumi Okamoto
- (7) Mr. Tomio Hosoda
- (8) Mr. Noboru Mihara
- (9) Mr. Iwao Maruyama
- (10) Mr. Makoto Tanaka
- (11) Ms. Sanae Abiko

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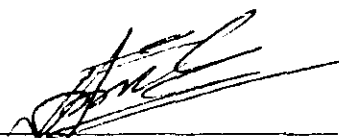
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**MINUTES OF MEETINGS
ON
THE INTERIM REPORT OF THE MASTER PLAN STUDY
FOR
DEVELOPMENT OF RURAL TELECOMMUNICATION SYSTEM
IN MONGOLIA
AGREED UPON BETWEEN
MINISTRY OF INFRASTRUCTURE / POST AND
TELECOMMUNICATION AUTHORITY OF MONGOLIA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY**

Ulaanbaatar, 10th September, 2002



Mr. Kh. AMARSAIKHAN
Director General
Department of Economic
Cooperation Management and
Coordination, Ministry of Finance and Economy



Mr. G. BATTUR
Director General
Post and Telecommunication Authority



Mr. Hideo MITSUHASHI
Leader,
Master Plan Study Team of JICA

Witness



Mr. G. BASANJAV
Director
Policy and Coordination Department of
Road, Transport, Information,
Communication & Tourism, Ministry of
Infrastructure



Mr. Junichi SHIOYA
Leader,
JICA Advisory Committee

Japan International Cooperation Agency (JICA) Study Team (hereinafter referred to as "Team"), Ministry of Infrastructure (hereinafter referred to as "MOI") and Post and Telecommunication Authority (hereinafter referred to as "PTA") had meetings on September 2, 2002 through September 9, 2002 at the headquarters of PTA in Ulaanbaatar.

A list of participants for the meetings is given in Attachment to this Minutes.

In the meeting on September 2, 2002, the Team submitted 20 copies of the Interim Report for "The Master Plan Study for Development of Rural Telecommunication System in Mongolia" (hereinafter referred to as "the Study") to MOI and PTA. Through a series of meetings, MOI and PTA and the Team discussed the contents of the Interim Report and the procedures for the Feasibility Study.

The following matters were concluded through the discussion between MOI/PTA and the Team:

1. Interim Report

The Interim Report was basically accepted by MOI/PTA and the further discussion for the following items in the Interim Report would be continued during the period of the 2nd study in Mongolia:

- (a) Project Implementation Plan and Cost Estimate;
- (b) Analysis of Financial, Economic and Social Aspect;
- (c) Operation and maintenance plan;
- (d) Human resource development plan;
- (e) Institution, organization and management plan;
- (f) Spectrum management plan;
- (g) Numbering plan; and
- (h) Recommendation.

2. Procedures for Feasibility Study

The procedures for the feasibility study were basically accepted by MOI/PTA and the site survey would be commenced from the middle of September 2002 together with the counterpart staff.

3. Feasibility Study Projects

MOI/PTA and the Team agreed the following feasibility study projects:

- (a) Rehabilitation and Expansion Project of Telecommunications Network in Uvurkhangai Aimag of Khangai region; and
- (b) Rehabilitation and Expansion Project of Telecommunications Network in Selenge Aimag of Central region

The foregoing matters of the above Items 1 to 3 were explained to the Steering Committee and approved by the Committee Meeting on September 9, 2002.

2    


Attachment-1 List of Attendees**Mongolian Side**

1. Steering Committee Members

- (1) Mr. G. Basanjav, Member, ITA Academician, Director, Policy and Coordination Department of Road, Transport, Information, Communication & Tourism, MOI
- (2) Mr. T. Naranmandakh, General Secretary, Chief Officer, Policy and Coordination Department of Roads, Transport, Information, Communications & Tourism, MOI
- (3) Ms. L. Nasanbuyan, Member, Senior Officer, Department of Economic Cooperation, Management and Coordination, MOFE
- (4) Mr. A. Amarsanaa, Member, Attache of Multilateral Cooperation Department, MOFA
- (5) Mr. U. Odgerel, Member, Director of Information, Monitoring and Evaluation Department, MOI
- (6) Mr. G. Battur, Member, Director General, Post and Telecommunication Authority

2. Attendance of Steering Committee

- (1) Dr. TS Bold, Director of Network, Planning and Project Implementing Department, Post and Telecommunication Authority
- (2) Dr. N. Nansaljav, Senior Officer, Post and Telecommunication Authority

3. Attendance of Meeting at MOI/PTA on September 5, 2002

- (1) Mr. T. Naranmandakh, Chief Officer, Ministry of Infrastructure
- (2) Mr. G. Battur, Director General, Post and Telecommunication Authority
- (3) Dr. TS Bold, Director of Network, Planning and Project Implementing Department, Post and Telecommunication Authority
- (4) Dr. N. Nansaljav, Senior Officer, Post and Telecommunication Authority

Japanese Side

1. JICA Advisory Committee


- (1) Mr. Junichi Shioya, Leader
- (2) Mr. Hiroaki Endo


2. JICA Master Plan Study Team

- (1) Mr. Hideo Mitsuhashi, Team Leader
- (2) Mr. Yasuo Ishihara
- (3) Mr. Hideaki Ishigaki
- (4) Mr. Masazumi Okamoto
- (5) Mr. Iwao Maruyama
- (6) Mr. Takao Sakagami
- (7) Ms. Sanae Abiko

MINUTES OF MEETING
ON
THE WORKING PAPER OF THE MASTER PLAN STUDY
FOR
DEVELOPMENT OF RURAL TELECOMMUNICATION SYSTEM
IN MONGOLIA
AGREED UPON BETWEEN
POST AND TELECOMMUNICATION AUTHORITY OF MONGOLIA
AND
JICA MASTER PLAN STUDY TEAM

Ulaanbaatar, 29th October, 2002


Mr. G. BAITUR
Director General
Post and Telecommunication Authority


Mr. Hideo MITSUHASHI
Leader,
JICA Master Plan Study Team

JICA Master Plan Study Team (hereinafter referred to as "the Team") and Ministry of Infrastructure and Post and Telecommunication Authority (hereinafter referred to as "MOI/PTA") had a meeting on October 28, at the headquarters of PTA in Ulaanbaatar.

A list of participants for the meetings is given in Attachment to this Minutes.

In the meeting on October 28, 2002, the Team submitted 20 copies of the Working Paper for "The Master Plan Study for Development of Rural Telecommunication System in Mongolia" (hereinafter referred to as "the Study") to MOI/PTA. At the meeting, MOI/PTA and the Team discussed the contents of the Working Paper.

The following matters were concluded through the discussion between MOI/PTA and the Team:

1. Working Paper

The Working Paper was basically accepted by MOI/PTA, including the progress of the Feasibility Study, the modification items and the recommendations of the Interim Report.

2. Feasibility Study

The Team will prepare the Draft Final Feasibility Study in the 2nd Work in Japan, based on the comments from MOI/PTA, which will be given to the Team from MOI/PTA within one week.

3. Comments and Modification Items of Interim Report

The comments and the modification items of the Interim Report from MOI/PTA were confirmed at the meeting, and the Team will reflect such items in the Draft Final Master Plan in the 2nd Work in Japan.

4. Draft Recommendations

The draft recommendations were basically accepted by MOI/PTA, and MOI/PTA will prepare the further comments on the draft recommendations so that the Team may reflect in the Draft Final Master Plan in December 2002.

PTA will explain the foregoing matters of the above Items 1 to 4 to the Steering Committee members for approval.

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Attachment-1 List of Attendees

Mongolian Side

1. Attendance of Ministry of Infrastructure (MOI)

- (1) Ms. I. Dugarmaa, Officer, Road, Transportation, Information, Communications and Tourism Policy Coordination Department, MOI
- (2) Ms. L. Banzragch, Senior Officer, Road, Transportation, Information, Communications and Tourism Policy Coordination Department, MOI

2. Attendance of Post and Telecommunication Authority (PTA)

- (1) Mr. G. Battur, Director General, PTA
- (2) Mr. B. Davaatseren, Deputy Director General, PTA
- (3) Dr. TS Bold, Director of Network, Planning and Project Implementing Department, PTA
- (4) Dr. N. Nansaljav, Senior Officer, PTA
- (5) Mr. N. Bilgee, Officer, PTA

Japanese Side

1. JICA Master Plan Study Team


- (1) Mr. Hideo Mitsuhashi, Team Leader
- (2) Mr. Katsuhei Kubo
- (3) Mr. Yasuo Ishihara
- (4) Mr. Hideaki Ishigaki
- (5) Mr. Masazumi Okamoto
- (6) Mr. Takashi Kasai
- (7) Mr. Iwao Maruyama
- (8) Mr. Makoto Tanaka
- (9) Ms. Sanae Abiko

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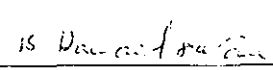
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MINUTES OF MEETINGS
ON
THE DRAFT FINAL REPORT OF THE MASTER PLAN STUDY
FOR
DEVELOPMENT OF RURAL TELECOMMUNICATION SYSTEM
IN MONGOLIA
AGREED UPON BETWEEN
MINISTRY OF INFRASTRUCTURE / POST AND
TELECOMMUNICATION AUTHORITY OF MONGOLIA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

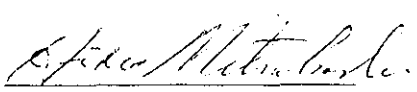
Ulaanbaatar, 20th December, 2002



Mr. Kh. AMARSAIKHAN
Director General
Department of Economic
Cooperation Management and
Coordination, Ministry of Finance and Economy

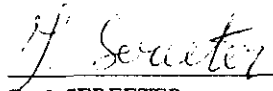


Mr. G. BATTUR
Director General
Post and Telecommunication Authority

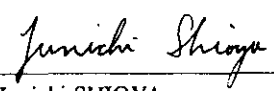


Mr. Hideo MITSUHASHI
Leader,
Master Plan Study Team of JICA

Witness



Dr. J. SEREETER
Director General
Policy and Coordination Department of
Road, Transport, Information,
Communication & Tourism, Ministry of
Infrastructure



Mr. Junichi SHIOYA
Leader,
JICA Advisory Committee

Japan International Cooperation Agency (JICA) Study Team (hereinafter referred to as "Team"), Ministry of Infrastructure (hereinafter referred to as "MOI") and Post and Telecommunication Authority (hereinafter referred to as "PTA") had meetings on December 10, 2002 through December 18, 2002 at the headquarters of PTA in Ulaanbaatar.

A list of participants for the meetings is given in Attachment to this Minutes.

In the meeting on December 10, 2002, the Team submitted 20 copies of the Draft Final Report for "The Master Plan Study for Development of Rural Telecommunication System in Mongolia" (hereinafter referred to as "the Study") to MOI and PTA. Through a series of meetings, MOI and PTA and the Team discussed the contents of the Draft Final Report.

The following matters were concluded through the discussion between MOI/PTA and the Team:

1. Draft Final Report

The Draft Final Report was basically accepted by MOI/PTA.

2. Comments on Draft Final Report and Final Report

MOI/PTA will send comments to JICA Study Team before January 10, 2003, if any, after the review the Draft Final Report and JICA will send the Final Report to MOI in February 2003.

The foregoing matters of the above Items 1 to 2 were explained to the Steering Committee and approved by the Committee Meeting on December 19, 2002.

The following comments were simultaneously expressed by the Steering Committee:

- (1) The Master Plan as submitted in the Draft Final Report is expected to contribute to realization of the urgent themes of Mongolia, such as poverty alleviation, elimination of the gap of information and communication opportunity between the urban and rural areas and the establishment of reliable telecommunications network in the rural areas.
- (2) It is preferred to have an introduction of the role and function of the Universal Service Obligations Fund for this Master Plan in the Final Report.
- (3) Also it is preferred to have an explanation as to the ways to shorten the period to recover the capital investments.

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Attachment-1 List of Attendees

Mongolian Side

1. Steering Committee Members

- (1) Mr. Tsegmed TSENGEL, Chairman, State Secretary, MOI
- (2) PhD. Javchig, SEREETER, Vice-chairman, Director General, Policy and Coordination Department of Roads, Transport, Information, Communications & Tourism, MOI
- (3) Mr. T. Naranmandakh, General Secretary, Chief Officer, Policy and Coordination Department of Roads, Transport, Information, Communications & Tourism, MOI
- (4) Mr. Kh. Amarsaikhan, Member, Director General, Department of Economic Cooperation, Management and Coordination, MOFE
- (5) Mr. Batjargal, Member, Deputy Director of Multilateral Cooperation Department, MOFA
- (6) Mr. Bayanmunkh, Member, Officer of Foreign Relations Department, Ministry of Justice and Home Affairs
- (7) Mr. Munkhjargal, Member, Officer of Trade and Cooperation, Ministry of Industry and Trade
- (8) Mr. G. Basanjav, Member, ITA Academician, Director, Policy and Coordination Department of Road, Transport, Information, Communication & Tourism, MOI
- (9) Mr. D. Naranpurev, Member, Head of International Cooperation Division, MOI
- (10) Mr. U. Odgerel, Member, Director of Information, Monitoring and Evaluation Department, MOI
- (11) Mr. B. Davaatseren, Deputy Director General, Post and Telecommunication Authority (PTA)

2. Attendance of Steering Committee

- (1) Mr. B. Davaatseren, Deputy Director General, PTA
- (2) Dr. TS Bold, Director of Network, Planning and Project Implementing Department, PTA
- (3) Dr. N. Nansaljav, Senior Officer, PTA

3. Attendance of Scientific and Technical Council of Communications Sectors (STCCS) Meeting at PTA on December 12, 2002

- (1) Dr. B. Sukhbaatar, Director of STCCS
- (2) Dr. TS Bold, Secretary of STCCS
- (3) Dr. L. Batkishig, Member of STCCS
- (4) Dr. G. Bayarsuren, Member of STCCS
- (5) Dr. N. Nansaljav, Member of STCCS
- (6) Dr. G. Tsogbadrakh, Member of STCCS
- (7) Dr. B. Damdinsuren, Member of STCCS
- (8) M.Sc. I. Norovjav, Member of STCCS

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4. Attendance of Meeting at MOU/PTA on December 16 and 18, 2002

- (1) Mr. T. Naranmandah, Chief Officer, MOI
- (2) Ms. I. Dugarma, Senior Officer, MOI
- (3) Ms. L. Banzragch, Senior Officer, MOI
- (4) Mr. D. Baterdene, Senior Officer, MOI
- (5) Mr. B. Davaatseren, Deputy Director General, PTA
- (6) Dr. TS Bold, Director of Network, Planning and Project Implementing Department, PTA
- (7) Dr. N. Nansaljav, Senior Officer, PTA

Japanese Side

1. JICA Advisory Committee

- (1) Mr. Junichi Shioya, Leader
- (2) Mr. Hiroshi Ishizuka

2. JICA Master Plan Study Team

- (1) Mr. Hideo Mitsuhashi, Team Leader
- (2) Mr. Katsuhei Kubo
- (3) Mr. Suzuo Uchiyama
- (4) Mr. Yasuo Ishihara
- (5) Mr. Hideaki Ishigaki
- (6) Mr. Noboru Mihara
- (7) Mr. Tomio Hosoda
- (8) Ms. Sanae Abiko

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To the Attention of
Committee of Minister of Ministry of Infrastructure and Director's Committee of PTA

13th December, 2002

Recommendations of Telecommunication Sector's Science and Technology Committee

1. The digitalisation of inter-town network which is the main component of the trunk network of Mongolian telecommunication and the introduction of internet and IT services are making favorite condition for the acceleration of social and economic development.

But the rural telecommunication are still of analogue system and could not meet the demand of modern society. Thus we consider the Master Plan for Development of Rural Telecommunication System in Mongolia which was conducted by JICA with the assistance of Japanese Government as an important document which reflects the way of telecommunication development of Mongolia till 2020.

