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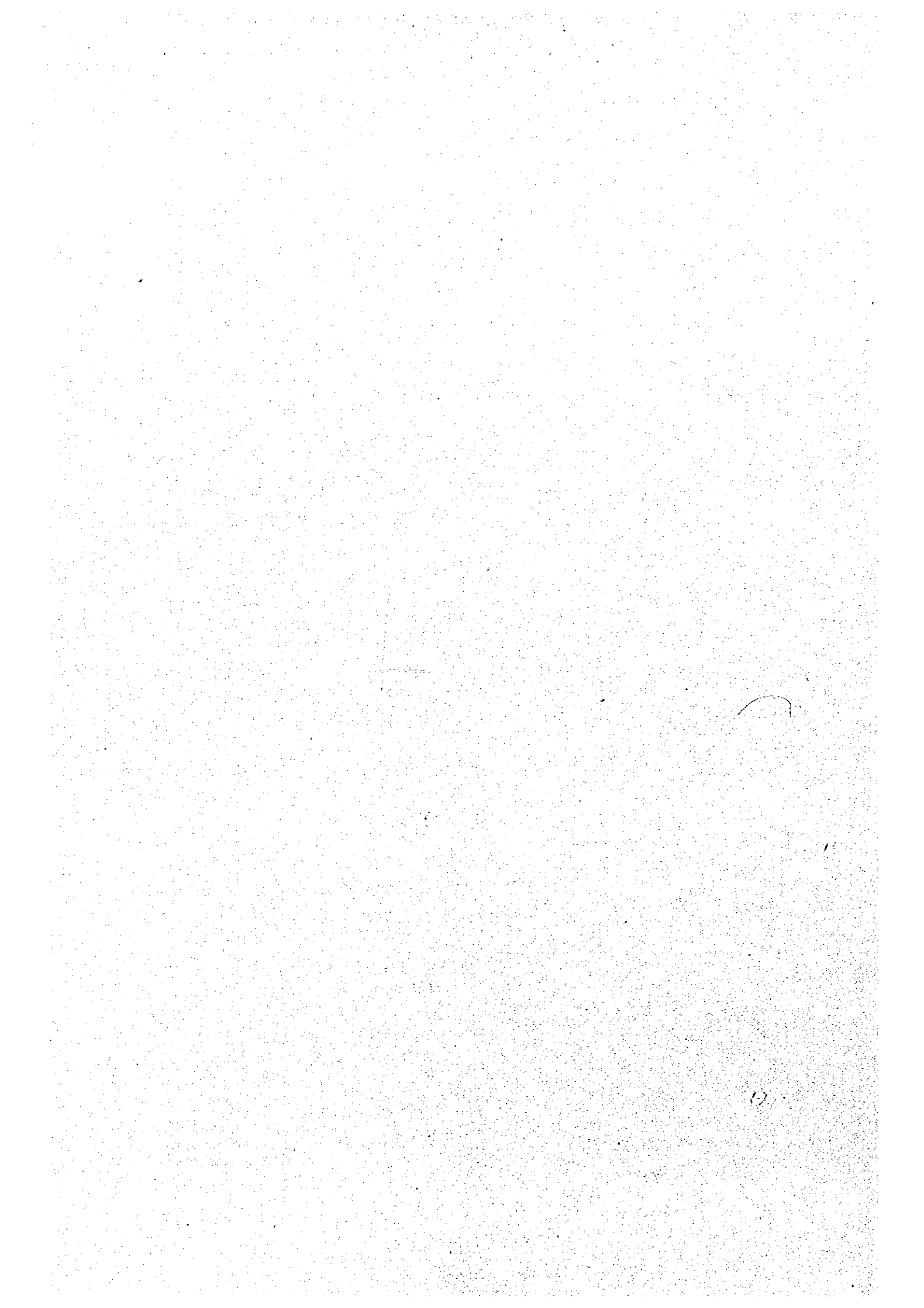
