

モンゴル国

東部幹線道路建設整備調査

技術情報資料集

平成 14 年 3 月

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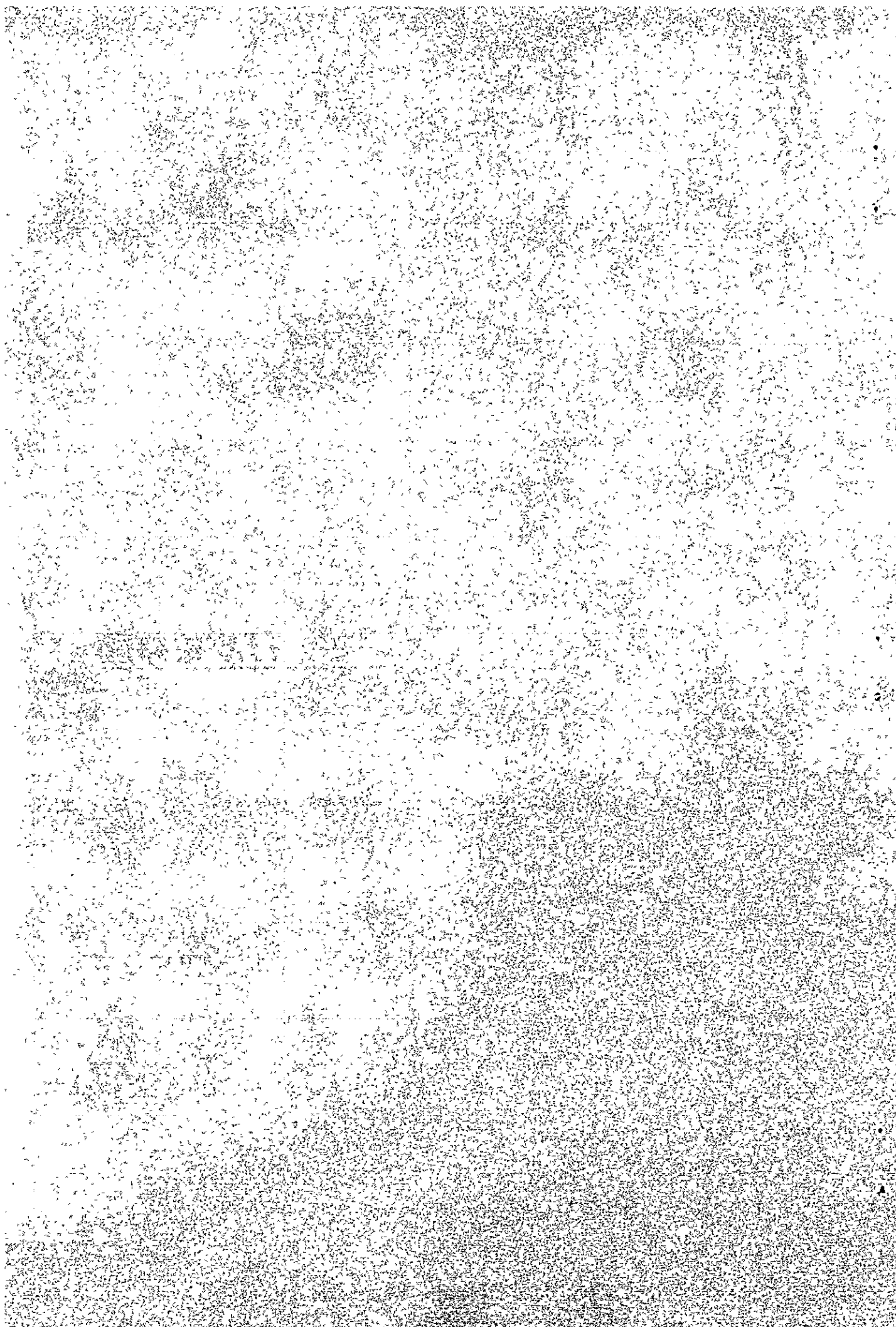
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東部幹線道路建設整備調査
技術情報資料書

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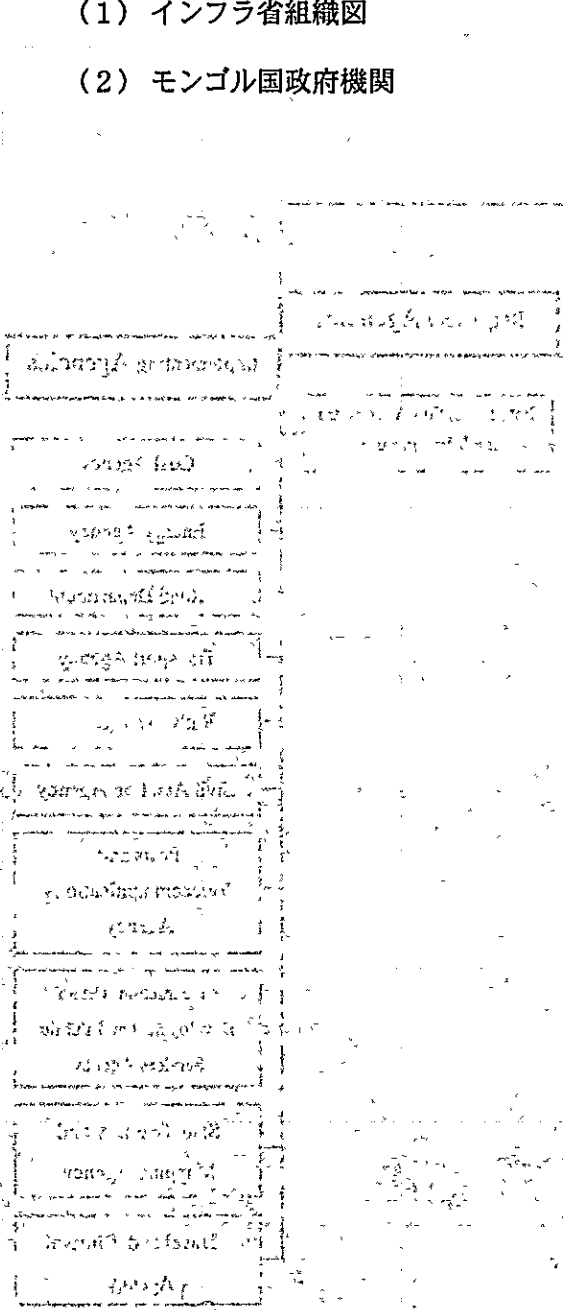
1. 行政組織図



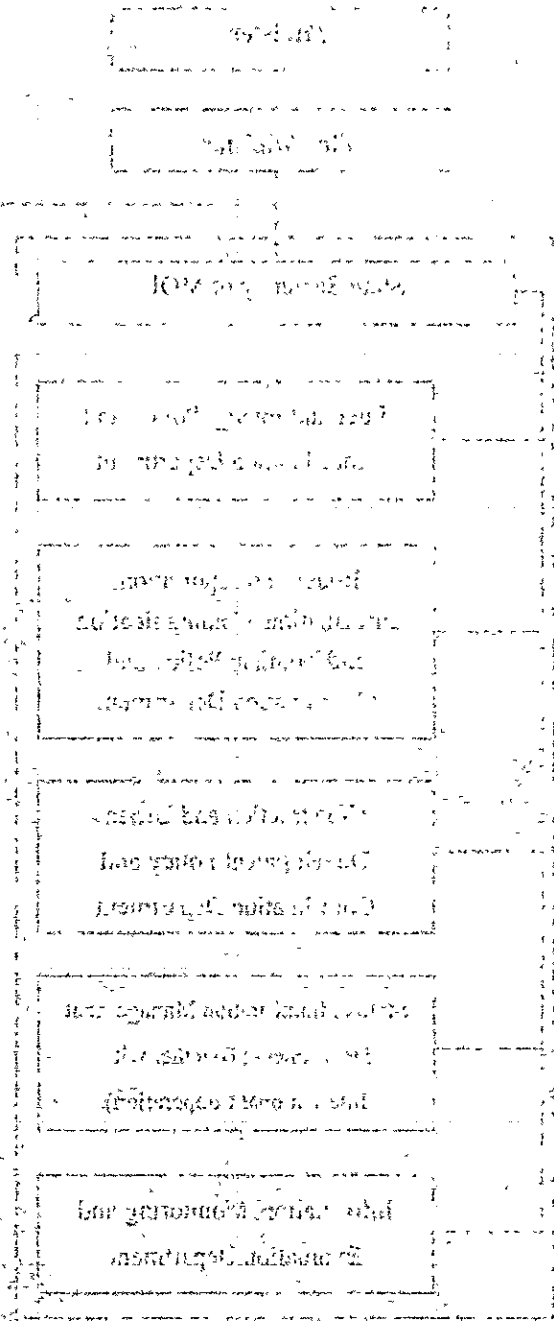
1. 行政組織図

モンゴル国の道路行政は、主としてインフラ省が執り行っている。その他の政府機関の表とともに次ページより示す。

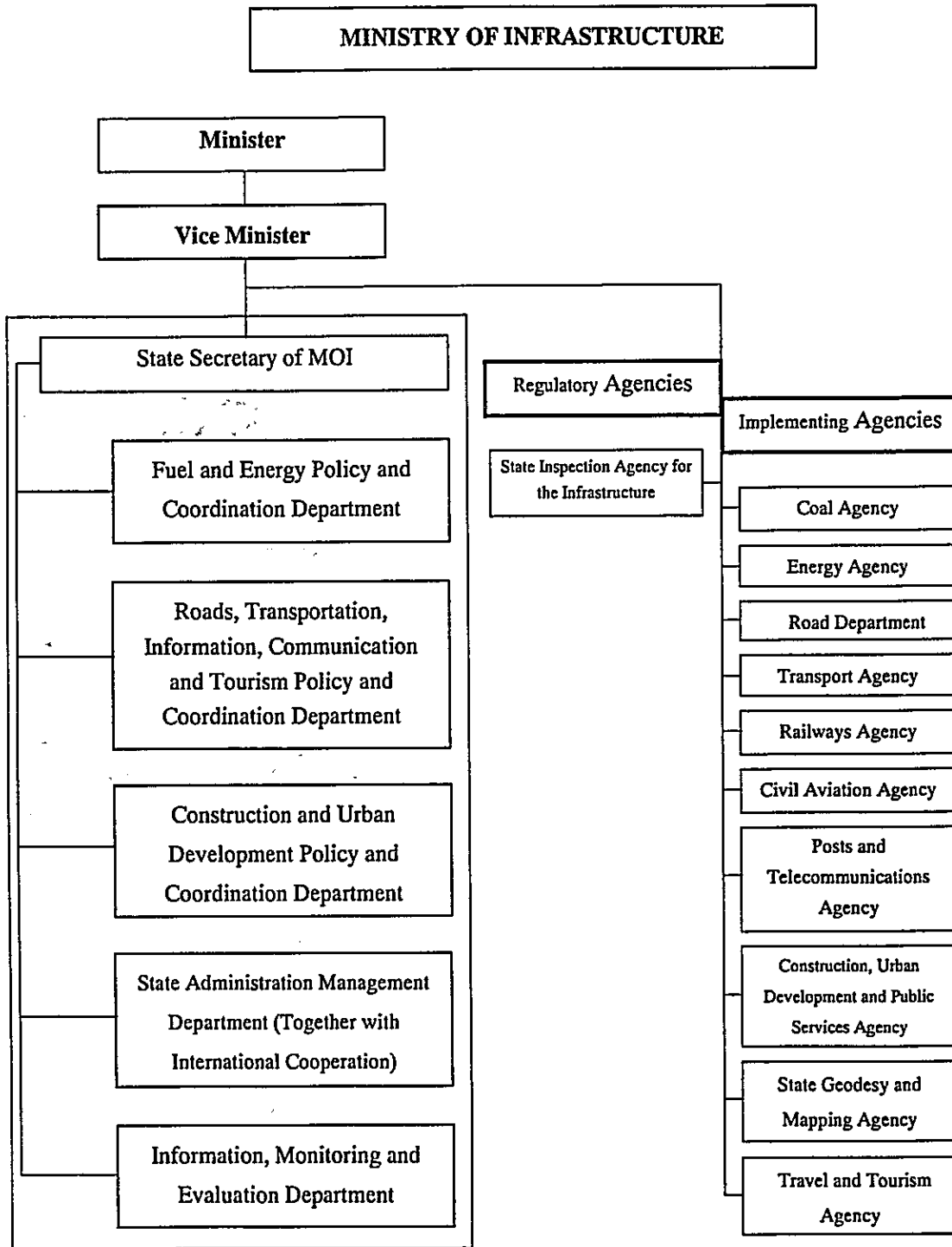
(1) インフラ省組織図



(2) モンゴル国政府機関



(1) インフラ省組織図



(2) モンゴル国政府機関

Framework of matters responsible for and jurisdiction	Government Regulating Agencies	Government Implementing Agencies
Under the jurisdiction of the Prime Minister	1. General Intelligence Department 2. State Property Committee	1. Radio and TV Authority 2. MONTSAME Information Agency
Under the jurisdiction of the Government Administration Department		3. Academy of Management 4. State and Government Service Bureau
Under the jurisdiction of the Minister of Finance and Economy	3. General Taxation Department 4. Customs General Department 5. Financial Auditing Department	
Under the jurisdiction of the Minister for Foreign Affairs		5. Bureau of Service to the Diplomatic Missions
Under the jurisdiction of the Minister of Justice and Internal Affairs	6. General Department of Police 7. Border Troops Department	6. State Center for Civil Registration and Information 7. Court Decision Execution Department 8. National Archive 9. Intellectual Property Department 10. Fire Fighting Department 11. Bureau of Immovable Property Registration
Under the jurisdiction of the Minister of Nature and Environment		12. Hydro, Meteorology and Environment Institute 13. Land Management Agency 14. Nature and Environment Protection Office
Under the jurisdiction of the Minister of Defense	8. General Staff of Military Forces 9. Civil Defense Department	
Under the jurisdiction of the Minister of Education, Culture and Science	10. State Inspection Department of Education, Culture and Science	
Under the jurisdiction of the Minister of Infrastructure	11. State Inspection Department of Infrastructure	15. Energy Agency 16. Coal Agency 17. Civil Aviation Agency 18. Post and Telecommunication Agency 19. Travel and Tourism Agency 20. Road Department 21. Auto Transport Agency 22. Construction, Urban Development and Public Service Agency 23. Geodesy and Mapping Agency 24. Railways Agency
Under the jurisdiction of the Minister of Social Welfare and Labour	12. State Inspection Office for Labour and Social Welfare	25. State Social Insurance General Office 26. Labour Regulation Bureau 27. Social Care Department
Under the jurisdiction of the Minister of Industry and Trade	13. State Inspection Office for Industry and Trade 14. National Center for Standardization and Metrology	28. Department of Minerals 29. Petroleum Authority 30. Foreign Trade and Foreign Investment Department
Under the jurisdiction of the Minister of Food and Agriculture	15. State Inspection Office for Food-staff Security and Agriculture	31. State Resources Department 32. State Veterinary Department