2. We recommend to take urgent measures to implement priority projects in such areas as Uvurkhangai, Selenge and Darkhan-Uul Aimags where the feasibility studies were conducted.

The Head of Science and Technology Committee

B. Sukhbaatar
Doctor of Science, Professor
Consultant Engineer

Secretary

Ts. Bold
PhD, Assistant Professor

Members:

N. Nansaljav
PhD, Assistant Professor
Consultant Engineer

L. Batkhishig
PhD, Consultant Engineer

G. Tsogbadrakh
PhD, Professor
Consultant Engineer

B. Damdinsuren
PhD, Professor
Consultant Engineer

G. Bayarsuren
PhD

I. Norovjav
M. Sc Consultant Engineer

ANNEX 2

SOCIO-ECONOMY AND FINANCIAL DATA

Annex 2

Socio-Economy and Financial Data

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2.1 Cash Flow Projection and FIRROI for Base Case B

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total		
Source of Funds	1,890	3,248	3,883	4,605	5,219	5,898	6,482	7,005	7,502	8,014	8,215	8,443	8,813	8,800	8,090	9,091	9,478	9,453	9,442	9,432	9,426	9,426	9,420	18,152B	
Funds from Operations	1,790	2,348	2,763	3,205	3,619	4,196	4,482	4,905	5,502	5,914	6,615	7,149	7,513	7,900	8,190	9,091	9,478	9,453	9,442	9,432	9,426	9,426	9,420	142,128	
Net profit	-59	-818	-1,028	-1,247	-1,520	-1,837	-1,942	-2,057	-1,929	-2,035	-1,582	-1,208	-1,079	-374	-453	1,788	3,340	3,980	4,588	5,266	6,004	6,538	6,538	11,967	
Depreciation	1,849	3,167	3,831	4,462	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,352	8,592	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881	2,881	130,161	
Subsidies Required	100	900	1,100	1,300	1,600	1,700	2,000	2,100	2,000	2,100	1,600	1,300	1,100	900	0	0	0	0	0	0	0	0	0	0	19,900
Use of Funds	28,067	19,898	10,038	9,402	10,387	11,236	8,171	8,146	7,097	7,837	3,486	2,689	3,654	2,789	2,684	3,211	2,369	0	0	0	0	0	0	0	141,070
Working Capital	329	130	72	91	87	77	55	73	64	68	61	61	62	64	66	67	67	0	0	0	0	0	0	0	1,496
Capital Investment	27,737	19,767	9,966	9,311	10,300	11,158	8,116	8,074	7,032	7,770	3,425	2,627	3,592	2,735	2,528	3,144	2,291	0	0	0	0	0	0	0	139,574
Net Cash Flow for the Year	-26,177	-16,650	-4,175	-4,898	-5,168	-5,339	-1,689	-1,141	406	176	4,729	5,755	4,959	6,001	5,395	5,880	7,120	9,453	9,442	9,432	9,426	9,426	9,420	20,868	
Cumulative Cash Flow	-26,177	-42,828	-48,003	-53,898	-59,067	-64,406	-69,095	-73,236	-68,931	-68,865	-61,825	-56,171	-51,212	-46,211	-39,315	-33,435	-26,315	-16,852	-7,420	2,012	11,438	20,868	20,868		

FIRROI 2004-2025 1.871%

2.2 Projected Income Statement for Base Case B

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total		
Revenues	3,137	3,639	4,181	4,798	5,346	6,032	6,375	6,898	7,320	7,776	8,270	8,684	9,103	9,531	9,961	10,396	10,823	10,808	10,808	10,808	10,808	10,808	10,808	176,370	
Telephone Services	1,646	1,969	2,200	2,582	2,928	3,224	3,422	3,731	3,979	4,253	4,483	4,735	4,985	5,245	5,508	5,780	6,060	6,035	6,035	6,035	6,035	6,035	6,035	96,902	
Distributed Inrl Settlement	430	504	546	619	679	732	762	812	849	888	916	945	974	1,003	1,031	1,059	1,085	1,085	1,085	1,085	1,085	1,085	1,085	19,258	
Distributed Access Charge	775	929	1,027	1,182	1,316	1,474	1,588	1,747	1,880	2,020	2,159	2,298	2,436	2,575	2,712	2,848	2,978	2,978	2,978	2,978	2,978	2,978	2,978	46,835	
Internet	204	204	310	310	310	483	483	483	483	483	572	572	572	572	572	572	572	572	572	572	572	572	572	10,824	
Others	83	83	97	106	112	118	121	126	128	131	133	134	135	136	136	137	137	137	137	137	137	137	137	2,752	
Operating Costs	3,197	4,518	5,249	6,047	6,866	7,719	8,317	8,955	9,249	9,812	9,831	9,893	10,181	10,406	10,414	8,808	7,482	6,828	6,218	5,541	4,804	4,263	4,263	164,403	
Personnel Costs	90	91	91	92	92	92	91	91	90	90	96	102	108	115	123	130	138	144	150	156	162	168	168	2,502	
Portion of BB Rental to PTA	740	674	704	768	812	856	871	908	813	811	557	400	403	406	207	0	0	0	0	0	0	0	0	9,928	
Satellite Charge	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	1,828	
Depreciation(New Assets)	1,849	3,167	3,831	4,462	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,362	8,592	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881	2,881	130,161	
Others	434	503	539	652	740	806	848	911	832	879	919	966	996	1,028	1,059	1,082	1,123	1,127	1,133	1,136	1,136	1,136	1,136	19,984	
Profit	-59	-819	-1,068	-1,247	-1,520	-1,687	-1,942	-2,057	-1,929	-2,036	-1,562	-1,209	-1,079	-874	-453	1,788	3,340	3,980	4,589	5,266	6,004	6,538	6,538	11,967	
Required Subsidies	100	900	1,100	1,300	1,600	1,700	2,000	2,100	2,000	2,100	1,600	1,300	1,100	900	0	0	0	0	0	0	0	0	0	0	19,900
Surplus for the Year	41	81	32	53	80	13	58	43	71	65	38	91	21	26	-453	1,788	3,340	3,980	4,589	5,266	6,004	6,538	6,538	31,767	
Accumulated Surplus	41	122	154	207	287	300	368	401	472	537	575	686	688	714	261	2,049	5,389	9,369	13,958	19,225	25,228	31,767	31,767		

2.3 Subscriber Development Plan

	National Base		Sum Base		Rural %	Urban %	Growth Rate			Sum		
	Increase	Subscribers	Increase	Subscribers			National					
2001		130,000		10,521	8.09%	91.91%						
2002	22,100	152,100	0	10,521	6.92%	93.08%						
2003	11,050	163,150	0	10,521	6.45%	93.55%						
2004	11,050	174,200	6,682	17,203	9.88%	90.12%						
2005	11,050	185,250	3,443	20,646	11.14%	88.86%						
2006	11,050	196,300	2,198	22,844	11.64%	88.36%						
2007	11,050	207,350	3,460	26,304	12.69%	87.31%						
2008	11,050	218,400	2,998	29,302	13.42%	86.58%	7.69%	1.68	0.032	15.76%	2.79	0.064
2009	10,355	228,755	3,045	32,347	14.14%	85.86%						
2010	10,355	239,110	2,060	34,407	14.39%	85.61%						
2011	10,355	249,465	3,004	37,411	15.00%	85.00%						
2012	10,355	259,820	2,424	39,835	15.33%	84.67%						
2013	10,355	270,175	2,556	42,391	15.69%	84.31%	4.35%	1.24	0.018	7.67%	1.45	0.032
2014	14,330	284,505	2,664	45,055	15.84%	84.16%						
2015	14,330	298,835	2,686	47,741	15.98%	84.02%						
2016	14,330	313,165	2,663	50,404	16.10%	83.90%						
2017	14,330	327,495	2,670	53,074	16.21%	83.79%						
2018	14,330	341,825	2,624	55,698	16.29%	83.71%						
2019	14,330	356,155	2,596	58,294	16.37%	83.63%						
2020	14,334	370,489	2,486	60,780	16.41%	83.59%	4.61%	1.37	0.020	5.28%	1.43	0.022
	240,489		50,259				5.67%	2.85	0.024	9.67%	5.78	0.040
							2009-2020					
							4.50%	1.70	0.019			

2.4 Revenues and Operations/Maintenance Costs

(1) Revenues

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Line Rental	186	224	248	285	317	350	373	405	432	459	488	517	546	575	603	632	659	659	659	659	659	659	659
Local Call	348	423	476	559	636	701	745	812	867	927	978	1,031	1,085	1,142	1,200	1,260	1,319	1,319	1,319	1,319	1,319	1,319	1,319
Long Dist.	441	536	602	707	805	887	943	1,027	1,097	1,173	1,238	1,306	1,374	1,445	1,518	1,594	1,670	1,670	1,670	1,670	1,670	1,670	1,670
Intl Call	630	766	861	1,011	1,151	1,268	1,348	1,469	1,569	1,678	1,770	1,866	1,964	2,067	2,171	2,279	2,387	2,387	2,387	2,387	2,387	2,387	2,387
Installation	40	21	13	21	18	18	12	18	15	15	16	16	16	16	16	16	15	0	0	0	0	0	0
Lease Line	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intl Settlement-net	430	504	546	619	679	732	762	812	849	888	916	945	974	1,003	1,031	1,059	1,085	1,085	1,085	1,085	1,085	1,085	1,085
Access Charge	775	929	1,027	1,182	1,316	1,474	1,588	1,747	1,880	2,020	2,159	2,298	2,436	2,575	2,712	2,848	2,978	2,978	2,978	2,978	2,978	2,978	2,978
Internet	204	204	310	310	310	483	483	483	483	483	572	572	572	572	572	572	572	572	572	572	572	572	572
Other	83	93	97	106	112	118	121	126	128	131	133	134	135	136	136	137	137	137	137	137	137	137	137
Total Revenues	3,137	3,699	4,181	4,793	5,346	6,032	6,375	6,898	7,320	7,776	8,270	8,684	9,103	9,531	9,961	10,396	10,823	10,808	10,808	10,808	10,808	10,808	10,808
Revenues/Sub.	0.182	0.179	0.183	0.182	0.182	0.186	0.185	0.184	0.184	0.183	0.184	0.182	0.181	0.180	0.179	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178

(2) Operations/Maintenance Costs

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Personnel Cost	90	91	91	92	92	92	91	91	90	90	96	102	108	115	123	130	139	144	150	156	162	168
Utility, Fuel	149	181	204	240	273	301	320	348	372	398	419	442	466	490	515	540	566	566	566	566	566	566
Repair	0	0	0	47	81	98	114	131	150	164	180	192	205	211	215	221	226	230	236	239	239	239
BB Rental to PTA	740	674	704	768	812	856	871	908	813	811	557	400	403	406	207	0	0	0	0	0	0	0
VSAT Charge	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Other Circuit	102	115	120	131	138	146	146	155	158	162	163	165	166	167	168	169	169	169	169	169	169	169
Depreciation (New)	1,849	3,167	3,831	4,452	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,352	8,592	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881
Depreciation (MT)	85	96	100	109	116	122	124	129	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adm. Cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Others	98	110	115	125	133	140	142	148	151	155	156	158	159	160	161	162	162	162	162	162	162	162
Total	3,187	4,518	5,249	6,047	6,866	7,719	8,317	8,955	9,249	9,812	9,831	9,893	10,181	10,406	10,414	8,608	7,482	6,828	6,218	5,541	4,804	4,269
Cost/Sub.	0.186	0.219	0.230	0.230	0.234	0.239	0.242	0.239	0.232	0.231	0.218	0.207	0.202	0.196	0.187	0.148	0.123	0.112	0.102	0.091	0.079	0.070

2.5 Economic Internal Rate of Return (EIRR)

US\$ '000

	Costs				Benefits			Net Cash Flow	Cumulative Cash Flow	EIRR	
	Investment	Operating Cost	Working Capital	Total	Saved Travel Cost	Net Telecom Revenues	Total				
2004	27,737	1,347	329	29,414	1,892	3,060	4,951	-24,462	-24,462	7.658%	
2005	19,767	1,351	130	21,249	2,271	3,606	5,877	-15,372	-39,835		
2006	9,966	1,418	72	11,456	2,512	4,078	6,591	-4,865	-44,700		
2007	9,311	1,595	91	10,997	2,893	4,681	7,573	-3,423	-48,123		
2008	10,300	1,727	87	12,114	3,223	5,214	8,436	-3,678	-51,801		
2009	11,158	1,836	77	13,071	3,557	5,886	9,443	-3,628	-55,429		
2010	8,116	1,893	55	10,064	3,784	6,220	10,004	-60	-55,439		
2011	8,074	1,993	73	10,139	4,114	6,729	10,844	704	-54,735		
2012	7,032	1,818	64	8,915	4,381	7,140	11,521	2,606	-52,129		
2013	7,770	1,863	68	9,700	4,662	7,585	12,247	2,547	-49,632		
2014	3,425	1,654	61	5,140	4,955	8,066	13,021	7,881	-41,751		
2015	2,627	1,541	61	4,230	5,250	8,469	13,719	9,490	-32,261		
2016	3,592	1,589	62	5,244	5,543	8,875	14,419	9,175	-23,086		
2017	2,735	1,631	64	4,431	5,837	9,292	15,129	10,698	-12,388		
2018	2,528	1,471	66	4,065	6,125	9,710	15,835	11,771	-617		
2019	3,144	1,305	67	4,517	6,411	10,133	16,544	12,028	11,410		
2020	2,291	1,344	67	3,703	6,684	10,548	17,233	13,530	24,940		
2021	0	1,354	0	1,355	6,684	10,533	17,218	15,863	40,803		
2022	0	1,365	0	1,365	6,684	10,533	17,218	15,852	56,655		
2023	0	1,375	0	1,375	6,684	10,533	17,218	15,843	72,498		
2024	0	1,381	0	1,381	6,684	10,533	17,218	15,836	88,334		
2025	0	1,388	0	1,388	6,684	10,533	17,218	15,830	104,164		
	139,574	34,242	1,496	175,312	107,517	171,959	279,476	104,164			

2.6 Saved Travel Costs

in Tg. mln

	Subscribers	Saved Travel			Tel. Charge			Net Saved Travel Cost	- do - in US\$'000
		Cost to UB	to Aimag C.	Total	to UB	to Aimag C.	Total		
2004	17,203	1,226	945	2,170	33	53	86	2,085	1,892
2005	20,646	1,471	1,134	2,605	39	63	103	2,502	2,271
2006	22,844	1,628	1,254	2,882	44	70	114	2,769	2,512
2007	26,304	1,874	1,444	3,319	50	81	131	3,188	2,893
2008	29,302	2,088	1,609	3,697	56	90	146	3,551	3,223
2009	32,347	2,305	1,776	4,081	62	99	161	3,920	3,557
2010	34,407	2,452	1,889	4,341	66	105	171	4,170	3,784
2011	37,411	2,666	2,054	4,720	71	115	186	4,534	4,114
2012	39,835	2,838	2,187	5,026	76	122	198	4,828	4,381
2013	42,391	3,020	2,328	5,348	81	130	211	5,138	4,662
2014	45,055	3,210	2,474	5,684	86	138	224	5,460	4,955
2015	47,741	3,402	2,622	6,023	91	146	237	5,786	5,250
2016	50,404	3,591	2,768	6,359	96	155	251	6,109	5,543
2017	53,074	3,782	2,914	6,696	101	163	264	6,432	5,837
2018	55,698	3,969	3,059	7,027	106	171	277	6,750	6,125
2019	58,294	4,154	3,201	7,355	111	179	290	7,065	6,411
2020	60,780	4,331	3,338	7,668	116	186	302	7,366	6,684
2021	60,780	4,331	3,338	7,668	116	186	302	7,366	6,684
2022	60,780	4,331	3,338	7,668	116	186	302	7,366	6,684
2023	60,780	4,331	3,338	7,668	116	186	302	7,366	6,684
2024	60,780	4,331	3,338	7,668	116	186	302	7,366	6,684
2025	60,780	4,331	3,338	7,668	116	186	302	7,366	6,684
				123,345			4,861	118,484	107,517