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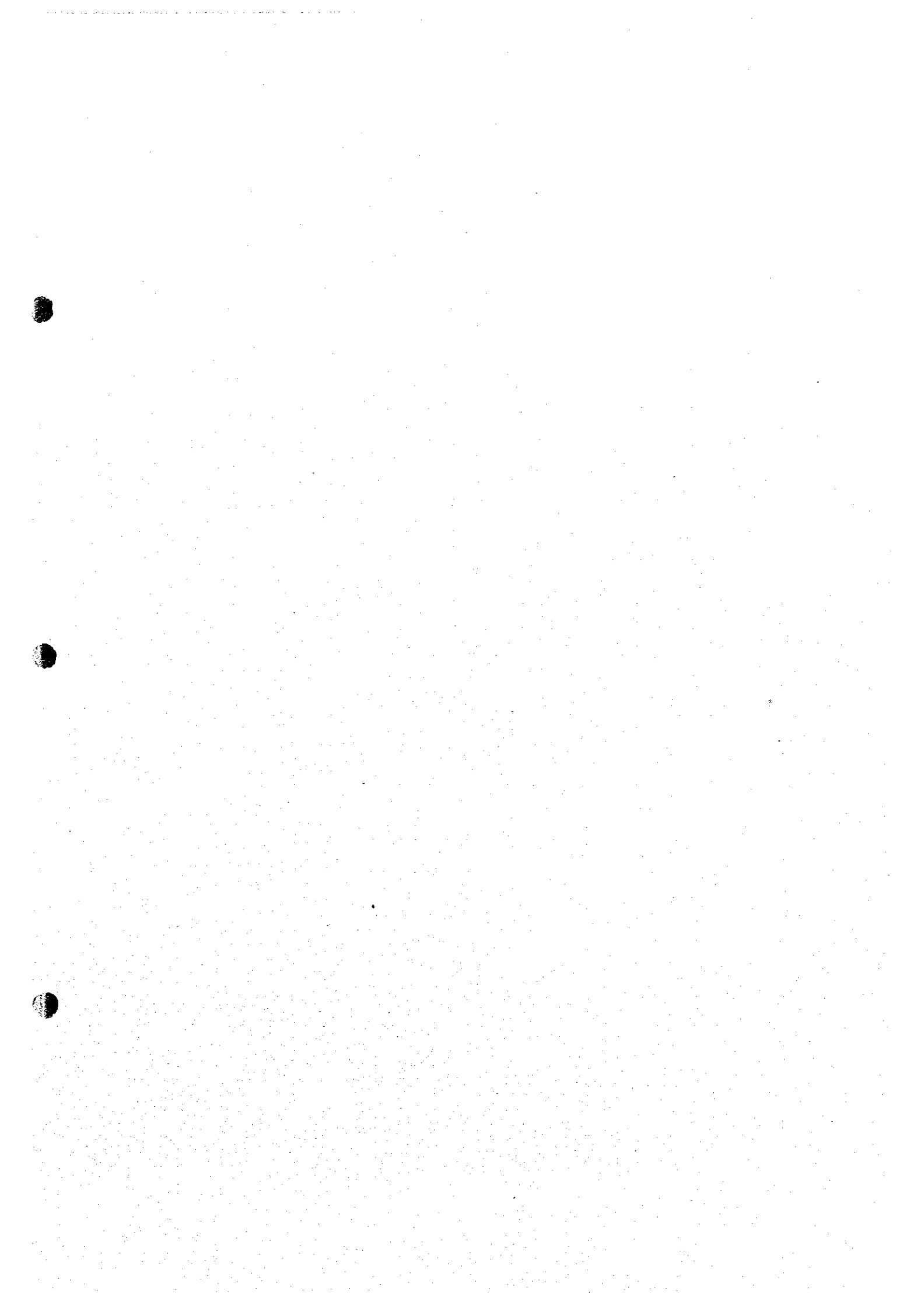