2. 地形図

2. 地形図

本プロジェクト実施に当たり、地形図（都市および地方）、航空写真及び衛星写真を利用した。縮尺と作成時期をそれぞれ以下の表に示す。

	縮尺	作成時期	所管
地形図（都市）	1:2,000	2001	Baganuur 区
	1:3,400	1997	Khentii 県
地形図（地方）	1:500,000	1992	SAGC
	1:100,000	1983	SAGC
	1:500,000	1974～1997	SAGC
航空写真	1:100,000	1964	SAGC
	1:80,000	1986	SAGC
	1:32,000	1986	SAGC
	1:18,000	1986	SAGC
衛星写真	1:200,000	1978～1980	SAGC

*SAGC: State Administration of Geology and Cartography

実施期間においては、地形図（地方）3種類の内 1:500,000 は所管の組織より購入可能であった。他の2種類は原本のみ使用が可能であり、複製には許可が必要であり複製部数及び使用場所が制限された。

航空写真及び衛星写真は、原本を借用し利用した。

地形図（都市）は、購入可能であった。

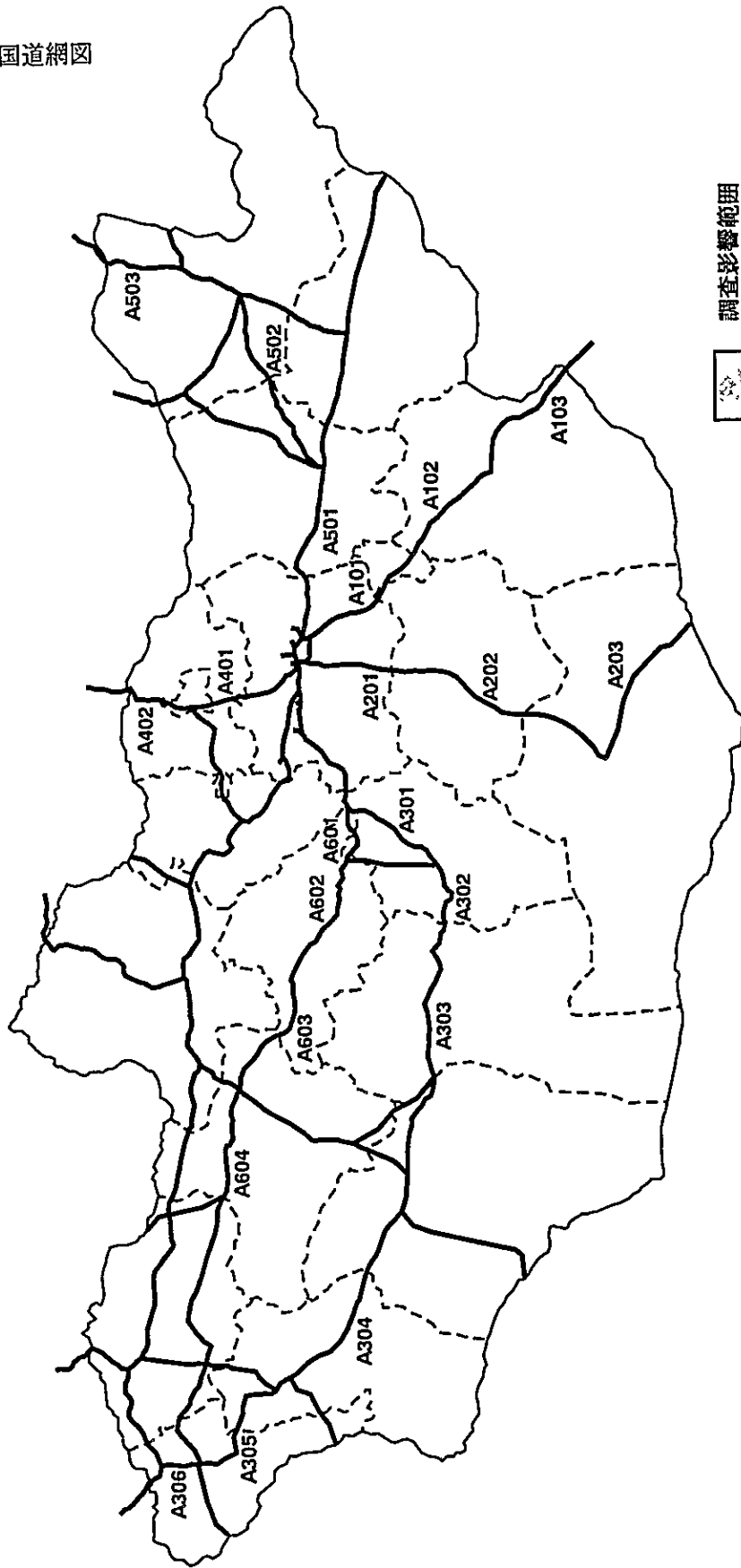
3. 道路網図

3. 道路網図

次ページより、既存道路網図及び将来計画幹線道路網図を示す。

- (1) 現況国道網図
- (2) Millennium Road Network
- (3) Road Development Master Plan

(1) 現況国道網図



現況国道網図

(3) Road Development Master Plan (2010)

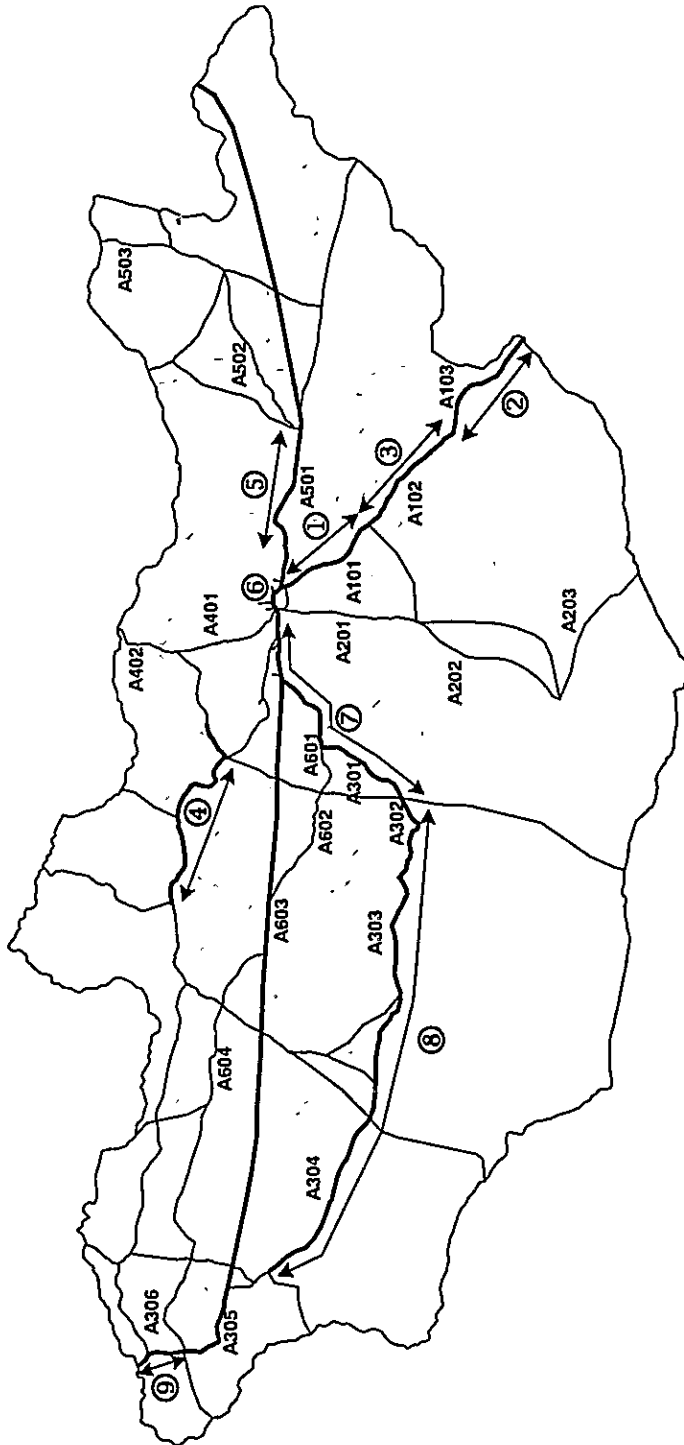


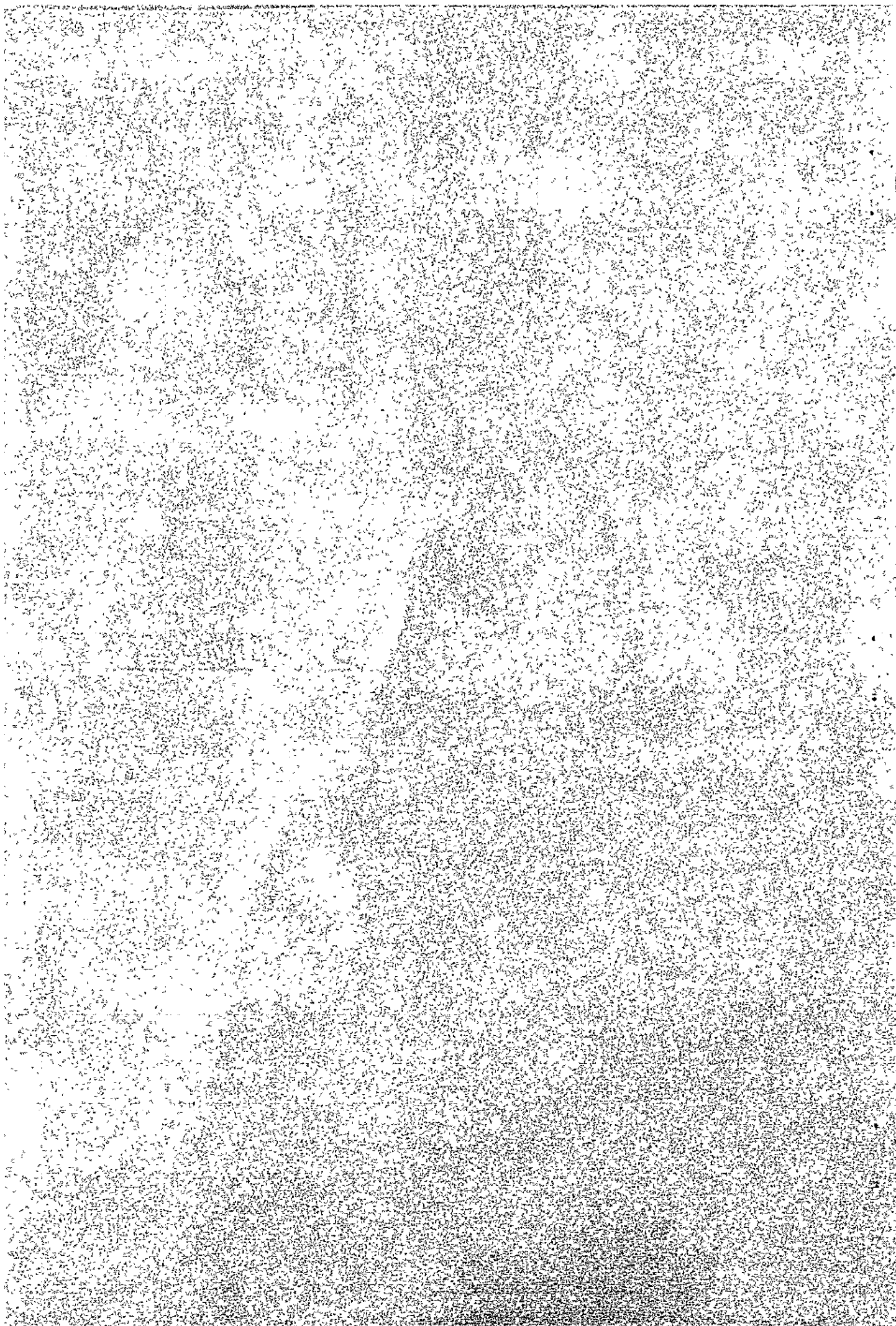
Figure Development Plan by Road Sector (Target Year 2010)

4. 社会・経済状況

4. 社会・経済状況

モンゴル国では、社会・経済状況を毎年“Yearbook of Statistics”にまとめている。編集は National Statistics Office of Mongolia である。この Yearbook は市販されている。