2.7 Cash Flow Projection and FIRROI for SR-1 (Revenue + 10%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total	
Source of Funds																								
Funds from Operations	2,104	3,218	3,632	4,485	5,154	5,859	6,520	6,955	7,434	7,991	8,242	8,012	8,424	8,853	9,486	10,130	10,561	10,634	10,623	10,513	10,507	10,500	189,565	
Net profit	254	-443	-650	-768	-955	-1,094	-1,304	-1,267	-1,197	-1,258	-735	-241	-138	79	544	2,827	4,423	5,061	5,670	6,347	7,085	7,619	159,765	
Depreciation	1,849	3,167	3,831	4,452	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,352	8,592	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881	130,161	
Subsidies Required	0	500	700	800	1,000	1,100	1,400	1,400	1,200	1,300	800	0	0	0	0	0	0	0	0	0	0	0	10,200	
Use of Funds																								
Working Capital	28,100	19,811	10,045	9,411	10,396	11,243	8,177	8,154	7,103	7,844	3,492	2,895	3,660	2,806	2,600	3,218	2,385	2	0	0	0	0	0	141,219
Capital Investment	362	144	80	100	96	84	60	80	71	74	67	67	69	71	72	74	74	74	2	0	0	0	0	1,645
	27,737	19,767	9,966	9,311	10,300	11,158	8,116	8,074	7,082	7,770	3,425	2,627	3,592	2,735	2,528	3,144	2,281	0	0	0	0	0	0	139,574
Net Cash Flow for the Year	-25,936	-16,893	-4,164	-4,827	-5,242	-5,344	-1,657	-1,159	331	147	4,760	5,317	4,763	6,047	6,886	6,912	8,195	10,633	10,523	10,513	10,507	10,500	28,744	
Cumulative Cash Flow	-25,936	-42,829	-47,052	-51,779	-53,021	-54,265	-56,022	-57,161	-56,950	-56,703	-51,559	-49,936	-51,673	-45,325	-39,369	-32,027	-26,832	-16,239	-2,776	7,737	18,244	28,744	28,744	

FIRROI 2004-2025 2.492%

2.8 Projected Income Statement for SR-1 (Revenue + 10%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total		
Revenues	3,451	4,069	4,599	5,279	5,881	6,635	7,013	7,588	8,052	8,554	9,096	9,553	10,013	10,484	10,967	11,436	11,905	11,888	11,888	11,888	11,888	11,888	11,888	194,007	
Telephone Services	1,810	2,166	2,420	2,840	3,221	3,547	3,764	4,104	4,377	4,678	4,938	5,208	5,484	5,770	6,060	6,358	6,655	6,638	6,638	6,638	6,638	6,638	6,638	106,593	
Distributed Infr Settlement	473	554	601	680	747	805	838	893	933	977	1,008	1,040	1,071	1,103	1,134	1,165	1,193	1,193	1,193	1,193	1,193	1,193	1,193	21,184	
Distributed Access Charge	853	1,022	1,130	1,300	1,447	1,621	1,747	1,922	2,068	2,222	2,374	2,528	2,680	2,833	2,983	3,133	3,276	3,276	3,276	3,276	3,276	3,276	3,276	51,518	
Internet	224	224	341	341	341	532	532	532	532	532	630	630	630	630	630	630	630	630	630	630	630	630	630	11,686	
Others	91	103	107	117	124	130	133	138	141	145	146	147	148	149	150	151	151	151	151	151	151	151	151	3,027	
Operating Costs	3,197	4,518	5,249	6,047	6,866	7,719	8,317	8,955	9,249	9,812	9,831	9,893	10,181	10,406	10,414	8,608	7,482	6,828	6,218	5,541	4,804	4,269	4,269	164,403	
Personnel Costs	90	91	91	92	92	92	91	91	90	90	96	102	108	115	123	130	138	144	150	156	162	168	168	2,502	
Portion of BB Rental to PTA	740	674	704	768	812	856	871	908	813	811	557	400	403	406	207	0	0	0	0	0	0	0	0	9,928	
Satellite Charge	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	1,628	
Depreciation(New Assets)	1,849	3,167	3,831	4,452	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,352	8,532	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881	2,881	130,161	
Others	434	503	539	652	740	806	848	911	832	879	919	956	995	1,028	1,059	1,092	1,123	1,127	1,133	1,136	1,136	1,136	1,136	19,984	
Profit	254	-449	-650	-768	-985	-1,084	-1,304	-1,367	-1,197	-1,258	-735	-341	-168	79	544	2,827	4,423	5,061	5,670	6,347	7,085	7,619	7,619	29,604	
Required Subsidies	0	500	700	800	1,000	1,100	1,400	1,400	1,200	1,300	800	0	0	0	0	0	0	0	0	0	0	0	0	0	10,200
Surplus for the Year	254	51	50	32	15	16	96	33	3	42	65	-341	-168	79	544	2,827	4,423	5,061	5,670	6,347	7,085	7,619	7,619	39,804	
Accumulated Surplus	254	306	356	388	403	419	515	548	551	594	659	318	150	229	772	3,600	8,022	13,083	18,753	25,100	32,185	39,804	39,804		

2.9 Cash Flow Projection and FIRROI for SR-2 (Revenue - 10%)

	2004	2005	2006	2007	2008	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total		
Source of Funds																										
Funds from Operations	1,278	3,178	3,845	4,525	5,184	5,852	6,445	7,016	7,470	7,470	8,038	8,188	8,375	8,603	8,847	8,984	8,051	8,396	8,373	8,362	8,362	8,346	8,346	8,339	164,891	
Net profit	1,476	1,978	2,345	2,725	3,084	3,582	3,845	4,215	4,770	4,770	5,136	5,788	6,275	6,603	6,947	7,494	8,051	8,396	8,373	8,362	8,362	8,346	8,346	8,339	124,491	
Depreciation	-373	-1,183	-1,493	-1,737	-2,054	-2,330	-2,579	-2,747	-2,881	-2,881	-2,813	-2,534	-2,077	-1,699	-1,827	-1,443	748	2,258	2,889	3,509	4,185	4,923	5,458	5,458	-5,970	
Subsidies Required	1,849	3,167	3,831	4,452	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,177	8,352	8,592	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881	2,881	130,161	
	400	1,200	1,500	1,800	2,100	2,300	2,800	2,800	2,800	2,700	2,900	2,400	2,100	2,000	1,900	1,500	0	0	0	0	0	0	0	0	0	30,200
Use of Funds																										
Working Capital	28,034	19,885	10,031	9,383	10,379	11,227	8,166	8,139	7,090	7,090	7,831	3,480	2,853	3,648	2,783	2,887	3,204	2,392	-1	-0	-0	-0	-0	-0	-0	140,920
Capital Investment	296	117	65	82	79	69	49	65	58	58	61	55	55	56	58	59	61	61	-1	-0	-0	-0	-0	-0	-0	1,346
	27,737	19,767	9,966	9,311	10,300	11,158	8,116	8,074	7,032	7,032	7,770	3,425	2,827	3,582	2,735	2,528	3,144	2,291	0	0	0	0	0	0	0	139,574
Net Cash Flow for the Year	-26,158	-16,706	-4,185	-4,868	-5,194	-5,335	-1,721	-1,124	-1,124	380	205	4,709	5,692	4,955	6,054	6,407	4,847	6,044	8,373	8,362	8,362	8,346	8,346	8,339	8,339	13,772
Cumulative Cash Flow	-26,158	-42,864	-49,043	-53,910	-53,112	-49,447	-65,168	-67,432	-67,432	-68,312	-66,707	-61,938	-58,206	-51,251	-45,237	-38,830	-34,943	-27,803	-13,626	-11,264	-2,910	5,433	5,433	13,772	13,772	

FIRROI 2004-2025 1.299%

2.10 Projected Income Statement for SR-2 (Revenue -10%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total		
Revenues	2,823	3,329	3,763	4,319	4,811	5,429	5,738	6,208	6,588	6,988	7,443	7,816	8,192	8,578	8,965	9,357	9,740	9,727	9,727	9,727	9,727	9,727	9,727	158,733	
Telephone Services	1,481	1,772	1,980	2,324	2,635	2,902	3,080	3,357	3,581	3,828	4,041	4,261	4,487	4,721	4,958	5,202	5,445	5,431	5,431	5,431	5,431	5,431	5,431	87,212	
Distributed Infr Settlement	387	454	492	557	611	659	686	731	764	799	825	851	876	902	928	953	976	976	976	976	976	976	976	17,332	
Distributed Access Charge	698	836	925	1,064	1,184	1,326	1,429	1,572	1,682	1,818	1,943	2,068	2,193	2,318	2,441	2,563	2,680	2,680	2,680	2,680	2,680	2,680	2,680	42,151	
Internet	183	183	279	279	279	435	435	435	435	435	515	515	515	515	515	515	515	515	515	515	515	515	515	9,561	
Others	74	84	88	96	101	107	108	113	116	118	119	120	121	122	123	123	124	124	124	124	124	124	124	2,476	
Operating Costs	3,197	4,518	5,249	6,047	6,866	7,719	8,317	8,955	9,249	9,812	9,831	9,893	10,181	10,406	10,414	8,608	7,482	6,828	6,218	5,541	4,804	4,269	4,269	164,403	
Personnel Costs	90	91	91	92	92	92	91	91	90	90	96	102	108	115	123	130	138	144	150	156	162	168	168	2,502	
Portion of BB Rental to PTA	740	674	704	768	812	856	871	908	813	811	557	400	403	406	207	0	0	0	0	0	0	0	0	9,928	
Satellite Charge	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	1,828	
Depreciation(New Assets)	1,849	3,167	3,831	4,452	5,139	5,893	6,424	6,962	7,431	7,949	8,177	8,352	8,592	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881	2,881	190,161	
Others	434	503	538	652	740	806	848	911	832	879	919	956	995	1,028	1,059	1,092	1,123	1,127	1,133	1,136	1,136	1,136	1,136	19,984	
Profit	-373	-1,189	-1,486	-1,727	-2,054	-2,290	-2,579	-2,747	-2,661	-2,813	-2,393	-2,077	-1,369	-1,827	-1,449	748	2,258	2,899	3,509	4,185	4,923	5,458	5,458	-5,670	
Required Subsidies	400	1,200	1,500	1,800	2,100	2,300	2,600	2,800	2,700	2,900	2,400	2,100	2,000	1,900	1,500	0	0	0	0	0	0	0	0	0	30,200
Surplus for the Year	27	11	14	73	46	10	21	53	39	87	11	23	11	73	51	748	2,258	2,899	3,509	4,185	4,923	5,458	5,458	24,530	
Accumulated Surplus	27	38	52	125	171	180	201	255	294	381	382	415	426	498	550	1,298	3,556	6,455	9,964	14,149	19,072	24,530	24,530		

2.11 Cash Flow Projection and FIRROI for SO-1 (OM Cost + 10%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total	
Source of Funds	1,855	3,213	3,922	4,545	5,148	5,912	6,483	7,006	7,520	8,027	8,280	8,389	8,654	8,837	8,343	8,940	9,344	9,318	9,306	9,295	9,288	9,281	160,904	
Funds from Operations	1,655	2,213	2,622	3,045	3,446	4,012	4,293	4,706	5,320	5,727	6,450	6,989	7,354	7,737	8,343	8,960	9,344	9,318	9,306	9,295	9,288	9,281	138,704	
Net profit	-194	-654	-1,210	-1,407	-1,692	-1,871	-2,181	-2,255	-2,111	-2,222	-1,727	-1,382	-1,027	-1,037	-819	1,657	3,206	3,844	4,453	5,129	5,866	6,400	8,543	
Depreciation	1,849	3,167	3,831	4,452	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,362	8,582	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881	130,161	
Subsidies Required	200	1,000	1,300	1,500	1,700	1,900	2,200	2,300	2,200	2,300	1,800	1,400	1,300	1,100	0	0	0	0	0	0	0	0	0	22,200
Use of Funds	28,067	19,398	10,038	9,402	10,387	11,235	8,171	8,146	7,097	7,837	3,488	2,689	3,654	2,799	2,664	3,211	2,359	0	0	0	0	0	0	141,070
Working Capital	329	130	72	91	87	77	55	73	64	68	61	61	62	64	66	67	67	0	0	0	0	0	0	1,496
Capital Investment	27,737	19,767	9,966	9,311	10,300	11,158	8,116	8,074	7,032	7,770	3,425	2,627	3,592	2,735	2,528	3,144	2,291	0	0	0	0	0	0	139,574
Net Cash Flow for the Year	-26,211	-16,586	-4,116	-4,857	-5,241	-5,323	-1,678	-1,141	424	190	4,784	5,701	5,000	6,037	6,749	5,749	6,985	9,317	9,306	9,295	9,288	9,281	19,834	
Cumulative Cash Flow	-26,211	-42,836	-49,012	-53,970	-59,111	-64,433	-66,112	-67,552	-66,929	-66,853	-61,975	-59,174	-51,174	-46,137	-33,827	-20,938	-9,653	17,336	9,030	1,265	10,553	19,834	19,834	

FIRROI 2004-2025 1.791%

2.12 Projected Income Statement for SO -1 (OM Cost + 10%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total	
Revenues	3,137	3,698	4,181	4,799	5,246	6,032	6,375	6,898	7,320	7,776	8,270	8,884	9,103	9,531	9,961	10,396	10,823	10,808	10,808	10,808	10,808	10,808	10,808	176,370
Telephone Services	1,646	1,969	2,200	2,582	2,928	3,224	3,422	3,731	3,979	4,253	4,489	4,735	4,985	5,245	5,509	5,780	6,050	6,035	6,035	6,035	6,035	6,035	6,035	96,902
Distributed Infr Settlement	430	504	546	619	679	732	762	812	849	888	916	945	974	1,003	1,031	1,069	1,085	1,085	1,085	1,085	1,085	1,085	1,085	19,258
Distributed Access Charge	775	929	1,027	1,182	1,316	1,474	1,588	1,747	1,880	2,020	2,159	2,298	2,436	2,575	2,712	2,848	2,978	2,978	2,978	2,978	2,978	2,978	2,978	46,835
Internet	204	204	310	310	310	483	483	483	483	483	572	572	572	572	572	572	572	572	572	572	572	572	572	10,624
Others	83	93	97	106	112	118	121	126	128	131	133	134	135	136	136	137	137	137	137	137	137	137	137	2,752
Operating Costs	3,331	4,653	5,391	6,206	7,058	7,902	8,506	9,154	9,431	9,898	9,987	10,047	10,340	10,569	10,561	8,739	7,617	6,963	6,355	5,679	4,942	4,408	4,408	167,827
Personnel Costs	100	100	100	101	101	101	100	100	99	99	105	112	119	127	135	143	152	158	165	171	178	185	185	2,752
Portion of BB Rental to PTA	814	742	775	845	883	941	958	998	884	882	612	440	443	446	227	0	0	0	0	0	0	0	0	10,921
Satellite Charge	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	2,011
Depreciation(New Assats)	1,849	3,167	3,831	4,452	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,352	8,592	8,774	8,943	7,303	6,198	5,474	4,853	4,166	3,422	2,881	2,881	130,161
Others	477	553	593	717	814	886	933	1,003	915	967	1,011	1,052	1,095	1,130	1,165	1,201	1,235	1,240	1,246	1,250	1,250	1,250	1,250	21,982
Profit	-194	-954	-1,210	-1,407	-1,812	-1,871	-2,131	-2,256	-2,111	-2,222	-1,727	-1,383	-1,237	-1,037	-600	1,657	3,206	3,844	4,453	5,129	5,886	6,400	6,400	8,543
Required Subsidies	200	1,000	1,300	1,500	1,700	1,900	2,200	2,300	2,200	2,300	1,800	1,400	1,300	1,100	0	0	0	0	0	0	0	0	0	22,200
Surplus for the Year	6	46	90	98	8	29	69	44	89	78	73	37	63	63	-600	1,657	3,206	3,844	4,453	5,129	5,886	6,400	6,400	30,743
Accumulated Surplus	6	52	142	236	243	272	341	385	475	553	626	663	725	788	188	1,846	5,051	8,896	13,349	18,477	24,343	30,743	30,743	