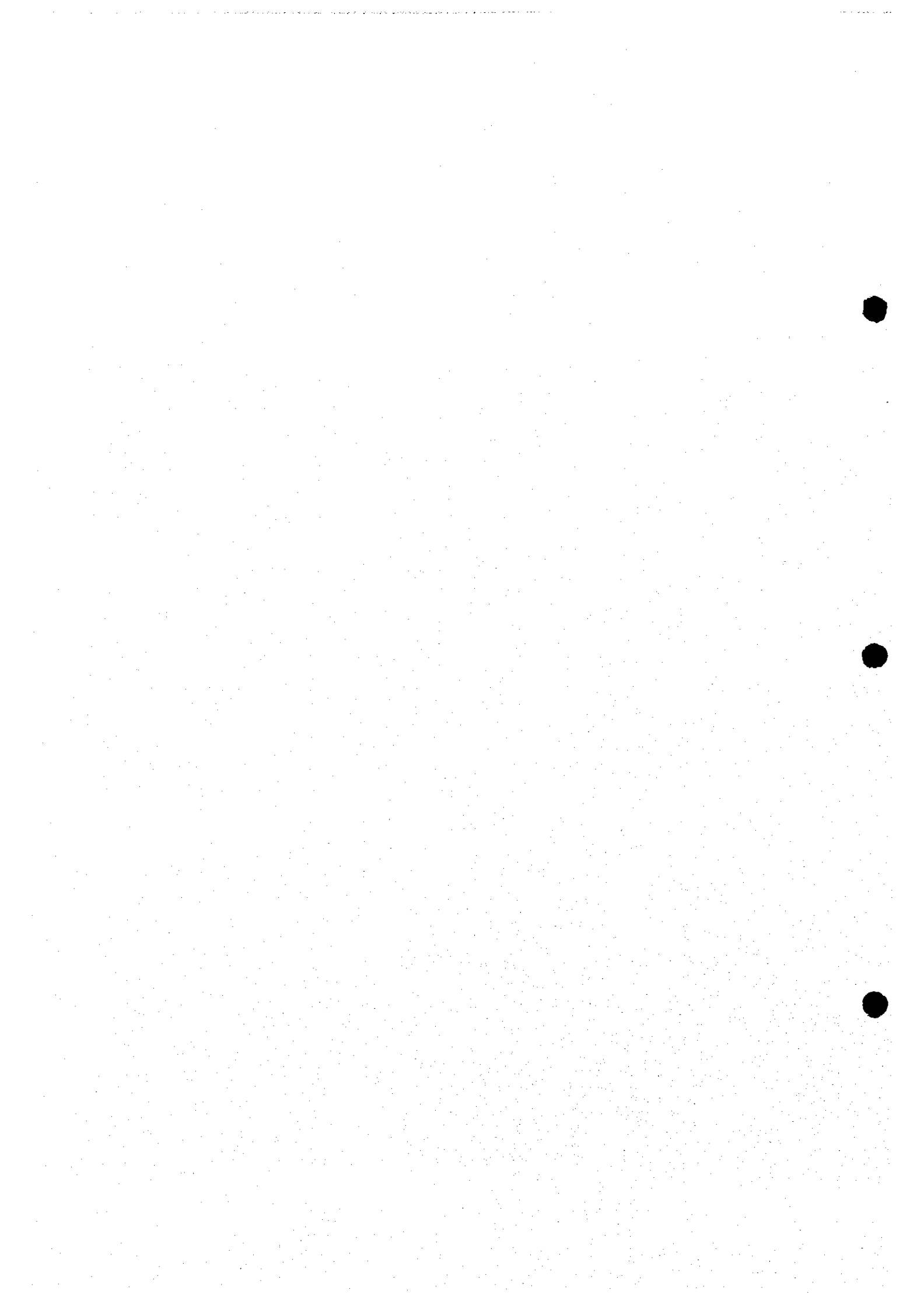
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