5. 都市計画図

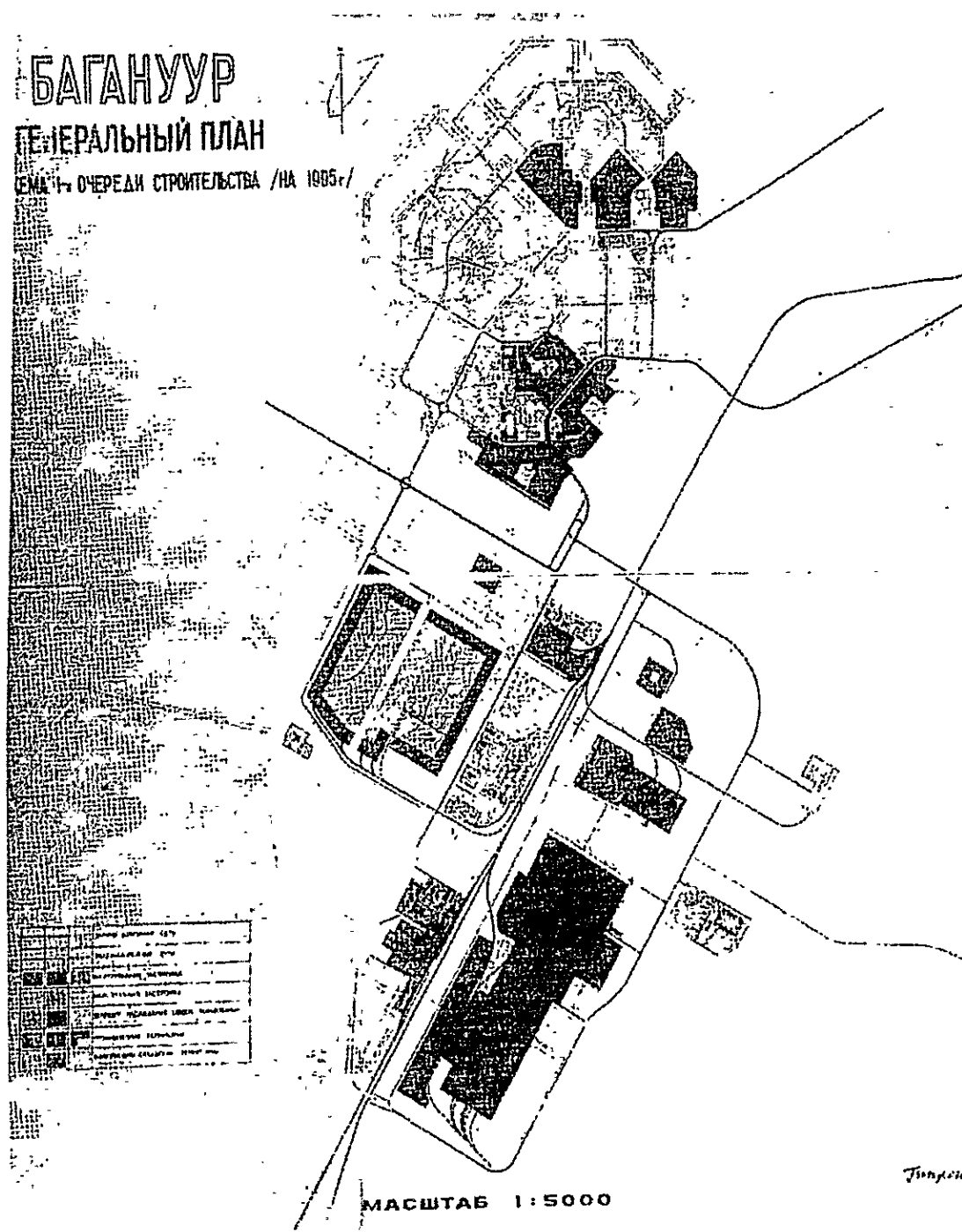


5. 都市計画図

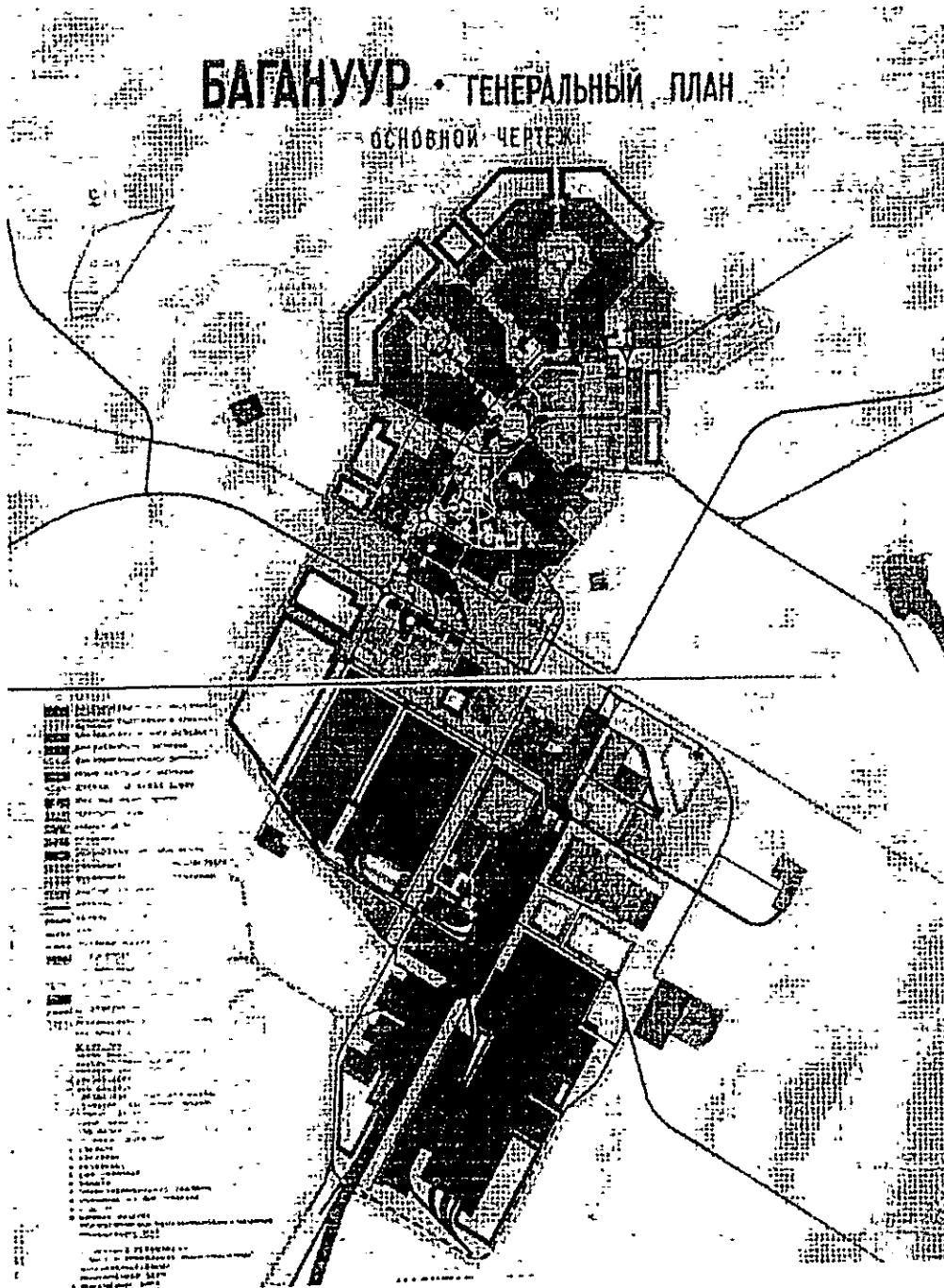
調査対象地域内にある Baganuur 区の都市計画図を入手し、調査に利用した。入手先は Baganuur 区役所である。それぞれを次ページ以降に示す。

- (1) Master Plan (1995)
- (2) Master Plan (2040)
- (3) Master Plan (Energy Infrastructure)
- (4) Landuse Plan (1999)

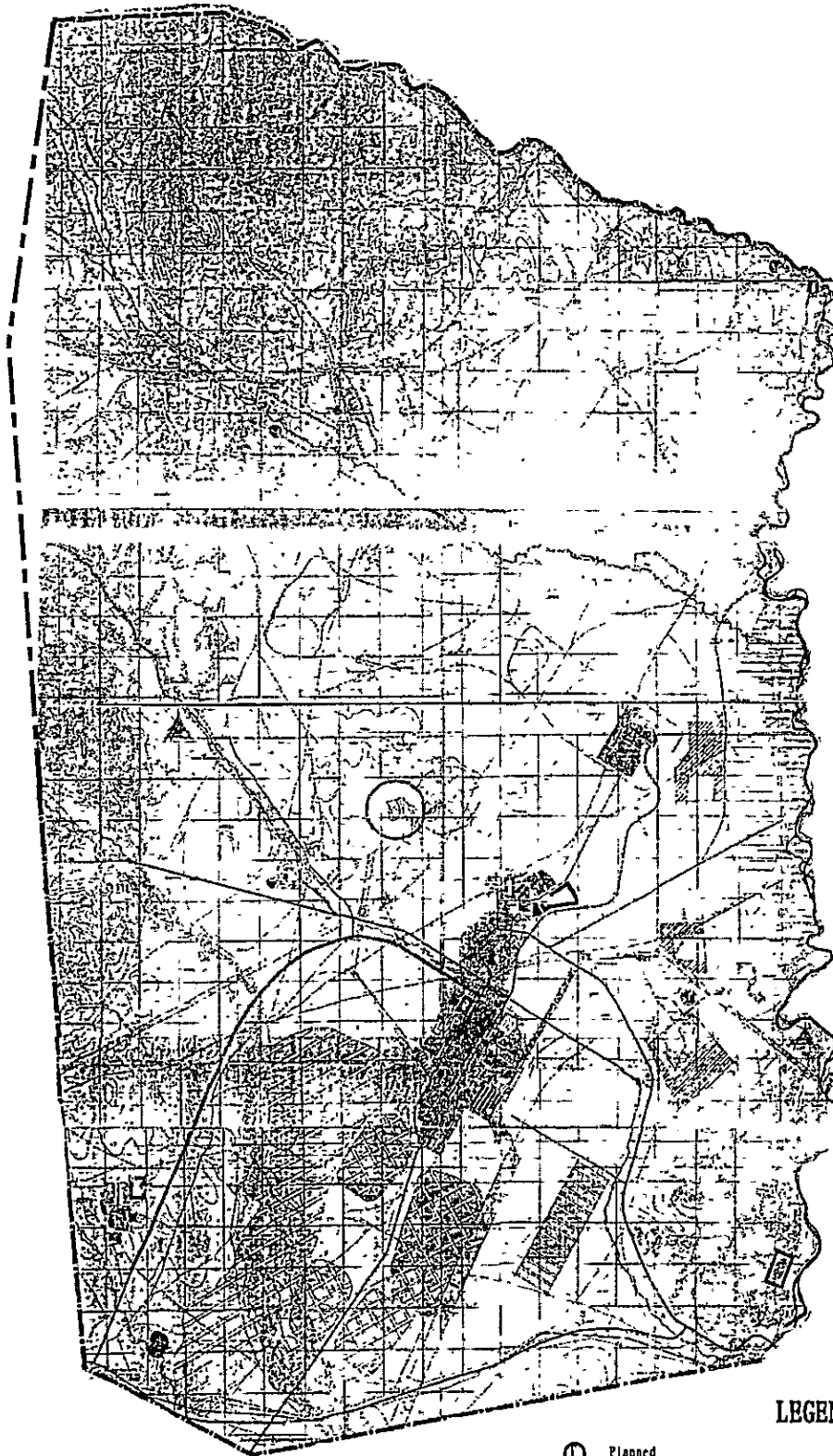
(1) Master Plan (1995)



























(2) Master Plan (2040)



(4) Landuse Plan (1999)



LEGEND

- | | | | |
|---|---|---|--|
|  : Railway |  : Water Resource Zone |  : Planned Apartment (Constructed by Public) |  : Tourist Camp |
|  : Road |  : Resort and Sanatorium |  : Apartment (Constructed by Private) | |
|  : Exploitation Zone |  : Berry's Farm |  : Ger Zone | |
|  : Developed Area |  : Filled up Area |  : Cultural and Service Center | |
|  : Ger Zone |  : Urbanized Area |  : Enterprizes | |
|  : Summer Cottage |  : Historical Place |  : Green House | |
|  : Runway for Airplain |  : Stock Farm (Cattle) |  : Heating Power Station (1260 mvt) | |
| |  : Stock Farm (Pig) |  : High Voltage Line | |

6. 設計図関連

6. 設計図関連

本プロジェクト関連及び他の計画プロジェクトの道路及び橋梁の設計図を入手し、参考資料として使用した。

No.	Title	Size	Date	Published By
1	Work drawings of RC bridge over Murun river in Murun sum of Khentii aimag	A3 long	1996	Road & Bridge Design, Production & Research Institute under the General Department of Roads
2	Cost Estimation of RC bridge over Murun river in Murun sum of Khentii aimag	A4	1996	Road & Bridge Design, Production & Research Institute under the General Department of Roads
3	Drawings & Cost Estimation of 20 km Chandgana Road Section in Murun river of Khentii aimag	A4 and A3 long	1998	Road & Bridge Design, Production & Research Institute under the General Department of Roads
4	Government of Mongolia, Ministry of Infrastructure , Transport Development Project Under IDA/NDF CREDIT, Bidding Document, Rehabilitation of Erdenesant - Arvaiheer Road, Volume III Drawings	A3	2000	Department of Roads, GBET Co., Ltd.