2.13 Cash Flow Projection and FIRROI for SO-2 (OM Cost -10%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total		
Source of Funds																									
Funds from Operations	1,926	3,183	3,905	4,484	5,192	5,979	6,471	7,004	7,484	8,000	8,191	8,397	8,872	8,883	8,837	9,221	9,613	9,689	9,579	9,570	9,564	9,558	9,558	163,063	
Net profit	75	684	828	1,068	1,247	1,532	1,757	1,938	1,747	-1,849	1,396	1,068	820	-711	-305	1,918	3,475	4,115	4,726	5,404	6,142	6,877	6,877	15,391	
Depreciation	1,849	3,167	3,831	4,452	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,352	8,692	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881	2,881	130,161	
Subsidies Required	0	700	1,000	1,100	1,400	1,600	1,800	1,900	1,800	1,900	1,400	1,100	1,000	800	0	0	0	0	0	0	0	0	0	17,500	
Use of Funds																									
Working Capital	28,067	19,896	10,038	9,402	10,387	11,239	11,171	8,146	7,097	7,837	3,486	2,639	3,654	2,799	2,694	3,211	2,359	0	0	0	0	0	0	0	141,070
Capital Investment	329	130	72	91	87	77	55	73	64	68	61	61	62	64	66	67	67	67	0	0	0	0	0	0	1,496
	27,737	19,767	9,966	9,311	10,300	11,158	8,116	8,074	7,032	7,770	3,425	2,627	3,592	2,795	2,528	3,144	2,291	0	0	0	0	0	0	0	139,574
Net Cash Flow for the Year	-26,142	-16,714	-4,133	-4,938	-6,196	-5,256	-1,700	-1,142	387	162	4,695	5,709	5,018	6,044	6,043	6,010	7,264	9,688	9,579	9,570	9,564	9,568	9,568	21,982	
Cumulative Cash Flow	-26,142	-42,856	-46,989	-51,927	-53,124	-54,279	-55,079	-57,220	-58,829	-59,671	-61,976	-59,267	-51,249	-45,195	-33,141	-33,132	-25,872	-16,239	6,711	2,859	12,424	21,982	21,982		

FIRROI 2004-2025 1.988%

2.14 Projected Income Statement for SO-2 (OM Cost -10%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total		
Revenues	3,137	3,656	4,181	4,756	5,346	6,032	6,375	6,898	7,320	7,776	8,270	8,684	9,103	9,531	9,961	10,396	10,823	10,808	10,808	10,808	10,808	10,808	10,808	176,370	
Telephone Services	1,946	1,969	2,200	2,582	2,928	3,224	3,422	3,731	3,979	4,253	4,489	4,735	4,985	5,245	5,509	5,780	6,050	6,035	6,035	6,035	6,035	6,035	6,035	96,902	
Distributed Infr Settlement	430	504	546	619	679	732	784	812	849	888	916	945	974	1,003	1,031	1,059	1,085	1,085	1,085	1,085	1,085	1,085	1,085	19,258	
Distributed Access Charge	775	929	1,027	1,182	1,316	1,474	1,588	1,747	1,880	2,020	2,159	2,298	2,436	2,575	2,712	2,848	2,978	2,978	2,978	2,978	2,978	2,978	2,978	46,835	
Internet	204	204	310	310	310	483	483	483	483	483	572	572	572	572	572	572	572	572	572	572	572	572	572	10,824	
Others	83	93	97	106	112	118	121	126	128	131	133	134	135	136	136	137	137	137	137	137	137	137	137	2,752	
Operating Costs	3,062	4,383	5,107	5,887	6,683	7,535	8,128	8,756	9,067	9,625	9,666	9,739	10,022	10,242	10,266	8,478	7,348	6,692	6,082	5,404	4,666	4,130	4,130	160,979	
Personnel Costs	81	82	82	82	82	82	82	82	81	81	86	92	98	104	110	117	125	130	135	140	146	152	152	2,252	
Portion of BB Rental to PTA	666	607	634	691	731	770	784	817	732	730	501	360	362	365	186	0	0	0	0	0	0	0	0	8,935	
Satellite Charge	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	1,645	
Depreciation(New Assets)	1,949	3,167	3,831	4,452	5,139	5,883	6,424	6,962	7,431	7,949	8,177	8,352	8,592	8,774	8,943	7,303	6,138	5,474	4,853	4,166	3,422	2,881	2,881	130,161	
Others	390	452	485	587	666	725	763	820	749	791	827	861	886	925	963	983	1,011	1,014	1,019	1,023	1,023	1,023	1,023	17,985	
Profit	75	654	526	1,086	1,347	1,503	1,752	1,852	1,747	1,849	1,398	1,655	1,320	711	-335	1,918	3,475	4,115	4,726	5,404	6,142	6,677	6,677	15,391	
Required Subsidies	0	700	1,000	1,100	1,400	1,600	1,800	1,900	1,800	1,900	1,400	1,100	1,000	800	0	0	0	0	0	0	0	0	0	0	17,500
Surplus for the Year	75	16	74	12	53	97	48	42	53	51	4	45	80	89	89	1,918	3,475	4,115	4,726	5,404	6,142	6,677	6,677	32,891	
Accumulated Surplus	75	92	166	178	231	327	375	417	470	521	525	570	650	739	434	2,362	5,827	9,942	14,668	20,072	26,214	32,881	32,881		

US\$'000

2.15 Cash Flow Projection and FIRROI for SI-1 (Investment -15%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total	
Source of Funds	1,790	2,748	3,213	3,805	4,419	5,056	5,482	6,005	6,402	6,814	6,615	7,143	7,513	7,900	8,490	9,091	9,478	9,453	9,442	9,432	9,426	9,420	149,228	
Funds from Operations	1,790	2,348	2,763	3,205	3,619	4,196	4,482	4,905	5,502	5,914	6,615	7,143	7,513	7,900	8,490	9,091	9,478	9,453	9,442	9,432	9,426	9,420	142,128	
Net profit	218	344	-433	-580	-743	-695	-374	-1,013	-314	-843	-336	44	210	442	889	2,883	4,261	4,801	5,317	5,891	6,517	6,971	31,491	
Depreciation	1,572	2,692	3,257	3,784	4,368	5,000	5,460	5,918	6,316	6,756	6,951	7,099	7,303	7,458	7,901	6,208	5,217	4,653	4,125	3,541	2,909	2,449	110,637	
Subsidies Required	0	400	500	600	800	900	1,000	1,100	900	900	0	0	0	0	0	0	0	0	0	0	0	0	7,100	
Use of Funds	23,906	16,933	8,643	8,008	8,842	9,561	9,954	9,935	6,042	6,672	2,972	2,295	3,115	2,389	2,214	2,740	2,015	0	0	0	0	0	0	120,134
Working Capital	328	130	72	91	87	77	55	73	64	68	61	61	62	64	66	67	67	0	0	0	0	0	0	1,496
Capital Investment	23,577	16,802	8,471	7,915	8,755	9,484	9,899	9,863	5,977	6,604	2,911	2,233	3,053	2,325	2,149	2,672	1,947	0	0	0	0	0	0	118,638
Net Cash Flow for the Year	-22,116	-14,184	-5,280	-4,201	-4,423	-4,455	-1,472	-930	360	142	3,643	4,849	4,398	5,511	6,276	6,351	7,463	9,453	9,442	9,432	9,426	9,420	29,094	
Cumulative Cash Flow	22,116	39,301	-41,500	-46,781	-59,204	-54,670	-56,142	-57,072	-56,710	-56,570	-52,927	-49,073	-43,650	-38,169	-31,834	-25,543	-13,073	-3,626	816	10,248	19,674	29,094	29,094	

FIRROI 2004-2025 2.533%

2.16 Projected Income Statement for SI-1 (Investment -15%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total		
Revenues	3,137	3,689	4,181	4,799	5,346	6,032	6,375	6,898	7,320	7,776	8,270	8,684	9,103	9,531	9,961	10,396	10,823	10,808	10,808	10,808	10,808	10,808	10,808	176,370	
Telephone Services	1,946	1,969	2,200	2,582	2,928	3,224	3,422	3,731	3,979	4,253	4,489	4,735	4,985	5,245	5,509	5,780	6,050	6,035	6,035	6,035	6,035	6,035	6,035	96,902	
Distributed Infr Settlement	400	504	546	619	679	732	762	812	849	888	916	945	974	1,003	1,031	1,059	1,085	1,085	1,085	1,085	1,085	1,085	1,085	19,258	
Distributed Access Charge	775	929	1,027	1,182	1,316	1,474	1,588	1,747	1,880	2,020	2,159	2,298	2,436	2,575	2,712	2,848	2,978	2,978	2,978	2,978	2,978	2,978	2,978	46,835	
Internet	204	204	310	310	310	483	483	483	483	483	572	572	572	572	572	572	572	572	572	572	572	572	572	10,624	
Others	83	83	97	106	112	118	121	126	128	131	133	134	135	136	136	137	137	137	137	137	137	137	137	2,752	
Operating Costs	2,919	4,043	4,675	5,379	6,095	6,636	7,353	7,911	8,134	8,619	8,605	8,640	8,892	9,089	9,072	7,513	6,562	6,007	5,490	4,916	4,290	3,837	3,837	144,879	
Personnel Costs	90	91	91	92	92	92	91	91	90	90	96	102	108	115	123	130	138	144	150	156	162	168	168	2,502	
Portion of BB Rental to PTA	740	674	704	768	812	856	871	908	813	811	557	400	403	406	207	0	0	0	0	0	0	0	0	9,928	
Satellite Charge	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	1,828	
Depreciation(New Assets)	1,572	2,692	3,257	3,794	4,368	5,000	5,460	5,918	6,316	6,756	6,951	7,089	7,303	7,458	7,601	6,208	5,217	4,653	4,125	3,541	2,909	2,449	2,449	110,637	
Others	434	503	539	652	740	806	848	911	832	879	919	956	996	1,028	1,059	1,092	1,123	1,127	1,133	1,136	1,136	1,136	1,136	19,984	
Profit	218	-344	-493	-580	-743	-604	-978	-1,012	-814	-843	-335	44	210	442	889	2,883	4,261	4,801	5,317	5,891	6,517	6,971	6,971	31,491	
Required Subsidies	0	400	500	600	800	900	1,000	1,100	900	900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,100
Surplus for the Year	218	56	7	20	51	95	22	87	86	57	335	44	210	442	889	2,883	4,261	4,801	5,317	5,891	6,517	6,971	6,971	38,591	
Accumulated Surplus	218	274	281	302	353	448	470	557	643	700	365	409	619	1,061	1,950	4,833	9,094	13,896	19,212	25,103	31,621	38,591	38,591		

2.17 Cash Flow Projection and FIRROI for CMB (Revenue +5%, OM Cost -10%, Investment -10%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total	
Source of Funds	2,081	2,668	3,514	4,104	4,659	5,381	5,790	6,349	6,760	6,489	7,394	7,732	8,127	8,540	9,135	9,741	10,154	10,129	10,119	10,110	10,105	10,099	169,171	
Funds from Operations	2,081	2,668	3,114	3,604	4,059	4,681	4,990	5,449	6,050	6,489	7,194	7,732	8,127	8,540	9,135	9,741	10,154	10,129	10,119	10,110	10,105	10,099	154,371	
Net profit	417	-182	-634	-400	-593	-114	-791	-819	-639	-856	-165	215	386	643	1,087	3,168	4,630	5,203	5,752	6,361	7,025	7,506	37,226	
Depreciation	1,664	2,850	3,448	4,007	4,625	5,294	5,781	6,266	6,688	7,154	7,369	7,517	7,733	7,897	8,048	6,573	5,524	4,926	4,368	3,750	3,080	2,593	117,145	
Subsidies Required	0	0	400	500	600	700	800	900	700	0	200	0	0	0	0	0	0	0	0	0	0	0	4,800	
Use of Funds	20,309	17,928	9,045	8,476	9,382	10,123	7,382	7,343	6,397	7,064	3,147	2,429	3,298	2,629	2,344	2,900	2,133	1	0	0	0	0	0	127,187
Working Capital	346	137	76	96	92	81	58	76	68	71	64	64	66	68	69	71	71	1	1	0	0	0	0	1,570
Capital Investment	24,964	17,791	8,969	8,380	9,270	10,042	7,305	7,266	6,329	6,993	3,083	2,365	3,233	2,461	2,275	2,829	2,062	0	0	0	0	0	0	125,617
Net Cash Flow for the Year	-23,228	-15,260	-5,531	-4,372	-4,703	-4,742	-1,572	-993	363	-675	4,248	5,303	4,829	5,011	6,791	6,841	8,021	10,128	10,119	10,110	10,105	10,099	31,983	
Cumulative Cash Flow	-23,228	-38,487	-44,018	-48,390	-53,093	-57,834	-59,466	-60,639	-60,946	-60,852	-56,374	-51,071	-46,242	-40,231	-30,410	-26,599	-19,579	-8,450	1,669	11,779	21,884	31,983	31,983	

FIRROI 2004-2025 2.926%

2.18 Projected Income Statement for CMB (Revenue +5%, OM Cost -10%, Investment -10%)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total	
Revenues	3,294	3,884	4,390	5,039	5,613	6,333	6,894	7,243	7,686	8,165	8,683	9,118	9,588	10,008	10,459	10,916	11,364	11,348	11,348	11,348	11,348	11,348	11,348	185,189
Telephone Services	1,728	2,067	2,310	2,711	3,075	3,386	3,553	3,917	4,178	4,466	4,714	4,971	5,235	5,507	5,785	6,069	6,362	6,337	6,337	6,337	6,337	6,337	6,337	101,748
Distributed Infr Settlement	452	529	574	650	713	769	800	852	891	932	962	993	1,022	1,053	1,082	1,112	1,139	1,139	1,139	1,139	1,139	1,139	1,139	20,221
Distributed Access Charge	814	976	1,079	1,241	1,382	1,547	1,667	1,834	1,974	2,121	2,267	2,413	2,558	2,704	2,848	2,990	3,127	3,127	3,127	3,127	3,127	3,127	3,127	49,176
Internet	214	214	326	326	326	507	507	507	507	507	601	601	601	601	601	601	601	601	601	601	601	601	601	11,155
Others	87	98	102	112	118	124	127	132	135	138	139	140	142	143	143	144	144	144	144	144	144	144	144	2,889
Operating Costs	2,877	4,068	4,724	5,442	6,179	6,947	7,485	8,060	8,324	8,630	8,848	8,904	9,163	9,365	9,372	7,748	6,734	6,145	5,586	4,987	4,323	3,842	3,842	147,963
Personnel Costs	81	82	82	82	82	82	82	81	81	81	86	92	98	104	110	117	125	130	135	140	146	152	152	2,252
Portion of BB Rental to PTA	666	607	634	691	731	770	784	817	732	730	501	360	362	365	186	0	0	0	0	0	0	0	0	8,935
Satellite Charge	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	1,645
Depreciation(New Assets)	1,664	2,850	3,448	4,007	4,625	5,294	5,781	6,266	6,688	7,154	7,359	7,517	7,733	7,897	8,048	6,573	5,524	4,926	4,368	3,750	3,080	2,593	2,593	117,145
Others	390	452	495	587	666	725	763	820	749	791	827	861	896	925	953	983	1,011	1,014	1,019	1,023	1,023	1,023	1,023	17,985
Profit	417	-182	-334	-403	-563	-614	-791	-816	-638	-865	-165	215	395	643	1,087	3,168	4,630	5,203	5,752	6,361	7,025	7,506	7,506	97,226
Required Subsidies	0	0	400	500	600	700	800	900	700	0	200	0	0	0	0	0	0	0	0	0	0	0	0	4,800
Surplus for the Year	417	-182	66	97	34	86	9	84	62	-363	35	215	395	643	1,087	3,168	4,630	5,203	5,752	6,361	7,025	7,506	7,506	42,026
Accumulated Surplus	417	235	301	399	433	519	528	611	673	8	43	258	652	1,295	2,382	5,560	10,180	15,383	21,135	27,495	34,520	42,026	42,026	

ANNEX 3

NATIONAL AND RURAL DEVELOPMENT

Annex 3

National and Rural Development

Annex 3.1 Socio-economic Survey Result.....2

Annex 3.2 Reference to Evaluation of Rural Development Needs 14
and Potential in Rural Area

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Telecommunication Supports

Annex 3.1 Socio-economic Field Survey Result

3.1.1 General

(1) Objectives

This socio-economic survey aims to define the real situation of nation's rural development, economic capacity of rural households and information and communication service demands for five aimags selected as typical rural areas in Mongolia through discussion with PTA. The field survey was focused to obtain the basic data and key information for socio-economic analysis in conjunction with rural telecommunication development, through questionnaire survey of sum's households in each aimag and interview survey for administrative experts.