7. 設計基準

7. 設計基準

モンゴル国の道路及び橋梁の基準を以下の表に示す。

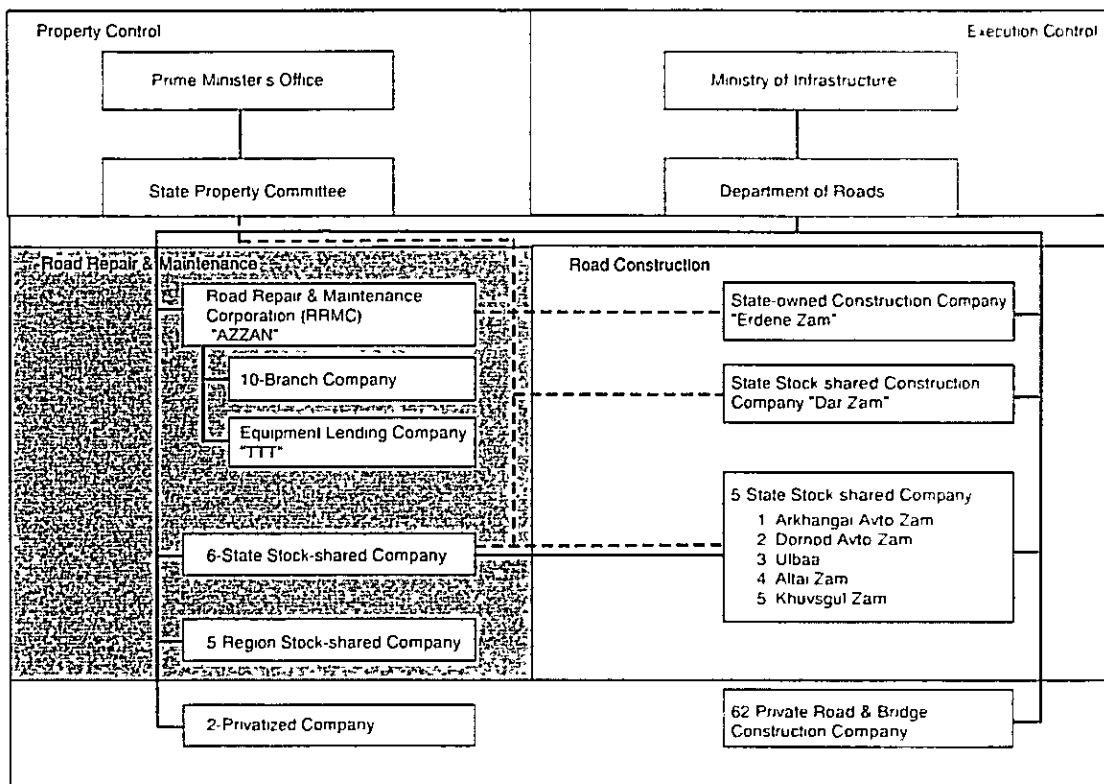
No.	Title	Size	Date	Published By
1	SNIP-32-02-00, Mongolian Road Construction Standard Book	A4	2000	Ministry of Infrastructure
2	Highway Design Standards	A4	1998	Ministry of Infrastructure
3	Road, Bridge and Pipe Culverts BNbD 2..05.03 - 97	A4	1997	Department of Roads, Ministry of Infrastructure
4	Construction Norms and Regulations BNbD 2..05.02 - 97	A4	1997	Department of Roads, Ministry of Infrastructure

本プロジェクトでは、設計基準を ASSHTO（米国）、道路構造令（日本）及び道路橋示方書（日本）を基に、他の類似プロジェクトを参考にモンゴル国特有の気象条件などを考慮して設定した。詳細は、レポート本編 7 章に示す。

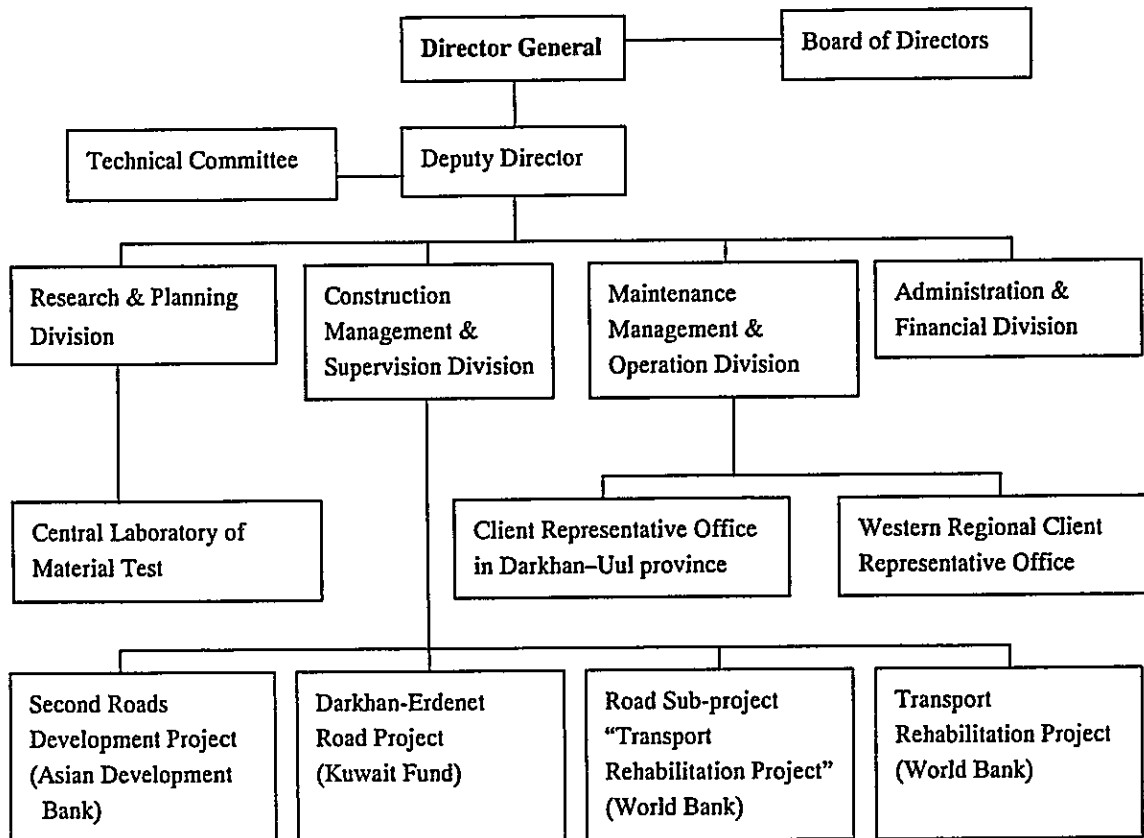
8. 道路維持管理、補修状況

8. 道路維持管理、補修状況

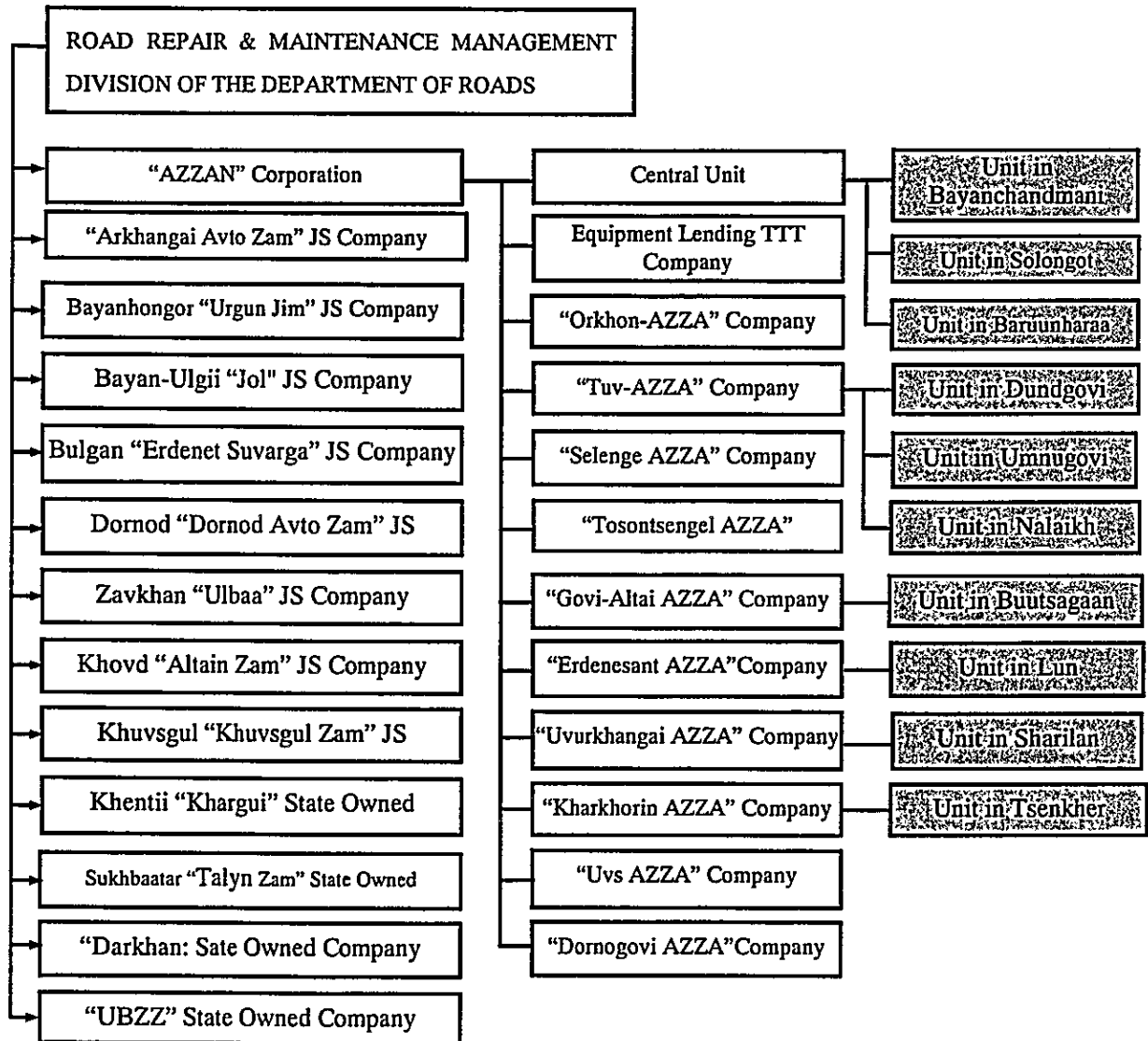
モンゴル国の道路維持管理体制の組織図を以下に示す。



モンゴル国での道路維持管理及び補修は、インフラ省道路局が担当している。以下に道路局の組織図を示す。

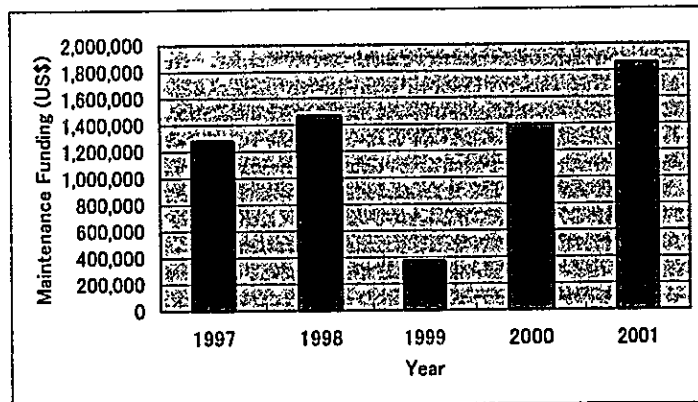


実際の道路維持管理及び補修作業は、主に Maintenance Management & Operation Division の下部組織である AZZAN Corporation が担当して実施している。AZZAN の株式は、モンゴル国政府が保有している。AZZAN の組織図を以下に示す。このうち TTT は建設機材のリース会社である。



道路局の道路維持管理及び補修の予算の推移を以下に示す。

Year	Maintenance Funding (Tg.)	Exchange Rate	Maintenance Funding (US\$)
1997	921,300,000	720	1,279,583
1998	1,297,700,000	885	1,466,328
1999	373,500,000	1,000	373,500
2000	1,489,900,000	1,070	1,392,430
2001	2,025,700,000	1,090	1,858,440



道路局の予算及び人員の推移を以下に示す。

Thousand Tg.

No.	Item	1996	1997	1998	1999
1	Revenue of Technical Supervision	102,636	147,700	156,938	49,758
2	National Budget				75,536
	Total of Revenue	102,636	147,700	156,938	125,294
4	Expenditure of Administration	97,959	120,411	150,527	138,440
5	Salary Fund	19,758	30,720	37,944	41,594
	Total of Expenditure	117,718	151,131	188,471	180,034
6	No. of personnel	41	54	56	50

AZZAN 全体の予算及び人員を以下に示す。

	AZZAN	Kharkhorin AZZAN	Govi-Altai AZZAN	Selenge AZZAN	Erdenesant AZZAN	Dornogovi AZZAN	Uvs AZZAN	Tuv AZZAN	Uvurhangai AZZAN	TTT Company	
Quota of Employees	150	67	39	56	41	34	38	170	59	27	
Wage Fund (Thousand Tg.)	90,000	21,000	16,380	23,520	12,000	13,950.2	13,000	102,000	24,780	16,200	
Total No. of Employees	150	67	39	64	40	34	35	164	59	24	
Including	Engineers	27	9	2	5	2	4	1	21	9	6
	Technicians	15	7	7	8	6	5	6	18	7	-

AZZAN Corporation の保有する建設機器一覧を以下に示す。

No.	Equipment	Model	Capacity	Q/ty	Country of origin	year	condition
1	Truck	ZIL-130	5 t	1	Russia	1985	Good
2	Truck	GAZ-53	3 t	1	Russia	1986	Good
3	Water lorry	ZIL-130	6000 L	1	Russia	1999	Good
4	Dump truck	ZIL-555		1	Russia	1986	Fair
5	Dump truck	ZIL-555		1	Russia	1985	Fair
6	Dump truck	ZIL-555		1	Russia	1988	Fair
7	Dump truck	ZIL-5054		1	Russia	1993	Good
8	Dump truck	ZIL-555		1	Russia	1985	Fair
9	Dump truck	KAMAZ-5511		1	Russia	1990	Fair
10	Dump truck	KRAZ-256	12 t	1	Russia	1988	Fair
11	Bitumen lorry	KAMAZ-53213		1	Russia	1989	Fair
12	Bitumen lorry	KAMAZ-53213		1	Russia	1990	Fair
13	Bitumen lorry	KAMAZ-53213		1	Russia	1990	Fair
14	Bitumen lorry	KAMAZ-53213		1	Russia	1990	Fair
15	Agitator truck	KAMAZ-54112		1	Russia	1989	Fair
16	Agitator truck	KAMAZ-54112		1	Russia	1989	Fair
17	Agitator truck	KAMAZ-54112		1	Russia	1990	Fair
18	Agitator truck	KAMAZ-54112		1	Russia	1990	Fair
19	Truck	ZIL-131		1	Russia	1988	Bad
20	Mobile workshop	GAZ-66		1	Russia	1988	Bad
21	Snow removal machine	ZIL-1314		1	Russia	1990	Good
22	Cement truck	ZIL-130		1	Russia	1990	Fair
23	Truck crane	KE-4561		1	Russia	1984	Fair
24	Dump truck	ZIL-4505		1	Russia	1987	Fair
25	Dump truck	ZIL-4505		1	Russia	1987	Good
26	Dump truck	ZIL-4505		1	Russia	1987	Good
27	Truck crane	KRAZ-256	16 t	1	Russia	1988	Fair
28	Motor grader	DZ-180		1	Russia	1994	Fair
29	Motor grader	DZ-143		1	Russia	1990	Fair
30	Excavator	JCB		1		1996	Good
31	Excavator	EO-2621		1	Russia	1989	Fair
32	Wheel loader	TO-18		1	Russia	1991	Fair
33	Tractor	UMZ-6	50 HP	1	Russia	1986	Not operable
34	Asphalt finisher	DS-143	3.5 m	1	Russia	1991	Good
35	Macadam roller	DU-47	5 t	1	Russia	1990	Fair
36	Macadam roller	DU-47	5 t	1	Russia	1987	Fair
37	Macadam roller	DU-47	5 t	1	Russia	1987	Fair
38	Bulldozer	DZ-116	116 HP	1	Russia	1988	Fair
39	Bulldozer	DZ-110	110 HP	1	Russia	1991	Fair
40	Bulldozer	DZ-42		1	Russia	1990	Fair
41	Trailer	4 MZAP		1	Russia	1991	Fair
42	Motor grader	DZ-122	2.8 m	1	Russia	1986	Fair
43	Excavator	EO-2621		1	Russia	1985	Good
44	Bulldozer	D-606		1	Russia	1985	Fair
45	Macadam roller	DU-47	5 t	1	Russia	1989	Fair
46	Air compressor	PR-10	6 atm.	1	Russia	1986	Fair
47	Air compressor	PR-10	6 atm.	1	Russia	1990	Fair
48	Air compressor	PKS-5.25		1	Russia	1988	Fair
49	Welding apparatus	SAK		1	Russia	1993	Fair
50	Welding apparatus	SAK-16		1	Russia	1986	Fair
51	Welding apparatus	TD-300		1	Russia	1985	Not operable
52	Welding apparatus	TD-300		1	Russia	1986	Not operable
53	Welding apparatus	PSO-300		1	Russia	1987	Not operable
54	Welding apparatus	TDM-401		1	Russia	1992	Good
55	Welding apparatus	TDM-401		1	Russia	1990	Good
56	Welding apparatus	TDM-401		1	Russia	1990	Fair
57	Welding apparatus	BB-400		1	Russia	1992	Good
58	Drilling machine	211-1353		1	Russia	1990	Good
59	Drilling machine	2M-112		1	Russia	1989	Fair
60	Grindstone			1	Russia	1985	Fair
61	Vibration roller			1	Russia	1993	Good
62	Steamer	E-01		1	Russia	1989	Good
63	Steamer	E-01		1	Russia	1996	Good
64	Asphalt mixer	DE-117		1	Russia	1988	Fair
65	Asphalt mixer	DE-117		1	Russia	1987	Fair
66	Asphalt mixer	D-508		1	Russia	1985	Not operable
67	Concrete mixer	SB-75		1	Russia	1987	Good
68	Clay mixer			1	Russia	1989	Not operable
69	Crusher	CM-561		1	Russia	1987	Not operable
70	Compactor			1	Great Britain	1997	Good
71	Compactor			1	Great Britain	1997	Good
72	Bitumen sprayer			1	Great Britain	1997	Good
73	Cutter			1	China	1999	Good

AZZAN の各支社の保有する建設機器一覧を以下に示す。

Name of Company	Arkhangai	Western Direction Road Construction	Bayan-olgi	Bulgan	Bayankhongor	Govi-Altai	Darkhan Road and Bridge Repair and Maintenance Company	Dar-Zam	Dornod	Dornogovi	Zavkhan	Erdene	Uvurkhangai	Sukhbaatar	Selenge	Tuv	Uvs Road Repair and Maintenance Company	Uvs Munkhjirim	Khovd	Khuvsgul	Khentii Road Repair and Maintenance	Erdensant	AZZAN	Bat Zam	Ganguur	Erdene Zam	ITT Company	Techno-Arch Co.,Ltd	Sum
1 Motor grader D3-98(99)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	5
2 Motor grader D3-557	3			1			1		2	2				1						1		1			1				13
3 Motor grader D3-122		2	2	1	1		2	2	1	1	1	2	2	1	3	3	2	2	1	1	1	2	1	1					34
4 Motor grader D3-143																1				1	1								4
5 Motor grader D3-180						1					1												1						3
6 Motor grader GD-511																										2			2
7 Motor grader GD-611																											3		3
64																													
8 Macadam roller DU-47	2	2		1	1	2	2	2	2	1			1	2	3	2		3	1			1	4	1	1				34
9 Macadam roller DU-48			1		1			1	1				2			2				1	1				1				11
10 Macadam roller DU-50											1									1									2
11 Macadam roller CP-201																										2			2
12 Tire-roller DU-16	2				1					1	1	1	1		1	3	1	2	1		1	1							17
13 Tire-roller CS-12																										2			2
14 Tire-roller CP-221																											3		3
15 Vibration-roller CA-251																										1			1
72																													
16 Excavator EO-2621	1					1			1	1	1	1	1	1	1					1	1	1	2						12
17 Excavator JCV-3X							1					1	1	1	1	1	1				1	1							7
18 Excavator EO-3322	1	1	2	2	2	1	2	1	1	1	1	1	1	2	2	1			2	1	1	1		1	1				30
19 Excavator EO-4121	1											1			1	1			2		1								7
20 Excavator CAT-330																											1		1
21 Excavator CAT-320																										6			6
22 Excavator PW-150																												1	1
23 Excavator Solar-200W																											1		1
65																													
24 Wheel loader TO-10(18)		1			1			1					1			1		2	1			1	1						10
25 Tractor Shovel CAT-938F																											2		2
26 Tractor Shovel CAT-910F																											2		2
27 Wheel loader WA-180																											3		3
17																													
28 Bulldozer DZ-42			1		1	2		1	1	1			1	1	1				2		2	1	2						17
29 Bulldozer DZ-110(117)	2		3		1	1	2	1	1	1	1	2	2		1	2	1	6	2	2		4	1	1					37
30 Bulldozer D-155																													1
31 Bulldozer D-85																											2		2
32 Bulldozer D-65																										1			1
58																													
33 Asphalt finisher DS-126(143)	1		1		1			1			1		1	1				3	1				1	1					14
34 Asphalt finisher NF-130DM																											1		1
15																													
35 Crane KS-2561	1			1	1		1	1	1							1									1				8
36 Crane KS-4561	1	2	2		1					1		1		1	1		1	4	3	1		1	2				1		22
37 Crane KS-5363	1									1							1								1				4
38 Crane 25t TL-250E																											1		1
39 Crane 8t FH-2245A																											1		1
36																													
40 Trailer 40t ChMZAP										1								1				1							3
41 Trailer 20t ChMZAP	1									1								1											4
42 Trailer 40t SS-633																											1		1
43 Trailer 40t SS-2FKSA																											1		1
9																													
44 Scraper MOAZ-546	1	2								1	1		4			2						1							12
45 Water lorry	1	1	1	1	1	1		1		1	1	1	1	3	1	1	3	2	1	1	1	1		1	1	2	5		32
46 Maintenance car			1																		1								5
47 Tractor UMZ-6	1		1	2				1		1	1				1	1					1			1					12
48 Bitumen lorry Pheonex PA	1	1																						4					6
49 Asphalt sprayer DS-39						1	1	1				1		1	1							1							9
50 Asphalt sprayer MUFK615																											1		1
51 Cement truck															1								5						6
52 Boring machine																													1
53 Fuel-lorry	1	1						1	1			1	1				1										2		10
54 Dump truck 5t-8t	6	1	7	6	4	4	6	13	10	7	8	6	2	17	23	6	12	11	5	7	7	12	5	7	1	1			194
55 Dump truck 12t-15t	9	8	3		1		2			1	3	5			2		9	2	1			2				29			77
271																													
56 Truck ZIL-130	2	1	1	1			2	1	1	2	1	1	2	2	2		1	2	1			1	2						26
57 Truck GAZ-53						1	1	1	1		1		1		3		3	2			1	2	1	2					20
58 Concrete mixer	1																												1
59 Snow removal machine																													1
60 Road sweeper																													1
61 Double cab pickup																												1	1
62 Microbus																													1
63 Explosive																													1
40 23 26 16 18 17 21 30 24 21 25 19 30 9 41 59 14 60 36 20 14 20 51 14 20 66 17 2 753																													

AZZAN の下部組織であるリース会社“TTT”の保有する建設機器一覧を以下に示す。

No.	Equipment	Model	Capacity	Q/ty	Country of Origin	Produced year	Present condition
1	Motor grader Komatsu	GD-611	2.8 m	1	Japan	1999	Operable
2	Motor grader Komatsu	GD-611	2.8 m	1	Japan	1999	Operable
3	Motor grader Komatsu	GD-611	2.8 m	1	Japan	1999	Operable
4	Wheel Loader Komatsu	WA-180	1.4 m ³	1	Japan	1999	Operable
5	Wheel Loader Komatsu	WA-180	1.4 m ³	1	Japan	1999	Operable
6	Excavator Komatsu	PW-150	1 m ³	1	Japan	1999	Operable
7	Tire Roller Dynapac	CP-221	12.5 t 21 t with ballast	1	Sweden	1999	Operable
8	Tire Roller Dynapac	CP-221	12.5 t 21 t with ballast	1	Sweden	1999	Operable
9	Tire Roller Dynapac	CP-221	12.5 t 21 t with ballast	1	Sweden	1999	Operable
10	Water lorry with sprayer, broom and cutter	ZIL-130 MDK-433360	6,000 L	1	Russia	1998	Operable
11	Water lorry with sprayer, broom and cutter	ZIL-130 MDK-433360	6,000 L	1	Russia	1998	Operable
12	Water lorry with sprayer, broom and cutter	ZIL-130 MDK-433360	6,000 L	1	Russia	1998	Operable
13	Water lorry with sprayer, broom and cutter	ZIL-130 MDK-433360	6,000 L	1	Russia	1998	Operable
14	Water lorry with sprayer, broom and cutter	ZIL-130 MDK-433360	6,000 L	1	Russia	1998	Operable

その他、道路維持管理及び補修に関する資料を入手し、参考とした。一覧表を示す。

No.	Title	Size	Date	Published By
1	WB, Transport Rehabilitation Project, Roads Subproject. Mid Term progress report	A4	1996	Scott Wilson Kirkpatrick
2	WB, Transport Rehabilitation Project, Roads Subproject, The Road Network & Road Maintenance resources	A4	1997	Scott Wilson Kirkpatrick
3	WB, Road Maintenance manual	A4	2000	Scott Wilson Kirkpatrick
4	ADB, Institutional Strengthening of the Roads Sector, Draft Final Report, Volume 1, Executive Summary	A4	1997	N.D.Lea International Ltd
5	Tacis, CIS & Georgia -TRACEKA, Technical Assistance to the Southern Republics, Roads Maintenance. Completion Report, Module B-Winter Maintenance	A4	1998	Finnroad OY & Parkman Ltd.
6	Tacis, Technical Deliverable Winter Maintenance System (WMS) Proposal for Mongolia, Modal-B	A4	1998	Finnroad OY & Parkman Ltd.
7	Mongolia, The World Bank, Transport Rehabilitation Project, Roads Subproject, 1996 Mid Term Progress Report	A4	1996	Intercontinental Consultants & Technocrats PVT Ltd
8	ASD, TA No. 2380-MON, Contract No. COCS 96/137, Institutional Strengthening of the Roads Sector, Draft Final Report, Volume 1-Executive Summary, Project No.7402.T820.250	A4	1997	N.D.Lea International Ltd. In association with Dorsch Consult, Padego Co. Ltd. & Technology Training Associates Ltd.
9	Transport Rehabilitation Project, Roads Sub-Project, The Road Network and Road Maintenance Resources	A4	1997	Scott Wilson Kirkpatrick, Transport Research Laboratory
10	Transport Rehabilitation Project, Mongolia (C-2615-MOG), Transport Sector Policy Advisor, Closing Report, Volume 2, Appendices	A4	1998	Scott Wilson Kirkpatrick
11	Transport Rehabilitation Project, Mongolia (C-2615-Mog), Transport Sector Policy Advisor, Closing Report, Volume 1, Text	A4	Aug-98	Scott Wilson Kirkpatrick