The study team in cooperation with PTA and local consultants conducted the survey for the following questionnaire and interview surveys.

- (a) Local Administration (aimag and sum centre) Interview Survey (SE-1,2)
- (b) Household Questionnaire Survey (SE-3)
- (c) MTC Local Telephone Exchange (TEX) Interview Survey (SE-4)

(2) Survey Area and Samples

Five aimags for field survey with certain criteria of selection through discussion with Mongolian side were Govi-Altai, Bulgan, Tuv, Khentii with 10 –15 sums in each aimags. Samples of survey are shown in the following table.

Table 3.1.1 Survey Area and Samples

Region	Aimag	Aimag Centre	Number of Sums	Number of Household	Number of TEX
Western	Govi-Altai	Altai	14	420	15
Khangai	Bulgan	Bulgan	15	481	23
Central (North)	Tuv	Zuunmod	16	556	16
Central (South)	Umnugovi	Dalanzadgad	13	433	15
Eastern	Khentii	Underkhaan	18	608	19
Total	5	5	76	2,498	88

Note: TEX = MTC local telephone exchange

Source: JICA study team

(3) Duration of Survey

Field surveys were implemented from 14th April to 31th May in the year of 2002.

(4) Method of Survey

In order to secure quality and standard of survey outputs among survey teams, pilot surveys were implemented in Tuv aimag including necessary amendments of questionnaires, and JICA study team attended at each survey of five aimags in terms of technological transfer to official staffs and local consultants.

(a) Contents of Questionnaire and Interview survey

The questionnaire asked about the following items shown briefly in Table 3.1.2 for each objects consisting of local administrators, households and MTC local telephone exchange officers in sum centres.

(b) Method of Survey

The survey was conducted through the following method taking account of characters of contents of questions in order to obtain and gather necessary information and data effectively and efficiently within limited time-framework.

Table 3.1.2 Contents of Questionnaire and Interview Survey

Survey Category	Persons interviewed	Key Contents of Questions	Method of Survey	Reference
Local Administration Interview for aimag centre	Governor Several departments in charge of socio-economic information and data	<ul style="list-style-type: none"> • Development constraints and issues • Direction of economic development and plans • Socio-economic data (GRDP by sector, population, etc) 	<ul style="list-style-type: none"> • Interview to administrative officers • Request data information and collection 	<ul style="list-style-type: none"> • Interview Sheet = SE1
Local Administration Interview for sum centre	Several departments in charge of socio-economic information and data	<ul style="list-style-type: none"> • Existing facilities and development status • Development constraints and issues • Direction of economic development and plans 	<ul style="list-style-type: none"> • Interview to administrative officers • Request data information and collection 	<ul style="list-style-type: none"> • Interview Sheet = SE1
Households Questionnaire Survey	Each resident as household in aimags and sums centres	<ul style="list-style-type: none"> • Existing family profile (members, income, etc) • Living conditions (utilities, housing type, etc) • Telecommunication use and willingness to pay or opportunity cost 	<ul style="list-style-type: none"> • House call interview to each household • Questionnaire by local consultant interviewer 	<ul style="list-style-type: none"> • Questionnaire Sheet = SE3
TEX office Interview	Each TEX officers in sum centres	<ul style="list-style-type: none"> • Operation and management status and issues 	<ul style="list-style-type: none"> • Interview to administrative officers 	<ul style="list-style-type: none"> • Interview Sheet = SE4

Note: TEX = MTC local telephone exchange
Source: JICA study team

3.1.2 Result of Survey

(1) Summary of Analysis of the Result of Local Administration Interview

This survey is summarised by the SWOT analyses on the rural development status of sums and aimags, through the result of collection of regional development program of Mongolian government, Mongolian government's action plan, Mongolian law of 2002 on the state central budget, statistic information and data.

(a) Govi-Altai aimag (Western Region)

• General

Gobi-Altai aimag is situated in west-south region of Mongolia and more than 1000 km far from Ulaanbaatar city. There are 2 sq. km of territory and 25 heads of livestock per person. The aimag has 3 large chain of mountains-Khantaisher, Khasagt Khairkhan, Khar azarga and vast lands of Sharga, Khuis, Zakhui, Zarman, Tsenkher nomin, Altain tsaag gobi, and it has continental climate. There are 18 sums, 85 bags and 2 villages. Gobi-Altai aimag has 1.7 million heads of livestock, including 28279 camel, 75117 horse, 39879 cow, 692678 sheep, 878778 goat, and has 9600 herdsman households.

It is famous for its beautiful natures such as "Nuden tsenkher" and "Ereen nuur" lakes with large stock of fish situated in the middle of large desert, 9 volcanic lakes on top a desert mountain, all types of herbal medicines, wild sheep and goats, desert bears, snow leopards and wild camels. Gobi-Altai aimag has 66490 inhabitants and 15483 households and cultivates wheat in 581.5 hectares, potatoes in 178.3 hectares and vegetables in 149.4 hectares. The total cropping field reserve is 12182.5 hectares.

• Strength

- Preliminary processing factory for wool and cashmere
- The construction works of a hydroelectric power plant in Ulaanboom is already started
- Manufactures wines and oils from wild berries
- The energy supply problem is solved to some extent when the Japanese diesel generators were installed at all sums in 2001
- Border crossing port with China
- Exotic animals such as wild sheep, wild goats, desert bears etc
- Developed hunting tourism business (revenue from foreign hunters)
- Coal mining of Zeegt, Khuren gol, Tsakhiurt and Maanit are in operation
- Famous for its oak and barley flour and milk products

• Weakness

- Poor development of health and social welfare systems
- Underdevelopment of commerce, service and transportation sectors
- Poor education system (distant)
- Lack of financing
- Low population density
- Underdevelopment of industrial sector
- Poor development of information and communication sector and poor service coverage
- Distant from Ulaanbaatar
- Poor development of road, transportation, communication and energy infrastructures

• Opportunity

- Introduction of satellite mobile communications to bags and sums
- Increase the local budget revenue by introducing small and medium industry and service sectors
- Exploitation of natural resources of coal, gold, platinum, limestone and magnesium
- Increase the quantity of cropping production, particularly, for those who have lost their livestock in natural disasters
- Develop industries for the construction materials such as cement and bricks by using its own natural resources
- Develop tourism industry based on its natural virgin landscapes
- Utilize fully the cropping field reserve of 12182.5 hectares

- **Threat**

- Frequent occurrence of natural disasters (successive droughts and zud for last 3-4 years and great number of livestock were lost)
- Due to the occurrence of natural disasters the herdsmen's psychology have changed (suicide cases reported)
- High poverty level
- High number of households without any livestock
- Desertification process continues
- The earth and weather conditions are not favorable for the cropping productions
- High loss and poor collection of local budget revenue (budget revenue-473.9 million tugrugs, expenditure-3988.9 million tugrugs)
- High unemployment rate of 7.6% is high indicator at national level
- Large number of children out of school for the purpose of herding livestock

(b) **Bulgan aimag (Khangai Region)**

- **General**

The aimag is experiencing an overall lack of qualified professional human resources and destabilization. Equipment and materialistic supply in the health and education sectors and the training and service level is poor. The unemployment level is 17.9% or higher than national average, which indicates that the poverty level may increase. In 2000, Bulgan aimag's local budget revenue was 1127.7 million tugrugs, local budget expenditure was 3933.9 million tugrugs, subsidy from the state central budget was 2380.0 million tugrugs and budget loss was 500 million. This fact clearly suggests that, in order to increase the budget revenue, the aimag should increase its production of cropping, animal husbandry, work places and the coverage of taxation system.

- **Strength**

- Wheat cropping in 27000 hectares (Occupies 3rd place in Mongolia)
- Good infrastructure development
- Connected to the central power line at aimag level
- The auto road of Ulaanbaatar-Murun route passes through all sums
- Has a rich reserve of forest (172 287 thousand m3)
- Saikhan and Mogod are famous for their mare milk drinks
- Brown rice cropping in Bayan-agt and Khutag-Undur sums
- Population density is 1.3 (3rd in national level)
- 5th at national level by its number of educated people (78.8% of total population is educated)
- Saikhan sum has 96.1 thousand sheep and it is the 4th largest at national level
- Prepares 56.4 thousand tons of natural hays and it is the 4th largest at national level

- **Weakness**

- Lack of health care specialists at aimag level
- Lack of training, materials and equipment for the primary and secondary schools
- Poor telecommunication service coverage
- Underdevelopment of industries

- Outdated and old technologies for the cropping production
- Old telecommunication equipment in Mogod sum

- **Opportunity**

- Provision of reliable and cheap energy if the hydro-electric plant of “Eg” river is commissioned
- Utilize natural resources of forest, wild berries, fish etc
- Development of tourism relying on beautiful natured site such as “Uran Togoo”
- Establish rest and treatment facility based on the hot spa of Mogod sum
- A total of 1.3 million livestock heads
- Harvest 28000 tons of wheat and 4000 tons of vegetables
- Exploitation and processing of natural resources such as gold, copper and molybdenum
- Green revolution, livestock projects are being implemented by World Vision-an international organization
- A permanent operational border crossing port is about to be opened in Teshig

- **Threat**

- Increase of poverty as the unemployment percentage is 17.9%
- Successive fires in many occasions
- Successive natural disasters for last 3-4 years
- 3.13 criminal offences were committed in 2000 and the number tends to increase
- Depreciation of land surface
- Improper use of forest reservation

(c) **Tuv aimag (Central Region-north)**

- **General**

The aimag has many beautiful natured sites and historic places such as “Tsogt taij” palace remaining, “Eej Khad” etc. The tourism industry is developing with tourist camps of “Undur Dov,” “Terej,” “Janchivlan” “Dugan khad” and etc.

The number of livestock is high. By its number of sheep occupies the 3rd place after Zavkhan and Uvurkhangai aimags (1101.2 thousand heads) and by its number of horses occupies the 2nd place after Arkhangai aimag (2495 thousand heads) at national level. It is one among the aimags with highest cropping production. Occupies the 2nd place after Selenge aimag (93656.4 hectares) with a total of 30094.5 hectares of cropping field. All sums are connected with the central power line. The postal and telecommunication services and infrastructure are poorly developed.

- **Strength**

- Near to Ulaanbaatar (3.3. km)
- All sums are connected with the central power line
- Many beautiful natured sites and historic places · Tourist camps (“Undur Dov”, “Terej”, “Janchivlan” “Dugan khad”)
- Large reserves of natural resources such as gold and coal (Baganuur coal mining)
- Good cropping production (wheat in 28044 hectares)
- Large number of livestock (sheep-894563, goats-457855, cows-120077, horses-192676, camels-2864)
- Special productive livestock breeds (big sheep, “Jargalant” horse, Kazak white head cows)
- Specialized training facilities (agriculture, construction)
- Manufacturing facilities (work clothing factory)
- As of 2000 number of inhabitants is 98 000 (5th at national level)

- **Weakness**

- Poor postal services (the communication office does not operate for 24 hours, mail delivered to some sums after a month)
- Poor auto road network

- Lack of housing, outdated utility network
- Lack of qualified personnel in education and health sectors
- Poor medical and educational services
- Lack of scholar training materials
- Poor water supply in some sums
- Outdated and old technologies for the cropping production

- **Opportunity**

- Increase the cropping production (Uransh-21, Shim Bordoo projects worth 56.0 million tugrugs are being implemented by JICA, large cropping field-233560 hectares)
- Develop the animal husbandry, increase the special livestock breeds and production of prime materials
- Improvement of road network (in the framework of millennium road project)
- Development of tourism industry
- Increase of exploitation of natural resources
- Improvement of medical services (Mongolian-German government's GTZ project is being implemented in 10 sums and 6 more sums shall be included in the future)
- Improvement of training materials and equipment of schools (a project for 10 years period is being implemented by Asian Development Bank)

- **Threat**

- Financial burden
- Increase of lack of qualified human resources
- Difficulties to develop industries because of competition from the near Ulaanbaatar city
- Ecological unbalance and environmental contamination due to the development of exploitation of natural resources
- Increase of land depreciation due to large number of livestock
- Frequent occurrence of natural disasters may damage the animal husbandry and cropping production
- Increase of unemployment (8232 unemployed persons)
- Increase of poverty (6670 poor households)
- Increase of criminal offences (1995-799, 1999-826, 2000-917) Improper use of forest reservation

(d) **Umnugovi aimag (Central Region-south)**

- **General**

Umnugobi aimag was established in 1931, has a territory of 165.4 thousand sq. km and borders with the People's Republic of China in south by more than 700 km, in other sides with Uvurkhangai, Dundgobi, Dornogobi. 60 % of the territory is mountainous with continental climate and it has administration units of 15 sums, 54 bags, 46.7 thousand inhabitants and 11.6 thousand households. (One person per 4 sq. km and one household per 14 sq. km)

The main economic sector is animal husbandry and according to the census as end of 2001, there were 1209566 livestock heads, including 92892 camel, 65910 horse, 12135 cow, 312394 sheep and 736835 goat. Products worth 5075035.0 thousand tugrugs produced annually from the animal husbandry. Nearly 60% of the industrial production belongs to energy, nearly 20% to coal exploitation and more than 10% belongs to the food processing industry respectively.

7 tourist camps are in operation and more than 4000 foreign tourists visit to the virgin nature of gobi per annum.

A thermoelectric plant was commissioned in 2000 in the aimag center and Khurmen and Khankhongor sums were connected to the power line in 2001 and Bayandalai sum shall be connected in 2002.

- **Strength**

- 2 border crossing ports (Gashuun Sukhait, Shivee Khuren)
- Leads the nation regarding the number of camels (92.8 thousand)

- Occupies 3rd place at national level regarding the number of goats (Gurvantes sum has the most number of goats)
- Occupies 3rd place at national level regarding the number private automobiles
- Major important natural resource reserves for the national economy (Copper reserve of “Oyu tolgoi, coal reserve of “Tavan tolgoi”)

- **Weakness**

- Poor infrastructure development (road, transportation, energy, communications)
- Distant from Ulaanbaatar (553 km)
- Low population density (per 1 sq. km territory 0.28 person)
- Least number of inhabitants compared with other aimags (46.9 thousand) (limited workforce)
- Least number of cows (23.8 thousand)
- Small size of cropped field (170.0 hectares)
- Poor preparation natural hays (3.9 thousand tons)
- Least sale of industrial products compared with other aimags (819.5 million tugrugs)
- Limited number of elementary schools (19)
- Lack of qualified personnel in health and education field
- Least number of doctors (88)
- Lack of medical services
- Poor scholar training materials · Poor telecommunication service coverage

- **Opportunity**

- As it borders with PR of China, it should intensively develop the commerce relying on the border crossing ports
- The quantity of workforce is relatively increasing (in 2000 increased by 3000 compared with 1992)
- Develop tourism industry (beautiful natured landscapes, exotic animals)
- Develop mining industry (coal reserve of “Tavan tolgoi”, copper reserve of “Oyu tolgoi”)
- Establish central energy network for aimag center and some sums · Develop infrastructure relying on the natural resource reserves
- Increase the local budget revenue
- Use renewable energy sources such as solar and wind
- Develop the animal husbandry production

- **Threat**

- Natural disasters (draughts and zud)
- Large investment required for the development of infrastructure as the population density is low
- The number of unemployed persons is increasing year after year
- Increasing number of poverty (poor households-3275)
- High percentage of infant death per 1000 children (45.8)
- Increase of criminal cases (207 registered cases per 10 000)
- Financial burden
- Obsolete technologies

(e) **Khentii aimag (Eastern Region)**

- **General**

Khentii aimag was established in 1923, and has a territory of 80.3 thousand sq. km, 17 sums, 2 aimag-center-level cities, 3 villages, 87 bags and 61 000 inhabitants. Seventy five percent of total territory is situated in mountainous areas of Khangai Khentii and 25% in vast plane steppe of Dornod Mongol. Forty two point seven percent of the total population is women and 72.5% is the young people under 35 years old. All sums have health care offices, a total of 27 pharmacies and 2 spas which are in operation.

There are 14544 children in a total of 32 secondary schools, and in 27 kindergartens, there are 2285 kids studying. As of 2000, there were 700 employees working in industrial sector and manufactured products worth 1165.2 million tugrugs. Most of the business entities carry out their activities in the field of animal husbandry, cropping production and food processing and produce 22% of the aimag's gross domestic products.

Khentii aimag has a total of 1356.7 thousand heads of livestock, 78 per one household and 20 per one person. Galshir, Delgerkhaan, Umnudelger, Batnorov, Kherlen are the sums with most heads of livestock, and Dadal and Batshireet are with least numbers. The aimag has a total of 25.0 thousand hectares of cropping field and annually an average of 10.0 thousand hectares are cultivated with wheat and about 400 hectares with vegetables. An average of 700 kg wheat and 550-600 kg of vegetables are harvested from a hectare.

The native land of Chingiss khaan- Khentii aimag has advantages of having many beautiful natured landscapes, historical and cultural sites and natural resources of gold, spars, tins and brown coals. The unemployment level is 7.3% and working on with an objective to decrease the rate to 2% in next 5 years.

- **Strength**
 - Tourist camps around the historical sites related to Chingiss khaan's history (remaining of Aurig palace, statue of Chingiss khaan's) and beautiful nature
 - Nationally famous spas (Hot spa of Onon river, spa of Avraga Toson)
 - Nationwide famous products (Silver craftsmanship of Batnorov, spar, tin, gold, coal, Mongolian traditional boots, flour plant, cashmere)
 - Food processing industries (high quality wheat, fruit, fish, vegetables)
- **Weakness**
 - Poor medical service coverage to overall population
 - Financial burden for the development of small and medium industries in the field of food, commerce and services
 - Poor telecommunication service coverage
 - The unemployment rate tends to increase (7.3% or 1864 unemployed persons)
 - Does not organize seminars or trainings for the human resource development. Lack of qualified teachers and doctors
 - Lack of local budget
 - Poor transportation services Old telecommunication equipment in Mogod sum
- **Opportunity**
 - 70.9 thousand inhabitants (72.5% of the total population is young people under 35 years old)
 - 1356.7 thousand heads of livestock
 - Increase of food processing production (particularly, flour and fodder) and ecologically clean products
 - Increase of exploitation of natural resources (gold, coal, spar)
 - Establish wholesale trading center for food products and supply the local market
 - Export meat and meat products
 - In the framework of "Mon-3685" project supported by the Asian Development Bank, 6000 m of fresh water pipes of existing 7 water point, 7 new hydro-pump water point shall be renovated and 603.2 million tugrugs shall be invested for the purpose.
- **Threat**
 - Outdated technologies in all sectors of the industry
 - The existing auto road network does not fulfill the requirements
 - 90% of the all projects implemented is for the education and health sectors
 - Poor development of infrastructure
 - The number of very poor family under MLSL tends to increase (5919 households)
 - Change of weather
 - High probability of natural disasters (in last 5 years there were 86 fires)

(2) Result of Household Survey

The results of the survey have been elaborated in this stage for the main purpose of the economic and financial impact study and feasibility studies in terms of affordability of telecommunication use. Selected summary of the household survey is shown as following Table 3.1.3.

Table 3.1.3 Selected Summary of Household Survey

	Numbers of Household	Income Tg. '000	% of Aimag C. and Composit %	Occupation	o/w herdsmen	Monthly Tel. Use		News Source: Is it enough?*	Home Tel.	Use of Tel. At	Purpose of Call**	Destination of Call***	Length of Call (min.)	Wish to subscribe?
						in Tg.	times / mo.							
I Bulgan		average												
15 Sums excl. Aimag C.	481	53.9	71%											
1 Income Bracket A <<Tg. 0-18,999>>	42	16.4	8.7%	mostly none	19%	511	2.4	TV & Press 33:67	4.8%	Tel. Center = 88%	14,74,12%	31,31,48%	3.0	Yes = 88%
2 Income Bracket B <<Tg. 19,000-40,999>>	165	35.0	34.3%	various	13%	1,811	4.9	TV & Press 56:44	17.6%	Tel. Center = 53%	13,84,18%	32,36,55%	3.0	Yes = 96%
3 Income Bracket C <<Tg. 41,000-100,999>>	249	64.0	51.8%	various	1%	2,231	4.1	TV & Press 57:43	22.0%	Tel. Center = 65%	16,75,7%	28,45,54%	3.1	Yes = 99%
4 Income Bracket D <<Tg. 101,000 and over>>	25	130.3	5.2%	various	16%	4,600	16.3	TV & Press 48:48	40.0%	Tel. Center = 44%	36,80,12%	28,48,60%	2.8	Yes = 88%
II Govi-Altai		average												
14 Sums excl. Aimag C.	420	108.7	104%											
1 Income Bracket A <<Tg. 0-18,999>>	3	17.1	0.7%	herdsman 1 none 2	33%	1,167	3.7	TV, Press, Friends 33:67	none	Tel. Center = 100%	0,100,0%	33,33,33%	5.9	Yes = 67%
2 Income Bracket B <<Tg. 19,000-40,999>>	54	36.2	12.9%	various	26%	3,118	3.5	TV, Press, Friends 30:70	9.3%	Tel. Center = 100%	13,81,6%	31,54,33%	3.6	Yes = 98%
3 Income Bracket C <<Tg. 41,000-100,999>>	224	77.6	53.3%	various	8%	6,063	7.3	TV, Press, Friends 38:62	24.1%	Tel. Center = 100%	17,87,13%	28,59,49%	4.7	Yes = 100%
4 Income Bracket D <<Tg. 101,000 and over>>	139	171.5	33.1%	various	12%	11,202	11.9	TV, Press, Friends 50:49	41.7%	Tel. Center = 98%	29,87,17%	32,57,51%	4.0	Yes = 99%
III Khentii		average												
18 Sums excl. Aimag C.	608	77.6	107%											
1 Income Bracket A <<Tg. 0-18,999>>	20	13.3	3.3%	mostly none	15%	1,616	1.0	TV & Press 30:70	5.0%	Tel. Center = 54%	0,35,15%	20,20,15%	3.5	Yes = 85%
2 Income Bracket B <<Tg. 19,000-40,999>>	171	37.7	28.1%	various	13%	3,828	5.5	TV & Press 37:63	5.8%	Home = 58%	5,74,15%	23,29,48%	3.5	Yes = 95%
3 Income Bracket C <<Tg. 41,000-100,999>>	348	72.8	57.2%	various	10%	6,337	10.0	TV & Press 40:60	54.9%	Home = N.A.	11,72,14%	31,43,65%	3.7	Yes = 96%
4 Income Bracket D <<Tg. 101,000 and over>>	69	142.8	11.3%	various	12%	12,000	14.0	TV & Press 42:57	52.2%	Home = N.A.	33,81,23%	33,39,87%	3.9	Yes = 100%
IV Umnugovi		average												
13 Sums excl. Aimag C.	433	61.6	71%											
1 Income Bracket A <<Tg. 0-18,999>>	36	17.2	8.3%	herdsman & none	39%	1,940	2.0	TV, Press, Friends 50:50	8.3%	Tel. Center = 72%	14,83,19%	50,44,33%	3.5	Yes = 94%
2 Income Bracket B* <<Tg. 19,000-40,999>>	135	38.0	31.2%	various	7%	3,677	5.7	TV & Press 43:57	2.2%	Tel. Center = 52%	12,83,10%	39,56,53%	4.0	Yes = 97%
3 Income Bracket C* <<Tg. 41,000-100,999>>	224	72.7	51.7%	various	6%	5,148	5.5	TV & Press 45:55	7.6%	Tel. Center = 28%	29,87,13%	53,68,71%	5.2	Yes = 100%
4 Income Bracket D* <<Tg. 101,000 and over>>	38	121.7	8.8%	various	8%	6,211	7.4	TV & Press 39:61	2.6%	Tel. Center = N.A.	29,87,13%	53,68,71%	4.1	Yes = 100%
V Tuv		average												
15 Sums excl. Aimag C.	556	58.1	80%											
1 Income Bracket A <<Tg. 0-18,999>>	49	15.6	8.8%	various	29%	1,197	8	TV, Press, Friends 30:70	2.0%	Tel. Center = 83%	8,75,0%	0,33,58%	3.5	Yes = 100%
2 Income Bracket B <<Tg. 19,000-40,999>>	179	36.6	32.2%	various	13%	954	6.6	TV & Press 30:70	9.5%	Tel. Center = N.A.	18,67,2%	22,26,54%	3.6	Yes = 98%
3 Income Bracket C* <<Tg. 41,000-100,999>>	290	69.3	52.2%	various	2%	2,162	11.3	TV & Press 33:67	21.7%	Tel. Center = N.A.	8,77,6%	31,29,80%	3.9	Yes = 97%
4 Income Bracket D* <<Tg. 101,000 and over>>	38	123.3	6.8%	various	0%	6,598	15.6	TV, Press, Friends 50:50	47.4%	Tel. Center = N.A.	27,82,36%	26,44,93%	4.0	Yes = 100%
VI Nalakh		average												
5 Districts	110	45.2												
1 Income Bracket A <<Tg. 0-18,999>>	15	17.9	13.6%	various	27%	829	0.5	TV, Friends 27:73	none	Tel. Center = 58%	7,87,0%	0,13,80%	2.0	Yes = 87%
2 Income Bracket B <<Tg. 19,000-40,999>>	54	35.0	49.1%	various	11%	1,292	3.2	TV, Friends 28:72	none	Tel. Center = 28%	4,87,0%	0,24,69%	2.3	Yes = 89%
3 Income Bracket C <<Tg. 41,000-100,999>>	39	80.5	35.5%	various	7%	2,397	4.8	√, Radio, Friend 28:72	5.1%	Tel. Center = 62%	8,85,0%	0,21,79%	2.7	Yes = 100%
4 Income Bracket D <<Tg. 101,000 and over>>	2	115.0	1.8%	various	0%	7,000	12.5	√, Radio, Friend 100:0	none	Tel. Center = NA	0,100,0%	0,0,100%	1.8	Yes = 100%

Note: * News source: Is it enough? = "33:67" means "enough" in 33% and "not enough" in 67%.

** Purpose of Call = ① Business, ② Private, ③ Health, indicated in percentage

*** Destination of Call = ① Inside Aimag and Sum, ② To Aimag Center, ③ To Ulaanbaatar, indicated in percentage

Source: JICA study team

Table 3.1.4 Willingness to Pay for Telephone Charge in Selected Aimags

By Aimag, and By Income Bracket	Telephone Charges			Current Tel. Expense
	Installation	Line Rental	Call Charge	
I Bulgan				
1 Income Bracket A <Tg. 0-18,999>	5,437	1,690	2,216	511
2 Income Bracket B <Tg. 19,000-40,999>	5,619	622	2,297	1,811
3 Income Bracket C <Tg. 41,000-100,999>	5,513	4,502	17,799	2,231
4 Income Bracket D <Tg. 101,000 and over>	5,732	520	3,236	4,600
II Govi-Altai				
1 Income Bracket A <Tg. 0-18,999>	8,667	383	237	1,167
2 Income Bracket B <Tg. 19,000-40,999>	3,827	595	2,668	3,118
3 Income Bracket C <Tg. 41,000-100,999>	4,989	816	5,425	6,063
4 Income Bracket D <Tg. 101,000 and over>	5,172	767	7,317	11,202
III Khentii				
1 Income Bracket A <Tg. 0-18,999>	1,963	390	1,038	1,616
2 Income Bracket B <Tg. 19,000-40,999>	6,160	973	1,882	3,828
3 Income Bracket C <Tg. 41,000-100,999>	7,552	974	2,495	6,337
4 Income Bracket D <Tg. 101,000 and over>	8,144	2,649	3,402	12,000
IV Umnugovi				
1 Income Bracket A <Tg. 0-18,999>	2,913	573	1,176	1,940
2 Income Bracket B <Tg. 19,000-40,999>	4,557	664	2,279	3,677
3 Income Bracket C <Tg. 41,000-100,999>	4,407	771	2,788	5,148
4 Income Bracket D <Tg. 101,000 and over>	4,620	836	4,375	6,211
V Tuv				
1 Income Bracket A <Tg. 0-18,999>	3,675	1,130	1,585	1,197
2 Income Bracket B <Tg. 19,000-40,999>	3,357	1,357	1,375	954
3 Income Bracket C <Tg. 41,000-100,999>	5,044	1,333	2,687	2,162
4 Income Bracket D <Tg. 101,000 and over>	4,600	1,159	3,300	6,598
VI Nalaikh				
1 Income Bracket A <Tg. 0-18,999>	10,750	350	3,275	829
2 Income Bracket B <Tg. 19,000-40,999>	12,240	460	4,060	1,292
3 Income Bracket C <Tg. 41,000-100,999>	16,040	492	5,460	2,397
4 Income Bracket D <Tg. 101,000 and over>	12,500	0	5,000	7,000