9. 交通量、交通管理関連

9. 交通量、交通管理関連

本調査業務において行った現況交通量調査及び分析の結果を次ページより示す。

- 1) 路側 OD 調査
- 2) 交通量調査
- 3) 走行速度調査
- 4) 路面ラフネス調査
- 5) 軸重調査

1) 路側OD 調査

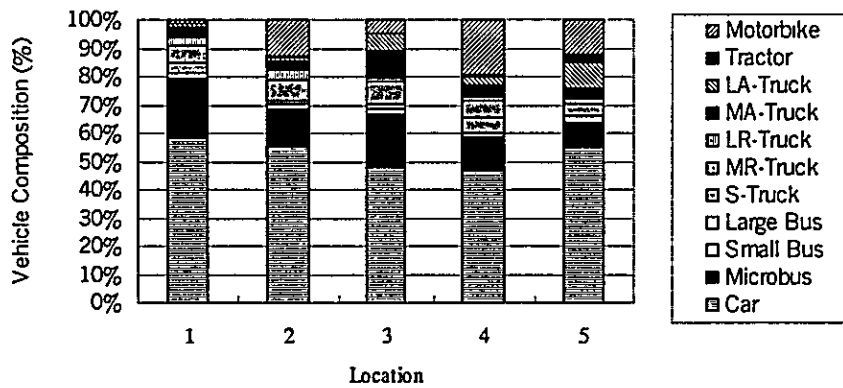


2) 交通量調査

No.	Location	Direction	Daily Traffic Volume (Vehicles per Day)			
			1st day	2nd day	3rd day	3 days average
1	Bayandavaa	To Erdene	180	149	225	185
		ToUndurkhaan	225	134	219	193
		Total	405	283	444	378
2	Kherien River Bridge	To Erdene	100	69	105	92
		ToUndurkhaan	107	58	98	88
		Total	207	127	203	180
3	Tsenkher River Bridge	To Erdene	59	54	77	63
		ToUndurkhaan	89	32	61	61
		Total	148	86	138	124
4	Murun River Bridge	To Erdene	54	50	81	61
		ToUndurkhaan	82	57	51	63
		Total	136	107	132	124
5	Sukhbaatar Road Fork	To Erdene	16	18	33	22
		ToUndurkhaan	16	24	25	22
		Total	32	42	58	44

Source: JICA Study Team, 2001

車種別割合を下のグラフに示す。

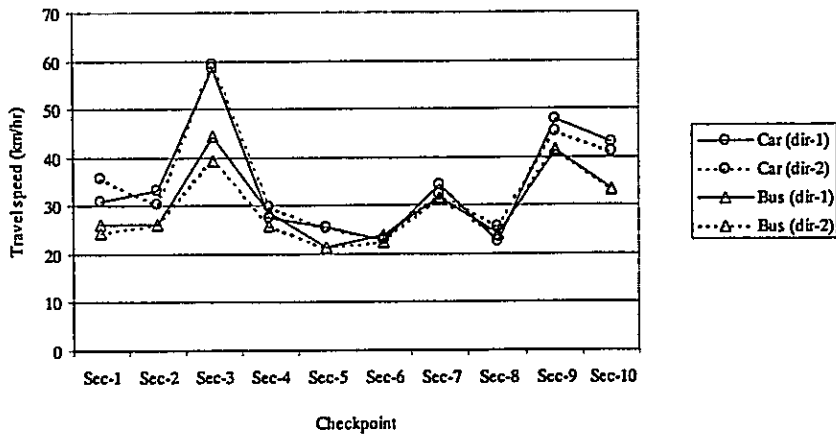


3) 走行速度調査

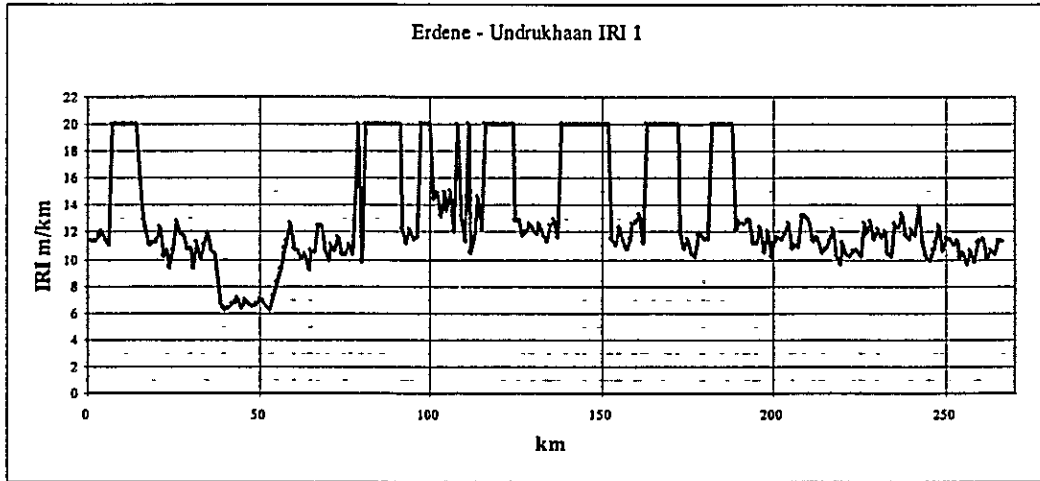
調査を行ったチェックポイントを下の表に示す。

Section No	Check point	Name of check point
1	1-2	Erdene - Bayandelger
2	2-3	Bayandelger - Entrance of Baganuur
3	3-4	Entrance of Baganuur - Khutsaa river bridge
4	4-5	Khutsaa river bridge - Kherlen river
5	5-6	Kherlen river - Tsenhermandal sum
6	6-7	Tsenhermandal sum - Tsenher river bridge
7	7-8	Tsenher river bridge - Jargalkhaan sum
8	8-9	Jargalkhaan sum - Top of Duut pass
9	9-10	Top of Duut pass - Murun river bridge
10	10-11	Murun river bridge - Undurkhaan

調査結果を下のグラフに示す。

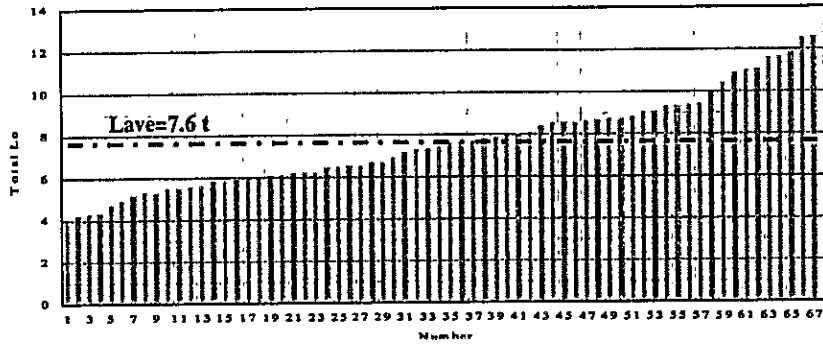


4) 路面ラフネス調査

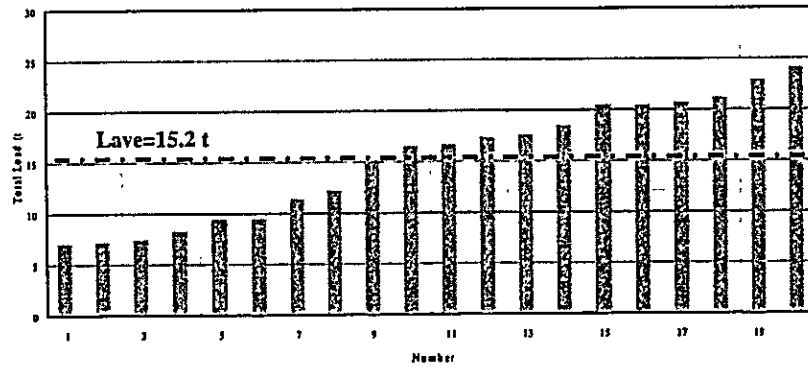


5) 軸重調査

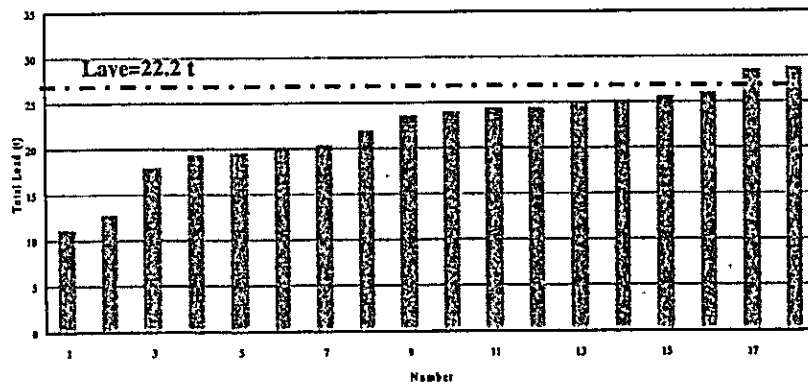
・中型トラック



・大型トラック



・トレーラー



10. 水文·水理

10. 水文・水理

本プロジェクト対象地域の水文・水理関連の資料を示す。

(1) 気象

モンゴル国年間降雨量分布図

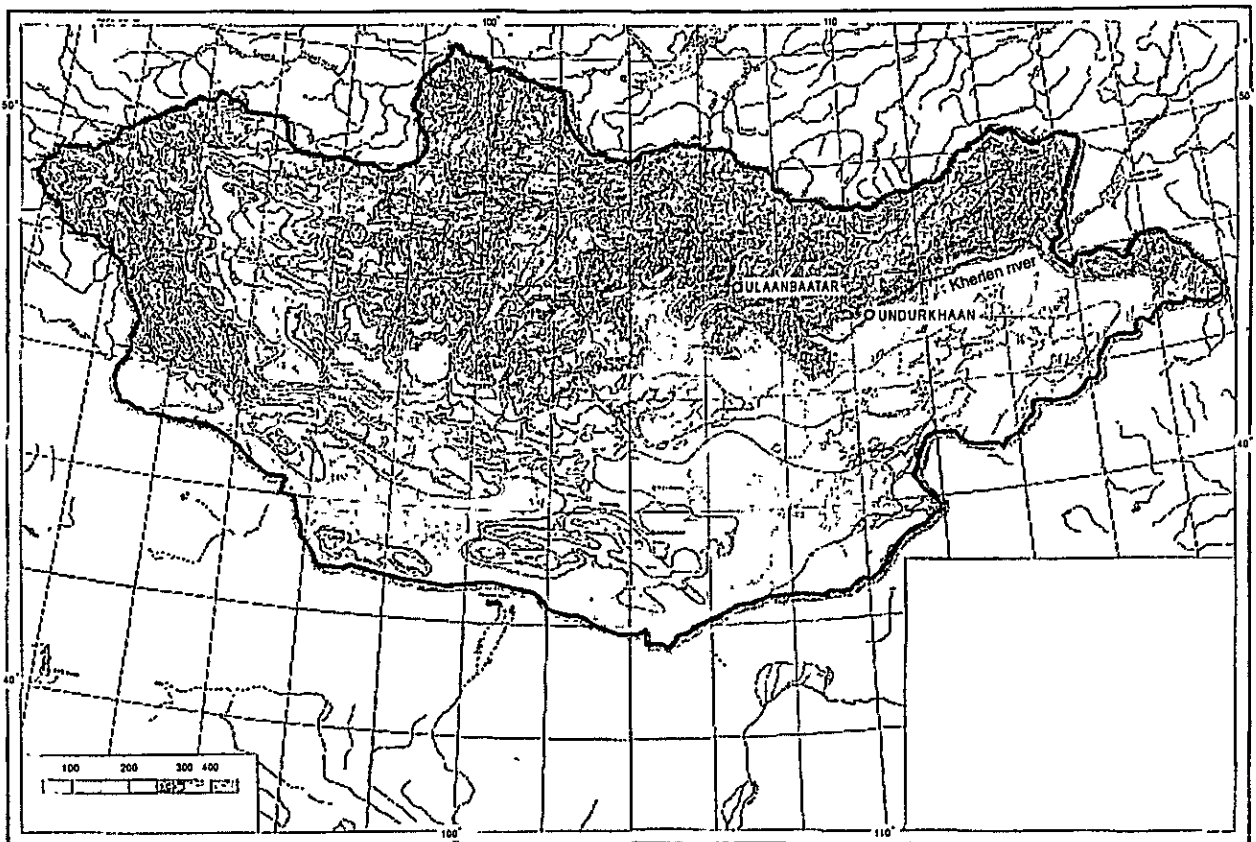


Figure 5-1-4 The Annual Rainfall Distribution

首都ウランバートルから調査対象地域の降水量、降雨日数、気温、風速を示す。

・ムルン川流域の最大降水量

Year	Undurkhaan			
	Yearly	July	Aug.	Daily
1970	317.5	92.8	130.8	33.0
1971	294.4	59.3	57.9	29.2
1972	169.5	18.8	19.8	7.5
1973	341.1	87.4	139.6	50.9
1974	314.9	39.1	83.9	28.7
1975	392.9	76.1	52.0	17.5
1976	249.6	46.1	38.0	8.5
1977	310.7	187.4	10.6	53.8
1978	194.9	57.5	27.6	29.3
1979	197.8	51.2	38.3	10.2
1980	256.6	22.7	66.9	12.2
1981	248.3	55.9	96.2	21.8
1982	213.7	64.0	83.0	26.2
1983	301.3	105.5	106.4	39.4
1984	380.9	86.9	29.0	37.0
1985	226.4	98.7	62.8	23.2
1986	203.1	79.5	41.2	15.4
1987	287.1	95.4	66.0	36.2
1988	247.2	44.2	69.2	17.6
1989	201.6	28.6	72.7	8.1
1990	367.3	160.9	62.2	38.0
1991	211.9	38.6	59.5	22.1
1992	211.0	43.3	63.8	14.4
1993	319.9	173.3	79.6	53.5
1994	248.5	111.9	41.4	25.5
1995	167.6	33.6	46.0	37.8
1996	191.8	100.7	41.1	80.1
1997	215.4	78.7	56.1	25.6
1998	289.0	47.0	149.6	32.3
1999				97.8
2000				19.0

・トーラ川流域の最大降水量 (1)