Source: JICA study team

Table 3.1.5 Travel Cost in Selected Aimags

By Aimag, and By Income Bracket	Travel to UB			How often a year?	Purpose of Travel *	Travel to Aimag Center			How often a year?	Purpose of Travel**
	Distance km	Travel Hours	Cost in Tg.			Distance km	Travel Hours	Cost in Tg.		
I Bulgan										
1<Tg. 0-18,999>	334	10	19,982	3.4	10,62,2,24%		4.2	9,327	3.2	19,60,2,19%
2<Tg. 19,000-40,999>	332	10	24,684	3.5	9,73,4,16%	114	4.4	10,434	3.6	8,62,19,15%
3<Tg. 41,000-100,999>	332	10	18,940	3.4	8,68,13,20%	138	4.0	8,255	5.1	8,55,37%
4<Tg. 101,000 and over>	344	8.5	18,348	7.8	56,56,8,12%		2.7	6,845	8.7	32,60,32,24%
II Govi-Altai										
1<Tg. 0-18,999>	1000	24	20,000	1.0	0,100,0,0%	100	3.5	6,000	2.0	0,100,0,0%
2<Tg. 19,000-40,999>	1022	22	44,542	0.9	2,54,2,7%	155	5.1	9,685	1.8	2,80,15,4%
3<Tg. 41,000-100,999>	1162	29	89,762	1.4	15,70,14,10%	186	6.2	19,521	2.1	14,77,43,15%
4<Tg. 101,000 and over>	1163	30	91,734	1.8	27,72,23,15%	185	5.9	15,964	1.6	25,83,40,19%
III Khentii										
1<Tg. 0-18,999>	535	5.5	10,171	1.0	0,60,0,5%	185	2.2	3,383	4.2	0,40,5,5%
2<Tg. 19,000-40,999>	357	9.9	25,469	2.4	12,68,11,16%	124	3.4	7,696	7.7	0,56,27,17%
3<Tg. 41,000-100,999>	367	9.2	20,287	3.6	15,78,24,19%	124	5.0	7,379	8.9	2,55,48,16%
4<Tg. 101,000 and over>	402	10	22,510	16.9	42,74,33,23%	139	5.0	8,326	17.4	12,54,46,6%
IV Umnugovi										
1<Tg. 0-18,999>	477	11	17,359	4.4	14,61,3,14%	107	3.0	5,373	9.0	0,89,6,22%
2<Tg. 19,000-40,999>	610	16	26,934	2.4	12,62,12,11%	141	4.4	10,690	14.0	4,76,30,18%
3<Tg. 41,000-100,999>	609	19	41,054	3.4	11,75, 20,9%	141	4.2	10,510	14.0	6,68,57,16%
4<Tg. 101,000 and over>	610	17	34,604	3.8	24,76,21,18%	141	3.7	9,227	9.8	21,89,50,21%
V Tuv										
1<Tg. 0-18,999>	103	2	4,775	8.4	25,83,0,33%	92	1.3	2,823	8.2	58,42,0,17%
2<Tg. 19,000-40,999>	103	3	4,210	11.0	4,65,31,6%	92	2.0	3,653	9.7	0,67,20,8%
3<Tg. 41,000-100,999>	103	3	5,756	20.2	7,81,19,4%	92	2.0	4,539	14.3	3,52,40,7%
4<Tg. 101,000 and over>	93	2	5,813	21.1	9,82,45,9%	92	1.5	5,775	14.3	9,27,64,18%
VI Nalaikh										
1<Tg. 0-18,999>	39	2	2,475	NA	0,67,0,0%	39	1.0	1,200	NA	7,33,7,0%
2<Tg. 19,000-40,999>	NA	2	3,300	NA	0,81,13,6%	39	1.0	1,260	NA	0,41,2,0%
3<Tg. 41,000-100,999>	38	3	4,100	NA	3,72,18,3%	NA	1.0	1,425	NA	0,46,10,0%
4<Tg. 101,000 and over>	NA	3	3,000	NA	0,50,0,0%	NA	1.0	3,500	NA	0,50,5,0%

Note:

* to Ulaanbaatar = ① Commerce, ② Private, ③ Other Business, ④ Medical Treatment, indicated in percentage

** to Aimag Center = ① Business, ② Private, ③ Official Travel ④ Medical Treatment, indicated in percentage

Source: JICA study team

(3) Result of MTC Local Telecommunication Exchange Survey

The result of survey is shown as follows. Detail analysis and results of the survey will be elaborated in the interim report for the main purpose of the feasibility studies in terms of affordability of telecommunication use and economic impact analysis. Some key fruits of the survey are shown as follows.

Table 3.1.6 Major Issues and

Region	Aimag	Major Issues	Customers Delinquency Rate
Western	Govi-Altai	<ul style="list-style-type: none"> • Introduction of satellite system • Increase of switching capacity • Introduction of mobile telephone system • Introduction of radio telecommunication • Increase of cable capacity 	7 %
Khangai	Bulgan	<ul style="list-style-type: none"> • Introduction of mobile telephone system • Provision of digital switching system • Starting FM radio broadcasting • Increase of customer • Increase of staff 	20 %
Central (North)	Tuv	<ul style="list-style-type: none"> • Provision of automatic system • Increase of intra-switching capacity • Increase of customer • Increase of channels 	15 %
Central (South)	Umnugovi	<ul style="list-style-type: none"> • Provision of switching system • Introduction of digital system • Introduction of satellite system • Starting FM radio broadcasting • Increase of customer 	10 %
Eastern	Khentii	<ul style="list-style-type: none"> • Provision of switching system • Introduction of digital system • Increase of customer • Provision of automatic system • Provision of optic fibres cable 	30 %
Total	5	—	—

Note: TEX = MTC local telephone exchange
 Source: JICA study team

Annex 3.2 References to Evaluation of Rural Development Needs and Potential in Rural Area

3.2.1 Evaluation factors and criteria

Each analysis component above mentioned is assessed by the following criteria based on evaluation factors with several attributes in consideration with quantitative data available to obtained by each aimag level of information and data.

(a) Social service needs

Taking consideration of people's basic human needs and necessity of support for vulnerable group of communities in rural area, factors as urgent actions for social services against severe constraints in each aimag are identified as priority criteria as follows.

- Health service needs indicator (possibilities to access health-care services, magnitude of disease condition by infant mortality)
- Poverty alleviation needs indicator (poor level population share in total population)
- Education service needs indicator focusing on the possibilities of *distance education* (number of pupils in rural remote area from schools)
- Disaster prevention needs indicator (magnitude of livestock victims by Dzud)

(b) Development potentials

Rural area as unspoiled land except livestock field has enormous potential to develop and exploit natural resources. The following criteria can be applied to this analysis in order to seek the potentials of economic development in major industrial sectors of Mongolia.

- Inland accessibility (magnitude of total length among centres including Ulaanbaatar, Aimag Centres and Sum Centres)
- Proximity to borders (proximity to neighbouring economic trade countries = Russia, China giving opportunities to develop free trade zones)
- Potential nature resources for development (number of major tourism resources, number of licenses for mining development)
- Human resource in rural area (number of rural population)

(c) Preparedness

Rural development should be effective and efficient to achieve development goal in consideration with future plans and possibilities of telecommunication support by following criteria.

- Existing major plans and projects by the Government and other organization
- Consistency with the Government development policies and programmes (these are convertible into major plans and projects that can be interpreted as implementation of policies).

(d) Key economic indicators

Rural development should be considered current economic trend as potential factors showing present magnitudes of economic development maturity grade. Telecommunication support might accelerate economic activities of aimags having high scores of each indicator as necessary attributes to evaluate the rural development needs and potentials.

- GRDP/capita of each aimags
- Labour force ratio of each aimags (utilising statistical figures of economically active population by NSO)
- Public service magnitude by the government budget expenditure per capita including several sectors such as education, health, security services, etc.

3.2.2 Evaluation method

(a) Absolute scoring of each factor

Each attribute of analysis group is scored by quantitative figures utilizing absolute scoring calculated by attributes ratio among each aimag such as infant mortality rate in health improvement evaluation attributes, or accessibility rate of each aimag in development potential evaluation attributes. Total assessment of each analysis group is evaluated by aggregated scoring by each attribute scores.

(b) Index scoring as correlative evaluation

Each absolute score is re-calculated and converted by index scoring from 0 to 100 points in order to compare relatively with other analysis factor's group among each aimags, and summed up as aggregated scores representing total points of each analysis group.

(c) Scoring of analysis group by ranking points

Each index score of aimag is ranked by scores giving from one to five points taking account of index score deviation.

(d) Evaluation given by overall score points

Overall evaluation for each economic region and aimag is calculated by cumulative evaluation score points among four analysis factors. Final scores are also converting to ranking scores from one to five points taking account of index score deviation.

3.2.3 Evaluation of Rural Development Needs and Potential in Rural Area

(1) Social Services Needs

Table 3.2.1 Social Services Needs Index Scores by Aimags

	Aimag	Health Needs Index	Poor Condition Index	Distance Education Index	Natural Disaster Index	Total Score	Index Scores
Western Region	1. Bayan-Ulgii	81	72	64	5	223	61
	2. Uvs	88	85	63	32	267	73
	3. Khovd	97	74	65	22	257	71
	4. Zavkhan	96	100	57	79	332	91
	5. Govi-Altai	83	52	59	26	220	60
Khangai Region	6. Khuvsgul	100	64	100	100	364	100
	7. Arkhangai	77	73	96	34	281	77
	8. Bayankhongor	97	63	79	55	295	81
	9. Bulgan	66	82	46	13	206	56
	10. Orkhon	62	72	9	0	143	39
	11. Uvurkhangai	91	74	83	99	346	95
Central Region	12. Selenge	72	39	19	1	130	36
	13. Darkhan-Uul	61	58	10	1	129	36
	14. Tuv	80	48	46	40	214	59
	15. Dundgovi	76	79	43	85	283	78
	16. Umnugovi	93	44	47	28	212	58
	17. Govisumber	66	64	5	5	140	38
	18. Dornogovi	71	31	24	19	145	40
Eastern Region	19. Khentii	89	65	37	7	198	54
	20. Sukhbaatar	51	65	37	6	159	44
	21. Dornod	87	79	29	2	197	54

Note: The highest score is 100 points as index scores.

1. Health needs index = (Physician rate- α / Physician rate-max \times 100 inverse) + (Nurse rate- α / Nurse rate-max \times 100 inverse) + (Infant Mortality- α / Infant Mortality-max \times 100) / Total-max \times 100
2. Poor condition index = Poor Population ratio- α / Poor Population ratio-max \times 100
3. Distance Education Index = (Dormitory and herdsmen ratio of total students- α / Dormitory and herdsmen students ratio-max \times 100
4. Natural disaster index = Livestock lost rate- α / Livestock lost rate-max \times 100

Source: JICA study team

(2) Development Potential

Table 3.2.2 Development Potential Index Scores by Aimags

	Aimag	Accessi- -bility Index	Proximi- -ty Index	Human Re- -source Index	Agricul- -ture Index	Tourism Index	Mining Index	Total Score	Index Scores
Western Region	1.Bayan-Ulgii	24	0	60	72	26	26	208	47
	2.Uvs	20	0	59	35	33	23	170	38
	3.Khovd	23	0	56	59	38	26	202	46
	4.Zavkhan	23	0	73	55	25	14	189	43
	5.Govi-Altai	18	0	48	67	39	24	195	44
Khangai Region	6.Khuvsugul	19	0	84	37	73	17	230	52
	7.Arkhongai	22	0	83	32	62	27	225	51
	8.Bayankhongor	24	0	67	49	42	58	240	54
	9.Bulgan	28	0	51	58	70	27	233	53
	10.Orkhon	25	0	1	34	0	2	61	14
	11.Uvurkhangai	26	0	100	38	89	29	282	64
Central Region	12.Selenge	43	61	52	58	18	87	319	72
	13.Darkhan-Uul	25	16	5	39	4	26	114	26
	14.Tuv	100	5	88	49	100	100	443	100
	15.Dundgovi	26	0	42	42	51	18	180	41
	16.Umnugovi	22	0	31	53	88	21	215	49
	17.Govisumber	18	4	3	60	1	0	86	19
	18.Dornogovi	26	61	18	100	26	28	260	59
Eastern Region	19.Khentii	22	25	38	62	62	57	266	60
	20.Sukhbaatar	21	34	43	51	53	10	212	48
	21.Dornod	20	60	23	90	33	43	269	61

Note: The highest score is 100 points as index scores.

1. Accessibility index = (Distance to UB-a / Distance to UB -max × 100 inverse) + (Distance between Aimag centre and Sum centres-a / Distance between AC&SC-max × 100 inverse) / Total-max × 100
2. Proximity index = Railway distance to boarder (China, Russia)-a / Railway distance -max × 100 inverse
3. Human resource Index = Rural population rate-a / Rural population rate -max × 100
4. Agriculture index = (Livestock rate per herder-a / Livestock rate -max × 100) + (Crop yield rate per sown-a / Crop yield rate -max × 100) / Total-max × 100
6. Tourism index = (Tourism resource -a / Tourism resource-max × 100) + (Accommodation capacity -a / Accommodation capacity -max × 100) / Total-max × 100
7. Mining index = Mining license number-a / Mining license number -max × 100

Source: JICA study team

(3) Preparedness for development

Table 3.2.3 Preparedness Index Scores by Aimags

	Aimags	Action Programme Index	Future Plan Index	Total Score	Index Scores
Western Region	1. Bayan-Ulgii	27	52	79	39
	2. Uvs	53	38	91	46
	3. Khovd	73	52	125	63
	4. Zavkhan	60	43	103	52
	5. Govi-Altai	33	28	62	31
Khangai Region	6. Khuvsgul	53	29	83	41
	7. Arkhangai	93	88	181	91
	8. Bayankhongor	53	40	93	47
	9. Bulgan	47	30	76	38
	10. Orkhon	13	17	30	15
	11. Uvurkhangai	87	56	143	71
Central Region	12. Selenge	53	66	119	60
	13. Darkhan-Uul	60	33	93	46
	14. Tuv	100	100	200	100
	15. Dundgovi	47	43	90	45
	16. Umnugovi	40	49	89	45
	17. Govisumber	27	15	42	21
	18. Dornogovi	27	15	42	21
Eastern Region	19. Khentii	53	83	136	68
	20. Sukhbaatar	47	26	72	36
	21. Dornod	87	47	134	67

Note: The highest score is 100 points as index scores.

1. Action programme index = Number of project by sectors - α / Number of project -max \times 100
Sector = livestock agriculture, mining, health service, education service, infrastructure, environment, poverty and rural support.
2. Future plan index = Number of project by long-term plan - α / Number of project -max \times 100
Plan = Road projects, Millennium road plan, Tourism Master plan development area, Free trade zones

Source: JICA study team

(4) Overall Development Priority Ranking of Regions and Aimags

Table 3.2.4 Ranking Score Points of Regions and Aimags

Points of Region Weighted Average Points	Ranking Scoring	Points of Aimags within each Region			
		Deviation Points for Western	Deviation Points for Khangai	Deviation Points for Central	Deviation Points for Eastern
Over 1.50	1	Over 0.80	Over 0.12	Over 0.20	Over 1.00
1.00 ~ 1.49	2	-0.20~0.79	-0.54~0.11	-1.40~1.90	-0.70~0.90
Under 1	3	Under -0.20	Under -0.54	Under -1.40	Under -0.70

Source: JICA study team

Table 3.2.5 Overall Development Scoring by Region And Aimags

	Aimag	Rural Development Needs	Key Economic Indicators	Total Score	Deviation points	Weighted Average Index*
Western Region	1. Bayan-Ulgii	3	1	4	-1.2	0.62
	2. Uvs	3	2	5	-0.2	
	3. Khovd	3	2	5	-0.2	
	4. Zavkhan	3	4	7	1.8	
	5. Govi-Altai	2	3	5	-0.2	
Khangai Region	6. Khuvsgul	4	3	7	-0.2	1.71
	7. Arkhangai	4	4	8	0.8	
	8. Bayankhongor	3	4	7	-0.2	
	9. Bulgan	2	5	7	-0.2	
	10. Orkhon	1	5	6	-1.2	
	11. Uvurkhangai	5	3	8	0.8	
Central Region	12. Selenge	3	2	5	-0.4	1.00
	13. Darkhan-Uul	1	1	2	-3.4	
	14. Tuv	5	2	7	1.6	
	15. Dundgovi	3	4	7	1.6	
	16. Umnugovi	3	5	8	2.6	
	17. Govisumber	1	3	4	-1.4	
	18. Dornogovi	2	3	5	-0.4	
Eastern Region	19. Khentii	3	4	7	1.3	0.69
	20. Sukhbaatar	2	5	7	0.3	
	21. Dornod	3	2	5	-1.7	

Note: Weighted average index = average score × (regional total score / total score)

Source: JICA study team

Annex 3.3 References to Rural Development Direction and Telecommunication Supports

This section is the reference description in detail for “Chapter 2.8 Rural Development Direction with Telecommunication Supports” focusing on sectoral development direction of health, education, livestock-agriculture and tourism in conjunction with telecommunication network development.

3.3.1 Health Service Needs on Emergency Care and Medical Information System

(1) Government Programmes for Health Service Improvement

The government of Mongolia has launched several public health programmes in rural area to expand family care practice and provision of an essential health minimum clinical package including rehabilitation of equipment and hospital facilities in aimag and inter-sum or sum centres to be improved in rural area.

Government programs on the acceleration of reforms in the medical sector, development of a *Family Doctor System*, establishment of *Regional Diagnosis-treatment Centres* (RDC) with *Telemedicine* as an experimental tool, *Health Management Information System* (HMIS) with and maintaining a proper ratio of doctors and nurses will be initiated. Government policy also will continue to support privately owned medical institutions through the promotion of their service areas and human resource development.

(2) New Direction of Health Care System in Rural Area

According to the health care system of Mongolia, health service grade is divided into 4 levels in the country. Recently the government has reoriented the system toward establishment of rational health services in order to provide certain level of health services with sufficient equipments and advanced information system in selected locations taking account of rational health services in rural areas, and in parallel with primary health care improvement. Especially, RDC with modern medical services equipments supported by remote diagnosis system in aimag centres and inter-sum hospitals covering several sums to serve local communities with primary referral services will play an important role in improving poor medical service levels of rural area.

The following Table 3.3.1 shows current medical system based on service grades and the new development direction including some arrangements for medical service facilities and additional functions.

Table 3.3.1 Health Service and Support System and Government Development Plan

Service Level	Health Service and Support System				Health Development Plan		
	Type of Facilities	Location and Administration	Role and Function	Un it	Additional or New Functions	Un it	Location
Level 4	Special Hospital	Capital of UB	Specialised clinical care under MOH	11	—	—	—
	HSIC ¹	Central Gov.	Medical statistic data information integration	1	—	—	—
Level 3	Clinical Hospital	Aimags Centre	General health care, instruction for sum hospitals	33	General Aimags Hospital	(4)	Bayan-Ulgii, Govi-Altai, Bulgan, Dornogovi
			Diagnosis-treatment support with remote medical care and emergency transport	(—)	RDC ³	(4)	Khovd, Uvurkhangai, Khvusugul*, Dornod
	PHC ²	Aimags Gov.	Medical statistic data information collection	(10)	Dept. of Health	—	—
Level 2	Sum Hospital (SH)	Sum Centre	General health care, with emergency treatment system and referral system	343	Inter-Sum Hospital	18	Western region (6) Khangai region (7) Central region (2) Eastern region (3)
			Grading them into 3 level of service based on population	(—)	Sum Hospital	—	—
Level 1	Bag Feldsher	Bag Centre or others belong to SH	Primary Health care for 50-100 households by a feldsher with community volunteers	936	—	—	—

Note: 1 = Health Statistic Information Centre, 2 = Public Health Centre, 3 = Regional Diagnosis-treatment Centres, *= Khvusugul is pilot place for experimental Telemedicine system.

Source: Good Governance for Human Security Programme 2001, Mongolia Health Sector Review 1999, data information from MOH 2001

(3) Possible ICT Support for Health Care Services

In the context of government programmes abovementioned, ICT will play a more important role in supporting effective health care in combination with RDCs and inter-sum hospitals and other rural hospitals in vast countryside where remote patients have to be transported in long distance way to medical facilities. ICT will enable to enhance health care system in various level of service from advanced technology for medical diagnosis to basic and urgent information services. However, careful measures and possibilities to introduce ICT system should be concerned according to quality of medical staff, availability of ICT staff or medical staff skill, financial availability for operation and maintenance and institutional arrangements. The possible or desirable ICT support measures and can be illustrated as following Table 3.3.2 and 3.3.3 for the health service improvement including direct health care services, administrative services and other health sector services in rural area taking account of their time-frame for the phased introduction (short-term: 2003-2008, medium-term: 2009-2013, long-term: 2014-2020).

Table 3.3.2 Health Service ICT Supports Measures and Desirable Phased Introduction

Sector Service	Issues	ICT Support Needs	ICT Support Measure	Introduction Phasing		
				Short	Medium	Long
Medical Care Service	• To improve difficult communication with emergency cases in remote nomadic settlement	• Necessity of effectuating frequent and secure contact between medical staffs and emergency cases	• Emergent telecommunication system by radio or telephones	●		
			• Emergent telecommunication by WLL, Mobile, etc	◎	●	
	• To improve medical staff skill and technical knowledge to prevent medical incidents and better treatment	• Necessity of offering adequate, current and forehanded advises and consultation for medical staff • Necessity of exchanging latest and adequate medical information	• Experts consultation by telephone / fax	●		
			• Consultation by as still and motion pictures	○	◎	●
			• Reference by case data base search-web	—	○	●
			• E-mail, fax, telephone	◎	●	
• To promote individual health care motivation	• Limited access and information for health care service information guide	• E-mail, fax, telephone	○	●		
		• Voice guidance	—	○	●	
Health Administration	• To establish efficient health payment system	• Insufficient management system for medical payment	• Health Info-web search	—	○	●
			• Electric payment by card system	—	○	●

Legend: ● = full-scale, ◎ = partial, ○ = experimental, — = not applicable, Source: JICA study team

Table 3.3.3 Information Communication Needs among Health Service Facilities

Item of Service	Health service Support Measures	Capital UB		Aimag Centre			Sum Centre		Bag	ICT Support Measures
		SH	HSIC	RDC	GAH	DH	ISH	SH	BF	
Health Care Service	Emergency Communication	—	—	●	○	—	●	○	●	• Emergency contact by radio / mobile
		◎	—	●	◎	—	●	◎	●	• Urgent consultation by telephone, fax
	Experts Consultation	●	—	●	○	—	—	—	—	• Consultation by X-ray as still pictures
		◎	—	◎	—	—	—	—	—	• Consultation by echocardiogram as motion pictures
		●	—	●	●	—	●	●	●	• E-mail, fax, telephone consultation
		◎	●	◎	○	●	◎	—	—	• Case search web
	Information Exchange	◎	—	◎	—	—	○	—	—	• Teleconference
		●	◎	●	●	◎	●	●	○	• Telecourse
Health Administration	Public Information Service	○	●	○	○	●	◎	—	—	• E-mail, fax, telephone
		○	●	○	○	●	○	○	—	• Info-search web
	Health Database	◎	●	◎	◎	●	◎	○	—	• E-mail, fax, telephone
Electric Payment Service	○	—	○	○	—	○	○	—	• Voice guidance, ombudsman system	
		○	—	○	○	—	○	○	—	• E-mail, fax by picture, document databases
		○	—	○	○	—	○	○	—	• Electric insurance card system

Legend: ICT support needs among organizations linked to each other by degree of: ● = necessary, ◎ = desirable, ○ = in case of possible or necessary, — = not suitable Note: SH = Specialised Hospital, HSIC = Health Statistic Information Centre, RDC = Regional Diagnosis-treatment Centre, GAH = General Aimag Hospital, DH = Department of Health, ISH = Inter-Sum Hospital, SH = Sum Hospital, BF = Bag Feldsher
Source: JICA study team

(4) Further Development Issues for ICT Support of Health Services

Except for conventional ICT support measures for health care services such as telephone and facsimile advanced ICT technology requires special experts and sufficient budget for maintenance and operation costs. According to several experimental projects in the world especially for Telemedicine (remote health care service by telecommunication system), several important issues that require careful and sufficient preparation to introduce ICT system for health care support are indicated as follows.

- **Economic and affordable service by telecommunication supports**
Advanced technological supports for remote diagnosis system require considerably not only initial costs but operational and maintenance costs. Feasibility study should be introduced into its ICT project taking account of justification by economic viability.
- **Sustainable management system for telecommunication supports**
There are few opportunities to line up people who have ICT technical skill in medical staffs and in rural areas. It is necessary to secure skilled human resources and periodical training for sustainable ICT operation.
- **Establishment of mutual relationship and confidence among medical staffs**
The medical services without malpractice of life and death highly depend upon mutual confidence among medical staff, especially in case of remote medical care system without human interface. Adequate training system and sufficient preparation should be secured.
- **Security of patients privacy about their medical data information**
The individual medical information of patients through ICT system sometimes faces the difficulties to protect its privacy. It should be considered to establish the guideline for privacy protection.
- **Institutional arrangement for ICT operation**
Institutional setting for medical care responsibility and insurance system should be established against the malpractice and payment system in case of remote ICT medical care.

3.3.2 Educational Service Needs for Remote Rural Area and IT Education

(1) Government Programmes for Educational Service Improvement

The Government intends to accelerate ongoing reforms in the educational system, and improve the content of training programs and materials. Greater attention will be devoted to the development of non-formal education, *Distance Learning Programme* and to the completion of ongoing rationalization and productivity improvement measures including diversification of services delivery and decentralization of education management. The Government also intends to improve education quality by gradually upgrading priority facilities and equipment. Especially, each local government of aimags is planning at present to re-organize secondary schools by formulating integrated sum schools that enable pupils to study higher level of educational services including ICT services in consideration with good accessibility, adequate infrastructure and proper number of pupils.

The Government's policy reform package includes measures to: (i) rationalize education structures and staffing; (ii) promote cost recovery; (iii) support privatisation and private provision of education; and (iv) develop a comprehensive policy framework for TEVT (Technical Education and Vocational Training) programme.

(2) IT education and Distance Learning Programme

Computer education is one of the important and regular curricula of upper secondary schools of Mongolia education at present. Ministry of Science, Technology, Education and Culture (MOSTEC) is starting to implement personal computers (PC) installation project (443 pc's) till 2005 for secondary schools.

In parallel, the national programme (2002-2010) of the Distance Learning (DL) has been taken in hand by the government to establish the national system of Distance Learning utilizing ICT such as radio-TV, Internet and National Information Network systems for all students from pre-school to higher education, especially students who live in remote area.

Although the broadcast system for DL has been given priority to than internet system for primary and secondary school students in rural area due to lack of telecommunication, telecommunication system will be one of inevitable factors to develop attractive and advanced IT education programmes in future.

(3) Possible ICT Support for Educational Sector

In the context of government programmes aforementioned, ICT will play a more important role in supporting effective distance education and IT education in schools and other advanced education utilizing ICT as an advantageous tool in vast rural areas where remote schools and students are apt to be isolated from essential and attractive information.

ICT will enable to enhance education system in various level of service from advanced technology for academic research to basic information services. According to the educational improvement programme of MOSTEC, ICT will enable to support several programmes as follows.

- **Basic Education Programme**
ITC (internet and e-mail by PCs) should supports IT education curriculum in major secondary schools where sufficient infrastructure such as constant power supply, enough number of students, telephone line with digital exchange will be or has been ready in major sum centres, and enhance academic information network of every higher education (institutions, universities and colleges) in rural areas.
- **Distance Education Programme**
ITC will be contributable tools to support distance education system by advanced programmes such as two-way teaching communication using Internet or tele-lecture by interactive TV. However, this system will be limited to long-term development after establishment and propagation of broadcast distance education system.
- **Adult Education Programme**
This programme will be also limited to long-term development by ICT support apart from broadcasting system for re-education of illiterate adult and up-grading vocational skill for adults in rural area.
- **Cultural Promotion Programme**
Few opportunities for people to obtain cultural information and its activities in rural area can be improved by ICT supports in order to fill the gap between Ulaanbaatar and rural areas in combination with the government programmes (culture centres improvement, mobile auto-clubs enhancement, etc).

The possible or desirable ICT support measures and can be illustrated as following Table 3.3.4 for the educational service improvement in rural area taking account of their time-frame for the phased introduction.

Table 3.3.4 Educational Programmes and ICT Supports Measures and Desirable Phased Introduction in Rural Area

Education Programme	Issues	ICT Support Needs	Educational Level						ICT Support Measure	Introduction Phasing		
			PS	LS	US	TV	HE	AD		Short	Medium	Long
Basic Education Programme	<ul style="list-style-type: none"> To improve backward IT education environment of public schools in rural area 	<ul style="list-style-type: none"> Necessity of dissolving lack of stand-alone PCs in public schools and improving unstable, insufficient and expensive telecommunication network between aimag centres and sum centres 	—	■	■	□	■	*	—	●		
		<ul style="list-style-type: none"> Necessity of augmenting skilled IT teaching staff and training teacher's knowledge for IT technology 	—	■	■	□	■	—		●		
	<ul style="list-style-type: none"> To promote higher education information and academic network 	<ul style="list-style-type: none"> Necessity of augmenting attractive higher educational opportunities in rural area against student outflow to UB 	—	—	—	□	■	—	<ul style="list-style-type: none"> Academic information network formulation by TN Academic database centre and E-library centre by TN 	—	○	●
Distance Education	<ul style="list-style-type: none"> To offer equal opportunities to attend schools for all students 	<ul style="list-style-type: none"> Necessity of offering basic educational service by ICT for students who can not attend school in remote settlement 	—	■	■	□	□	□	<ul style="list-style-type: none"> Broadcasting system of radio school programme and TV educational programme 	○	●	
			<ul style="list-style-type: none"> TN system by education web-course, internet education course 	—	◎	●						
Adult Education	<ul style="list-style-type: none"> To re-educate illiterate adults 	<ul style="list-style-type: none"> Limited opportunities to improve literacy of rural adults in compliance with their drop-out children issues 	—	—	—	—	—	■	<ul style="list-style-type: none"> Broadcasting system of radio school programme and TV programme IT system in Cultural Centre 	○	●	
	<ul style="list-style-type: none"> To encourage vocational skill of rural adults 	<ul style="list-style-type: none"> Limited access and information for useful information guide about living ability skill and professional skill 	—	—	—	■	—	■	<ul style="list-style-type: none"> Broadcasting system of radio school programme and TV programme IT system in Cultural Centre 	—	○	●
Cultural Promotion	<ul style="list-style-type: none"> To promote cultural activities and information 	<ul style="list-style-type: none"> Necessity of filling gap of cultural information, activities between UB and rural area 	□	□	□	□	□	■	<ul style="list-style-type: none"> TN system by culture web-course, internet education course 	○	●	

Legend / Educational level: ■= compulsory, □= desirable / Phasing : ●= full-scale, ◎= partial, ○= experimental, — = not applicable, PS =Primary School (1-4), LS =Lower Secondary School (4-8), US =Upper Secondary School (4-10), TV =Technical & Vocational School, HE =University and College and other higher education, AD =Adult Education

Source: JICA study team

3.3.3 Livestock and Agriculture Development with ICT Support

(1) Government Programmes for Livestock and Agriculture Improvement

The major constraints undermining the performance in the livestock-agriculture sector include the undeveloped agricultural marketing systems including export market development of livestock products, low activity level of cooperatives, lack of prevention from animal disease, especially insufficient risk management of the livestock disaster in the winter of recent years. Ministry of Food and Agriculture's (MOFA) support will address the agro-processing industries as main issues including lack of working capital and insufficient market study. MOFA has already implemented the following programmes and projects in cooperation with *Whole Sale Network* programme by Ministry of Trade and Industry.

- National Programmes
 - Green Revolution, White Revolution
 - Protection of animals from drought and winter disaster, Improvement of livestock quality and reproduction, etc.
- Specific Programmes
 - Cashmere Programme, Seed Sub-programme, Wool Sub-programme
 - Meat Export Sub-programme, Combating cattle, sheep and goat diseases, etc

(2) Possible ICT Support for Livestock and Agriculture Improvement

On the context of livestock and agriculture programme above mentioned, there will be various opportunities for ICT to be able to support their development programmes in terms of effective and efficient business formulation in rural agri-business management. Especially, marketing information and trade transaction of products of livestock and crops are desirable for its agri-business to be supported by ICT such as voice service of market information, Internet market web-site, products promotion web-site and E-commerce system as an ultimate tool. Land and resource management for livestock and agriculture industry supported by ICT such as GIS system will contribute to adequate land use and environment protection for those sustainable developments.

Also, technical information and database sharing for livestock breeding, animal disease prevention and crops upgrading by breeding are very important tool to improve farmers technical skill and to develop production effectively and efficiently.