Year	Ulaanbaatar A point				Ulaanbaatar B point			
	Yearly	July	Aug	Daily	Yearly	July	Aug	Daily
1970	230.9	59.4	73.8	19.5				
1971	369.8	76.5	84.3	28.6				
1972	59.9	21.7	3.9	-				
1973	198.7	90.1	16.1	-				
1974	189.4	62.3	57.9	-				
1975	268.8	67.3	43.8	36.0				
1976	220.2	64.7	44.1	17.7				
1977	186.6	43.8	45.2	20.5				
1978	230.2	36.1	41.5	17.0				
1979	169.3	44.2	41.1	15.0				
1980	166.2	19.4	39.0	9.8				
1981	189.5	35.4	59.9	17.9				
1982	257.0	38.9	114.4	44.2				
1983	320.7	104.3	62.1	27.1	286.9	84.8	55.6	20.4
1984	344.1	98.2	133.5	51.7	344.5	130.1	106.3	56.3
1985	214.2	56.5	31.0	14.7	248.7	82.2	48.0	31.7
1986	356.4	87.7	112.0	38.0	299.5	72.4	70.6	26.1
1987	244.7	58.8	78.9	34.2	237.0	57.1	86.1	29.4
1988	268.8	51.3	135.7	19.5	340.9	47.9	127.1	18.5
1989	180.3	40.7	52.6	17.7	184.5	38.4	54.1	20.2
1990	308.1	82.8	84.6	23.0	340.7	98.4	88.4	33.0
1991	240.9	53.4	36.8	18.6	244.7	58.6	37.0	23.1
1992	301.7	84.4	89.7	31.7	270.0	74.4	82.8	22.7
1993	381.6	156.8	76.0	46.8	380.1	143.9	100.6	35.8
1994	455.6	70.0	162.6	35.4	374.0	71.2	139.4	35.3
1995	326.8	61.4	143.5	49.8	268.7	66.1	107.9	24.3
1996	216.2	84.5	61.0	21.7	206.3	77.8	64.8	20.0
1997	217.3	114.6	33.8	28.4	233.3	110.0	42.3	35.6
1998	269.2	55.4	66.7	16.6	264.3	66.3	68.7	16.9
1999	298.8	58.8	48.4	15.5	283.0	65.1	49.4	15.1
2000	328.8	59.9	137.7	29.3	249.1	57.7	109.4	13.5

・トーラ川流域の最大降水量 (2)

Year	Ulaanbaatar C point				Terelj point			
	Yearly	July	Aug	Daily	Yearly	July	Aug	Daily
1975	237.0	54.6	30.2	17.9				
1976	240.9	84.6	29.1	24.3				
1977	153.6	30.4	54.3	28.0				
1978	196.8	34.2	31.3	11.8				
1979	206.9	48.4	44.9	15.0				
1980	185.6	22.7	47.6	14.5				
1981	143.4	33.3	40.3	8.7				
1982	239.0	49.1	63.4	13.8				
1983	262.9	70.0	55.9	22.0				
1984	309.4	86.0	104.1	37.6				
1985	293.7	110.7	58.8	37.9			v	
1986	230.7	99.3	86.6	39.0	456.1	182.1	80.0	48.8
1987	231.6	56.1	80.4	32.4	359.1	75.7	122.6	35.7
1988	346.4	59.5	112.4	25.1	478.8	81.9	181.9	36.2
1989	174.7	37.6	56.7	18.1	271.0	52.8	78.4	33.1
1990	298.0	82.9	76.8	23.9	380.9	103.6	105.9	33.0
1991	243.4	59.1	45.3	23.3	358.0	128.3	48.8	51.2
1992	248.7	74.8	104.4	21.2	419.9	172.8	94.9	45.2
1993	319.5	129.4	64.4	56.2	456.5	193.3	61.5	51.7
1994	371.6	70.5	165.0	48.8	489.1	94.3	210.3	55.5
1995	293.1	114.4	76.6	60.1	368.4	79.2	150.2	45.8
1996	151.7	34.2	54.9	11.1	309.7	102.8	77.6	20.4
1997	212.9	114.2	33.7	32.5	298.5	131.6	85.3	35.8
1998	259.3	35.6	79.5	17.0	417.3	136.2	143.5	23.2
1999	296.1	48.3	49.3	14.1	343.5	77.0	69.9	28.6
2000	221.6	44.6	95.7	16.1	280.5	58.0	99.6	37.9

・ヘルレン川流域の最大降水量

Year	Baganuur city point				Mungun Morit point			
	Yearly	July	Aug	Dayly	Yearly	July	Aug	Dayly
1989					247.3	81.7	76.4	24.8
1990					322.5	73.8	136.1	31.3
1991	158.5	22.1	30.7	28.0	291.6	109.4	46.1	29.5
1992	222.4	55.1	40.8	13.2	387.2	73.6	102.5	37.1
1993	235.1	89.4	61.3	33.8	405.1	208.1	59.6	38.3
1994	217.4	43.8	52.3	14.7	365.3	69.7	138.3	35.4
1995	142.5	21.4	55.1	26.3	236.3	50.1	52.4	24.5
1996	140.5	48.6	50.4	10.5	204.1	75.6	57.2	20.1
1997	215.5	105.5	47.7	24.7	227.1	104.6	66.7	22.0
1998	329.0	76.5	136.0	48.9	325.3	80.9	98.2	30.2
1999	255.1	51.1	61.8	51.1	354.0	101.1	69.8	28.1
2000	206.8	62.5	72.7	62.5	277.7	115.1	73.5	26.0

・気温及び風速 (ウランバートル)

Year	January			February			March			April		
	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W
1991	-9.5	-33.7	12	-4.0	-28.9	10	4.0	-23.5	9	13.9	-12.3	18
1992	-6.4	-28.6	6	8.5	-26.7	12	11.0	-19.1	12	20.5	-13.3	18
1993	-7.1	-33.4	10	-1.1	-24.6	16	11.7	-21.2	22	22.3	-15.0	19
1994	-4.4	-38.8	9	-1.5	-26.9	16	15.5	-26.6	16	20.8	-9.5	18
1995	-6.1	-29.7	15	-1.8	-29.3	10	8.7	-26.1	16	18.4	-11.8	20
1996	-5.4	-31.7	13	1.4	-29.6	15	8.6	-20.3	16	23.6	-15.6	20
1997	-7.5	-31.0	14	3.8	-25.3	12	12.0	-21.9	16	19.4	-9.1	24
1998	-11.9	-36.2	14	3.0	-28.4	12	9.0	-25.4	16	22.0	-9.3	18
1999	-2.6	-34.4	14	3.0	-25.6	14	7.0	-26.2	16	23.4	-12.4	16
2000	-13.3	-35.8	11	-1.1	-31.4	7	9.8	-20.1	15	22.1	-15.1	20
Ave	-7.4	-33.3	11.8	-1.02	-27.7	12.4	9.7	-23.0	15.4	20.6	-12.3	19.1
Year	May			June			July			August		
	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W
1991	30.5	-5.4	23	32.8	1.9	19	29.0	4.0	14	34.6	4.2	18
1992	30.5	-4.5	15	28.4	-2.7	16	31.9	8.1	14	25.4	4.4	13
1993	27.8	-8.2	23	31.0	1.3	24	25.0	4.9	14	25.2	8.7	14
1994	27.7	-2.7	22	31.7	3.1	17	31.7	5.4	16	29.5	5.7	13
1995	23.8	-8.4	20	29.3	3.9	20	31.8	5.8	14	29.3	6.7	17
1996	30.8	-6.4	19	26.2	1.1	16	29.4	8.0	19	30.6	3.3	16
1997	26.7	-2.4	18	32.8	-0.3	18	36.7	4.5	19	29.4	4.2	14
1998	27.3	-4.9	24	27.5	0.3	24	35.3	9.1	17	25.8	5.1	13
1999	30.0	-1.3	20	32.0	4.5	20	38.1	8.8	16	33.7	2.2	15
2000	27.9	-2.6	22	34.5	5.6	16	31.9	6.4	14	27.9	4.8	14
Ave	29.3	-4.7	20.6	30.6	1.9	19.0	32.1	6.5	15.7	29.1	4.9	14.7
c	September			October			November			December		
	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W
1991	19.0	-2.0	15	16.5	-15.1	12	5.8	-24.1	15	-4.8	-34.5	8
1992	23.7	-4.4	16	17.0	-13.2	16	5.7	-23.3	18	-4.2	-30.5	14
1993	25.7	-4.8	14	20.5	-17.1	22	5.0	-29.7	16	-8.2	-31.2	15
1994	23.6	-5.8	18	15.0	-14.2	19	9.2	-18.2	16	-2.4	-30.6	7
1995	26.0	-6.5	14	16.3	-15.4	15	6.3	-17.7	16	-4.6	-26.6	13
1996	24.5	-3.5	16	20.6	-16.7	20	1.6	-29.1	11	-2.8	-31.0	12
1997	27.0	-3.3	16	18.0	-14.8	12	8.7	-29.7	12	-4.7	-32.1	10
1998	28.8	-0.7	15	21.7	-14.2	15	5.2	-32.2	13	-5.6	-31.7	5
1999	28.3	-2.5	16	18.4	-16.0	15	10.6	-26.1	10	-5.0	-29.1	12
2000	26.8	-2.9	14	16.4	-17.5	12	2.0	-28.5	12	-9.8	-32.6	12
Ave	25.3	-3.6	15.4	16.5	-15.4	15.8	6.01	-25.9	13.9	-5.2	-31.0	10.8

・気温及び風速 (ウンドゥルハーン)

Year	January			February			March			April		
	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W
1991	-16.1	-38.2	12	-4.0	-37.0	14	0.5	-35.0	12	16.0	-17.5	20
1992	-16.0	-32.7	8	10.6	-29.1	16	12.5	-24.6	14	21.0	-19.3	20
1993	-3.5	-32.5	14	-0.1	-33.2	14	13.5	-25.0	16	23.6	-15.4	20
1994	-10.6	-36.0	10	-5.5	-32.3	14	19.0	-32.6	14	23.7	-9.0	18
1995	-4.6	-34.0	14	-1.0	-33.1	7	8.8	-26.1	18	21.1	-13.5	28
1996	-3.0	-39.5	18	-2.0	-35.4	16	15.6	-22.9	20	27.5	-16.7	24
1997	-9.5	-38.5	16	-3.2	-33.7	18	13.3	-28.0	26	20.4	-11.8	20
1998	-5.3	-33.6	14	7.4	-28.5	16	10.7	-22.2	20	24.4	-11.7	32
1999	-4.2	-36.3	16	-0.9	-29.7	14	5.4	-35.3	16	24.0	-16.8	22
2000	-14.1	-38.8	12	2.9	-34.0	14	11.3	-25.5	18	23.7	-16.1	30
Ave	-8.7	-36.0	13.4	-3.8	-32.6	14.3	11.1	-27.7	17.4	22.5	-14.8	23.4
Year	May			June			July			August		
	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W
1991	32.1	-6.1	14	34.0	-0.6	14	31.9	4.9	14	38.1	5.5	18
1992	32.6	-8.1	14	33.0	-1.5	14	35.4	7.9	14	29.0	3.6	16
1993	28.1	-4.1	20	33.2	1.7	18	27.5	3.1	16	27.2	3.6	18
1994	29.0	-3.4	18	31.8	4.4	16	30.8	7.5	22	29.9	6.4	16
1995	27.0	-6.7	20	34.4	2.3	34	33.0	4.6	28	31.8	6.7	18
1996	32.9	-10.4	34	31.5	0.0	16	30.8	6.6	16	31.2	4.2	16
1997	30.3	-5.6	20	35.9	2.9	26	38.0	6.0	18	32.9	6.6	14
1998	31.8	-4.7	30	33.2	2.6	20	33.5	10.5	14	25.3	5.7	14
1999	29.3	-3.1	18	34.4	3.2	26	38.6	9.0	22	35.2	2.5	20
2000	34.2	-4.3	20	35.9	2.7	18	37.0	7.9	24	32.9	4.0	14
Ave	30.7	-5.7	20.8	33.7	1.8	20.2	33.7	6.8	18.8	31.4	4.9	16.4
Year	September			October			November			December		
	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W
1991	25.9	-6.0	18	20.0	-15.7	16	3.2	-26.0	20	-1.8	-34.9	12
1992	25.2	-3.8	15	20.6	-14.2	14	8.3	-25.9	20	-1.0	-30.3	12
1993	25.7	-3.1	18	19.6	-20.5	14	10.2	-32.9	18	-6.0	-32.3	14
1994	28.2	-6.1	20	17.6	-13.4	16	13.5	-21.9	16	-1.4	-37.8	14
1995	29.0	-7.0	20	19.4	-17.4	20	10.4	-23.6	18	-2.5	-31.2	14
1996	29.3	-8.9	18	18.9	-25.4	16	2.3	-32.4	14	-2.9	-33.9	14
1997	28.2	-4.7	16	20.1	-15.0	16	10.4	-31.7	16	0.7	-30.4	20
1998	28.3	-0.8	14	24.8	-20.3	16	9.6	-38.1	16	-5.3	-37.6	14
1999	28.6	-3.9	17	20.1	-15.4	16	9.5	-30.5	14	0.7	-31.6	14
2000	32.3	-1.9	18	17.0	-20.3	18	4.6	-34.5	22	-9.5	-35.9	14
Ave	28.1	-4.6	17.4	19.8	-17.8	16.2	8.2	-29.8	17.4	-3.2	-33.6	14.2

・気温及び風速（バガヌール）

Year	January			February			March			April		
	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W
1991	-15.5	-36.3	6	-6.8	-34.5	14	1.8	-30.6	10	12.0	-16.5	18
1992	-3.2	-34.1	10	8.3	-29.5	12	9.5	-23.9	9	16.0	-18.0	15
1993	-8.9	-39.3	10	-2.8	-31.4	12	9.5	-26.3	22	21.7	-20.0	18
1994	-8.6	-38.4	16	-4.4	-32.8	14	15.5	-37.0	14	19.6	-10.4	20
1995	-7.6	-34.6	9	-2.0	-33.2	6	8.2	-28.2	20	16.5	-15.4	20
1996	-5.1	-38.5	9	3.3	-34.9	14	11.0	-25.2	14	23.0	-19.4	14
1997	-9.8	-38.0	12	1.4	-33.0	14	11.5	-28.1	18	20.1	-11.5	16
1998	-12.0	-40.0	12	3.9	-33.5	9	9.0	-23.5	17	22.0	-11.4	18
1999	-8.4	-40.5	14	-1.4	-30.0	18	2.4	-36.0	16	24.5	-17.0	16
2000	-16.0	-43.7	12	-2.0	-39.6	12	9.6	-23.5	18	20.7	-16.6	20
Ave	-9.5	-38.3	11.0	-0.25	-33.2	12.5	8.8	-28.2	15.8	19.6	-15.6	17.5
Year	May			June			July			August		
	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W
1991	28.6	-5.0	15	31.0	0.2	14	27.1	1.6	10	33.6	2.1	6
1992	27.1	-9.4	16	29.0	-6.1	10	32.0	4.6	10	23.8	-0.2	9
1993	26.6	-6.2	24	31.3	-6.1	16	24.9	5.4	16	24.5	0.4	10
1994	26.8	-4.2	16	30.2	4.0	14	28.0	5.2	9	27.4	3.8	9
1995	23.7	-11.5	14	28.1	0.2	14	31.8	2.3	9	28.4	4.3	9
1996	31.6	-9.5	14	25.9	-1.3	14	27.4	4.3	9	28.8	0.2	12
1997	31.3	-7.9	14	35.3	-1.9	14	34.7	4.4	12	28.2	1.7	10
1998	29.1	-9.3	14	26.9	-1.5	14	31.5	6.1	9	24.6	3.6	10
1999	27.5	-6.9	14	31.0	-0.4	13	35.6	5.5	9	31.2	-0.5	12
2000	28.2	-8.7	20	33.5	-0.1	12	34.2	4.5	10	27.0	0.2	16
Ave	28.1	-7.9	16.1	30.2	-1.3	13.5	30.7	4.4	10.3	27.8	1.6	10.3
Year	September			October			November			December		
	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W	Max.T	Min.T	Max.W
1991	23.0	-6.8	14	16.4	-15.6	12	1.8	-29.0	12	-0.7	-20.4	8
1992	21.4	-5.7	10	16.0	-16.5	16	5.4	-26.3	12	-7.1	-33.5	14
1993	23.1	-9.8	14	19.3	-20.0	15	-0.2	-34.8	8	-9.6	-33.0	14
1994	22.6	-6.2	16	15.0	-15.2	12	8.6	-23.5	14	-3.0	-35.0	9
1995	26.0	-8.8	10	21.2	-21.9	16	8.8	-23.1	11	-5.0	-31.7	8
1996	23.5	-10.6	14	18.0	-25.0	14	3.6	-31.6	11	-0.7	-34.8	11
1997	25.5	-5.8	14	18.0	-16.3	14	7.0	-33.6	14	-8.8	-36.0	12
1998	26.2	-3.1	10	20.1	-15.1	12	5.9	-39.8	9	-4.4	-41.8	9
1999	24.4	-5.5	14	17.8	-20.9	14	7.5	-33.1	12	-3.6	-39.2	12
2000	24.6	-6.4	14	14.4	-25.5	14	3.6	-35.8	15	-10.2	-40.3	6
Ave	24.0	-6.9	13.0	17.6	-19.2	13.9	5.2	-31.1	11.8	-5.3	-34.6	10.3

・降雨日数（ウランバートル）

Year	January		February		March		April	
	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<
1991	6	-	6	-	12	-	12	-
1992	4	-	6	-	2	-	8	-
1993	6	-	7	-	5	-	7	-
1994	6	-	6	-	5	-	7	-
1995	5	-	3	-	7	-	13	1
1996	6	-	5	-	10	-	5	-
1997	5	-	5	-	3	-	4	-
1998	10	-	4	-	4	-	5	-
1999	4	-	6	-	8	-	6	-
2000	10	-	3	-	6	-	10	-
	May		June		July		August	
	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<
1991	7	-	16	-	14	2	9	1
1992	9	-	12	1	17	3	23	1
1993	9	-	13	2	16	4	16	1
1994	7	-	14	1	16	2	19	4
1995	11	1	13	-	16	2	8	5
1996	8	-	14	-	12	3	16	2
1997	9	-	11	1	16	3	11	1
1998	8	-	12	2	15	2	14	3
1999	6	1	12	3	13	1	11	2
2000	9	-	11	1	14	2	14	7
	September		October		November		December	
	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<
1991	12	1	10	-	12	-	9	-
1992	14	-	7	-	10	-	10	-
1993	10	1	3	-	5	-	10	1
1994	8	2	5	-	9	-	9	-
1995	8	1	7	-	5	-	10	-
1996	8	-	6	-	9	-	7	-
1997	8	-	5	-	4	-	6	-
1998	11	2	8	1	13	-	7	-
1999	8	2	6	-	6	-	11	-
2000	6	-	8	-	15	-	13	-

・降雨日数 (ウンドゥルハーン)

Year	January		February		March		April	
	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<
1991	1	-	3	-	8	-	9	-
1992	5	-	1	-	4	-	7	-
1993	3	-	3	-	5	-	1	-
1994	5	-	3	-	5	-	5	-
1995	2	-	3	-	8	-	11	-
1996	5	-	2	-	5	-	1	-
1997	3	-	4	-	1	-	3	-
1998	4	-	4	-	1	-	4	-
1999	1	-	3	-	10	-	6	-
2000	5	-	3	-	3	-	5	1
	May		June		July		August	
	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<
1991	7	-	14	1	17	-	12	2
1992	11	-	12	-	18	1	19	2
1993	6	-	13	-	13	7	15	1
1994	4	1	15	-	13	4	17	1
1995	4	-	11	2	14	1	10	1
1996	3	-	15	1	17	1	13	1
1997	8	-	13	2	18	2	13	1
1998	8	-	12	1	17	1	13	6
1999	8	-	14	2	13	-	14	2
2000	5	-	7	-	17	2	16	4
	September		October		November		December	
	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<
1991	12	-	10	-	7	-	1	-
1992	7	2	5	-	4	-	7	-
1993	7	-	2	-	3	-	6	-
1994	10	-	8	-	2	-	5	-
1995	7	-	8	-	4	-	7	-
1996	5	-	6	-	8	-	4	-
1997	7	2	3	-	4	-	5	-
1998	7	1	8	-	9	-	4	-
1999	11	1	3	-	3	-	5	-
2000	4	-	8	-	10	-	4	-

・降雨日数（バガヌール）

Year	January		February		March		April	
	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<
1991	1	-	3	-	6	-	8	-
1992	2	-	1	-	4	-	8	-
1993	3	-	3	-	5	-	4	-
1994	7	-	3	-	11	-	14	-
1995	1	-	1	-	7	-	9	-
1996	4	-	2	-	4	-	3	-
1997	2	-	4	-	3	-	3	-
1998	4	-	4	-	2	-	8	-
1999	2	-	1	-	11	-	5	-
2000	7	-	1	-	3	-	7	-
	May		June		July		August	
	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<
1991	3	1	11	-	17	2	13	-
1992	7	1	12	1	18	2	20	-
1993	4	-	14	1	14	3	13	3
1994	16	-	17	2	14	1	16	-
1995	8	-	14	-	16	-	11	2
1996	6	-	11	-	19	3	18	-
1997	7	-	8	-	15	3	8	2
1998	5	-	12	-	13	3	17	4
1999	8	-	16	2	15	-	18	2
2000	10	-	9	1	16	-	16	3
	September		October		November		December	
	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<	0mm<	10mm<
1991	9	1	4	-	4	-	3	-
1992	9	1	2	-	7	-	3	-
1993	6	-	3	-	4	-	4	-
1994	7	-	5	-	3	-	3	-
1995	7	-	4	-	1	-	3	-
1996	7	-	4	-	5	-	3	-
1997	4	1	4	-	3	-	4	-
1998	6	2	5	1	8	-	2	-
1999	8	3	3	-	2	-	2	-
2000	2	1	5	-	8	-	8	-

(2) 水位及び流量

・年間最大水位及び流量

Year	Tuul river Basin (6380km ²)						Kherlen River Basin (7100km ²)			
	Ulaanbaatar S (6380)		Bosgo BridgS(2158)		Tereij S.(1220)		K.R.B S.(7100)		UnderkhaanS(39400)	
	H.W.L.	Discharge	H.W.L.	Discharge	H.W.L.	Discharge	H.W.L.	Discharge	H.W.L.	Discharge
1970	158	266	77	82.1	290	-	376	-	251	127
1971	150	246	103	135	266	-	250	117	252	127
1972	52	15.9	39	12.5	169	69	254	91.9	165	23.5
1973	241	717	115	215	321	200	314	181	271	257
1974	158	370	80	126	288	93	272	79.9	243	136
1975	164	406	84	123	253	139	257	115	256	155
1976	150	360	82	106	246	116	294	260	265	159
1977	113	190	75	76.3	233	-	294	277	242	116
1978	115	194	60	48.4	225	52.7	237	130	199	48.9
1979	108	119	62	45	215	57.9	246	154	195	57.6
1980	87	80.1	48	29.3	245	123	253	178	214	79.2
1981	104	137	62	62	227	64.1	292	273	228	91
1982	140	327	94	145	242	109	269	197	234	122
1983	264	917	189	118	332	564	282	241	227	110
1984	238	345	198	151.2	264	230	325	263	279	208
1985	230	295	183	121	309	144	-	-	266	205
1986	233	291	181	109	312	279	261	110	219	94
1987	222	227	168	83.4	236	153.5	214	101	225	110.5
1988	245	375	198	154	256	196	242	-	261	135
1989	210	174	-	-	356	173	210	174	228	50.5
1990	252	507	429	343	245	166	252	638	279	248
1991	383	388	314	178	251	171	301	214	235	127
1992	208	323	330	175	223	101	358	256.4	252	154
1993	357	678	329	340	260	190	436	480	295	230
1994	461	226	372	106	243	132.1	479	292	268	189
1995	357	80.3	323	43.7	248	98.6	462	219	262	124
1996	306	35.7	274	26.6	172	43.5	371	60.1	299	35
1997	364	78.3	308	30.4	198	82.1	419	158	241	116
1998	376	76.9	310	41.8	218	84.2	237	148	268	257
1999	316	88	293	50.3	188	48.1	200	105	162	130
1966	311	795	-	-	-	1961	251	598	-	-

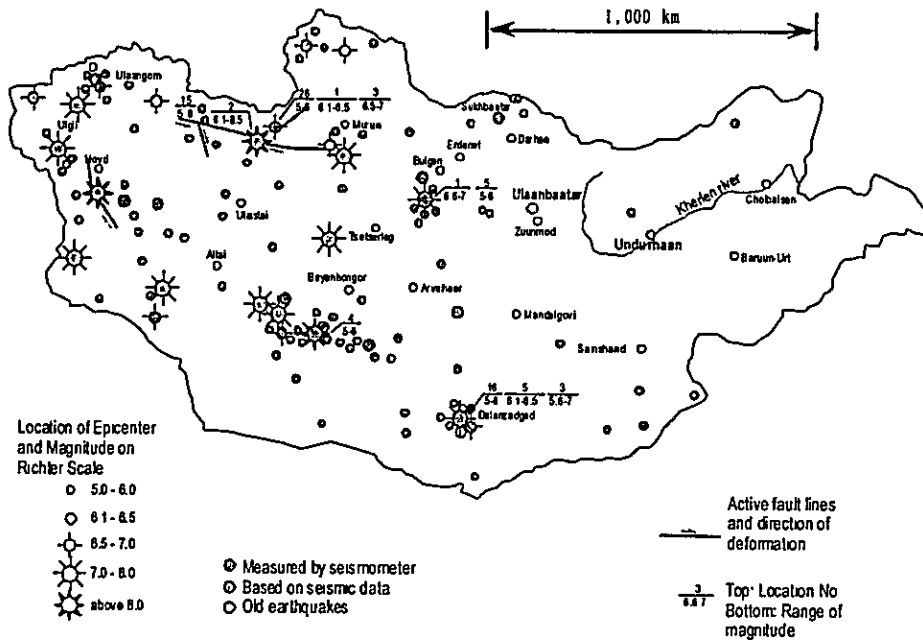
その他の参考資料を入手した。下に一覧表を示す。

No.	Title	Size	Date	Published By
1	Geological Map of The Catchment Area of The Kherlen River	A1	1965	P.V.Osorin, A.A.Khapov, V.V.Soloviyov, E.D.Stepanyan, A.S.Zelenko, S.M.Markov, A.N.Passkazchikov, T.A.Khrapova, Emuun, Nergui, Densmaa
2	Geological Map of The Catchment Area of The Kherlen River Middle Stream	A1	1968	S.M.Kalimulin, M.B.Durante, L.P.Zonenshain, R.N.Kalimulina, I.B.Filippova, Z.P.Kozlovskoi, E.E.Fyodorova, M.E.Fyodorovoi

1 1. 地震

1.1. 地震

・震源地分布図



・調査範囲内地震記録一覧 (M>3.5)

Date	Coordinates		Magnitude	Remarks
	N	E		
Jan. 1, 1951	47.70°	109.90°	5.8	70km to the northwest of Undurkhaan
Sep. 4, 1983	47.40°	110.70°	3.5	10km to the north of Undurkhaan
Apr. 10, 1986	47.15°	108.70°	4.0	65km to the southeast of Kherlen river RC bridge
Jul. 7, 1995	47.15°	108.83°	3.9	65km to the southeast of Kherlen river RC bridge

・参考文献

No.	Title	Size	Date	Published By
1	On the seismicity of territory of Mongolia	A4	1974	T.Bayaraa, B.Tsengel, T.Dugarmaa