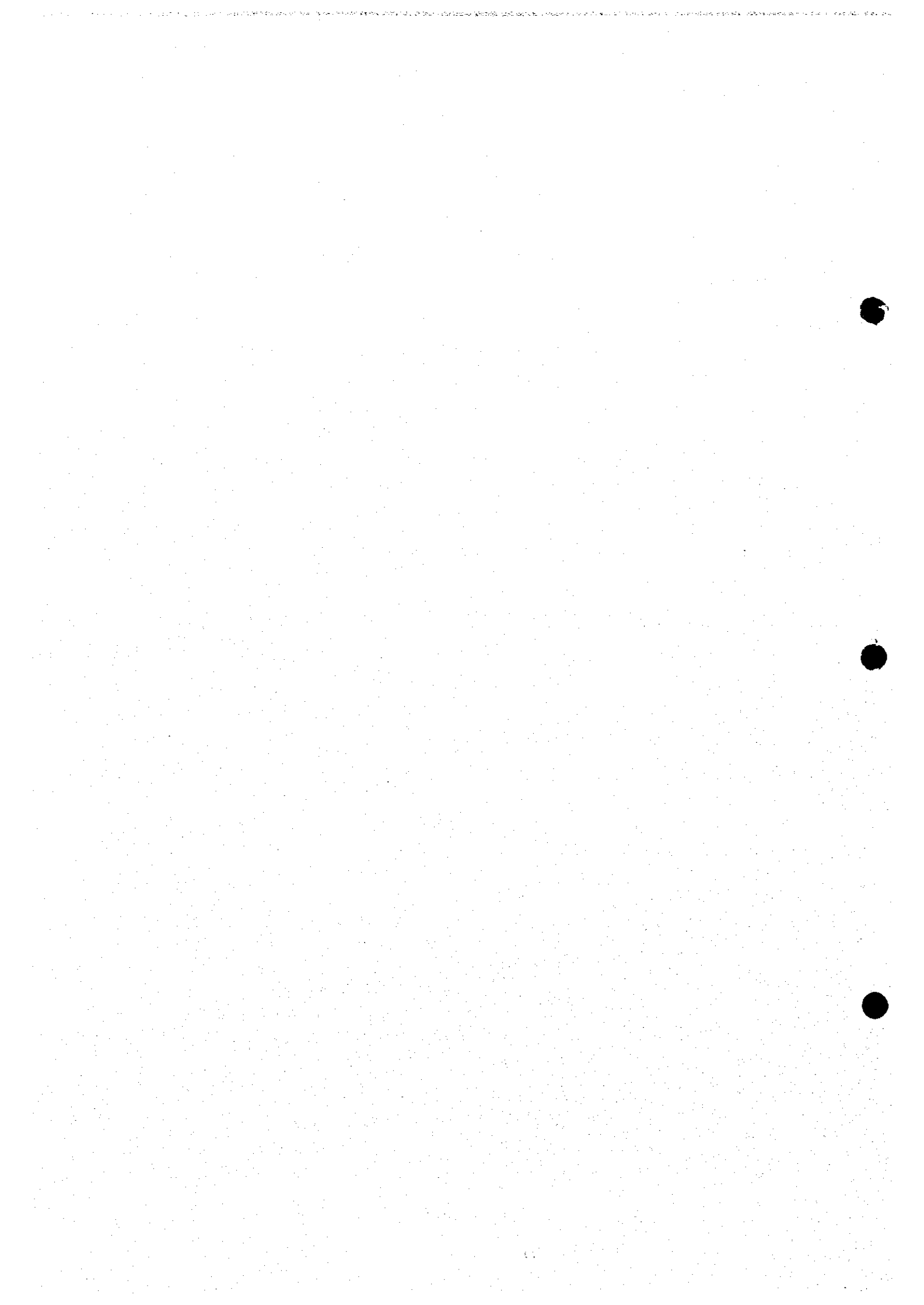
社会開発調査部報告書











JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

THE MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT
THE SOCIALIST REPUBLIC OF VIET NAM

***THE STUDY
ON GROUNDWATER DEVELOPMENT
IN THE RURAL PROVINCES
OF NORTHERN PART
IN THE SOCIALIST REPUBLIC
OF VIET NAM***

***FINAL REPORT
MAIN REPORT***

JANUARY 2000

**KOKUSAI KOGYO CO., LTD.
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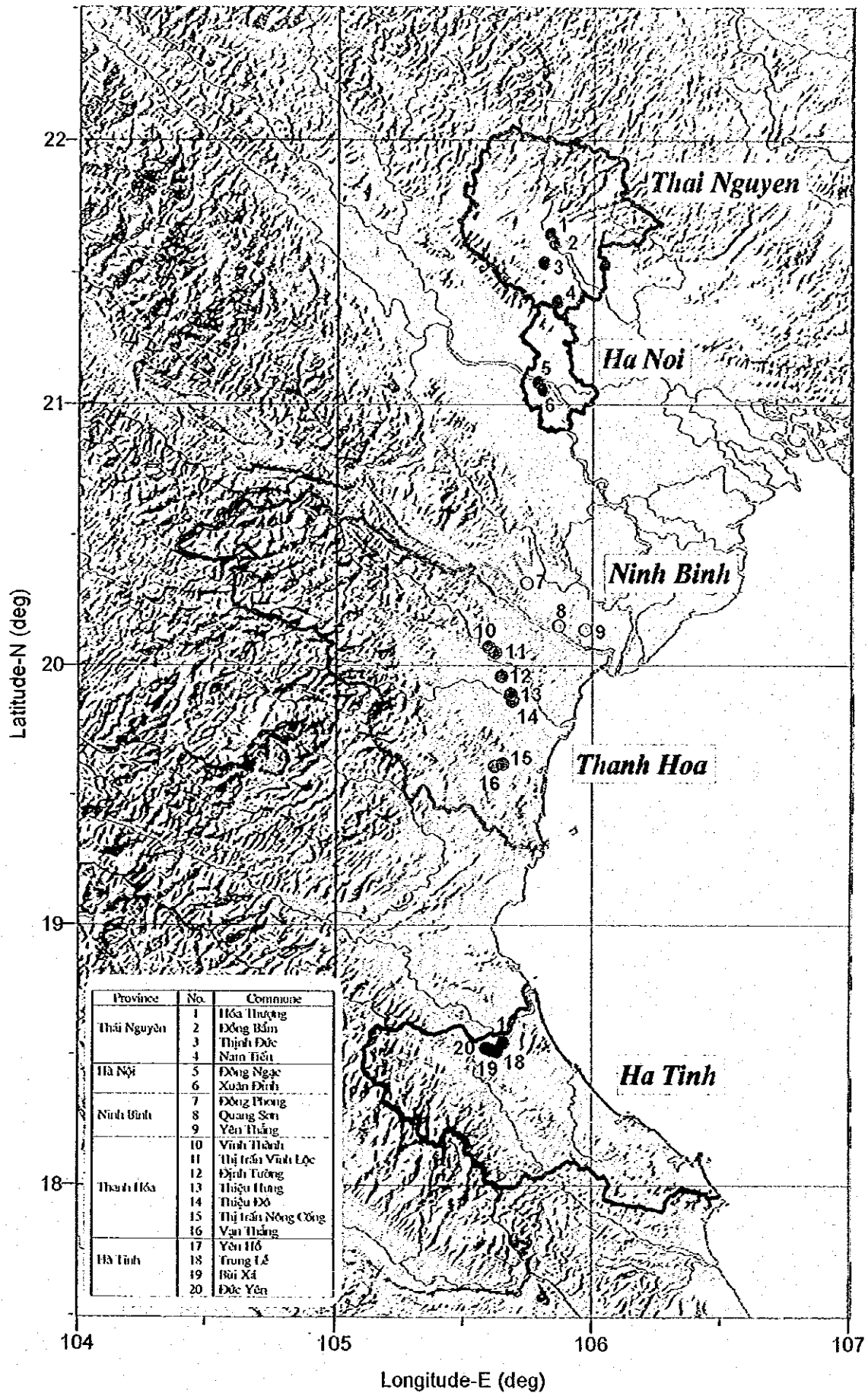
Composition of the Final Report

The final reports are composed of the following 7 volumes.

1. Summary Report (Japanese)
2. Summary Report (English)
3. Summary Report (Vietnamese)
4. Main Report (English)
5. Supporting Report A (English)
6. Supporting Report B (English)
7. Data report (English)



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LOCATION MAP OF THE STUDY AREA

**The Study on Groundwater Development in the Rural Provinces of Northern Part
in the Socialist Republic of Viet Nam**

Main Report

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EXCHANGE RATE, ABBREVIATION

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Exchange Rate
(November 1999)

US\$ 1.00=13,941VND=106 Yen
1 VND=0.0076 Yen=US\$ 0.000072
1 Yen=US\$ 0.009=131.5 VND

List of Abbreviations

CERWASS:	Centre for Rural Water Supply and Environmental Sanitation
CHC:	Community Health Care
CI:	Consulting Institute
CPC:	Commune's People's Committee
DANIDA:	Danish International Development Assistance
DARD:	Department of Agriculture and Rural Development
DARDO:	District Agriculture and Rural Development
DF/R:	Draft Final Report
DGMV:	Department of Geology and Minerals of Vietnam
DHC:	District Health Centre
DOF:	Department of Finance
DOH:	Department of Health (provincial level)
DOSTE:	Department of Science, Technology & Environment
DPC:	District Peoples Committee
DPI:	Department of Planning & Investment
EIA:	Environmental Impact Assessment
F/R:	Final Report
FISOLS-95:	Fifth International Symposium on Land Subsidence-95
F/S:	Feasibility Study
GAD:	Gender and Development
GDP:	Gross Domestic Product
GSO:	General Statistical Office
HRD:	human resources development
IEC:	information and education campaign
IC/R:	Inception Report
IT/R:	Interim Report
IEE:	Initial Environmental Examination
JICA:	Japan International Cooperation Agency
KI:	Key Informant

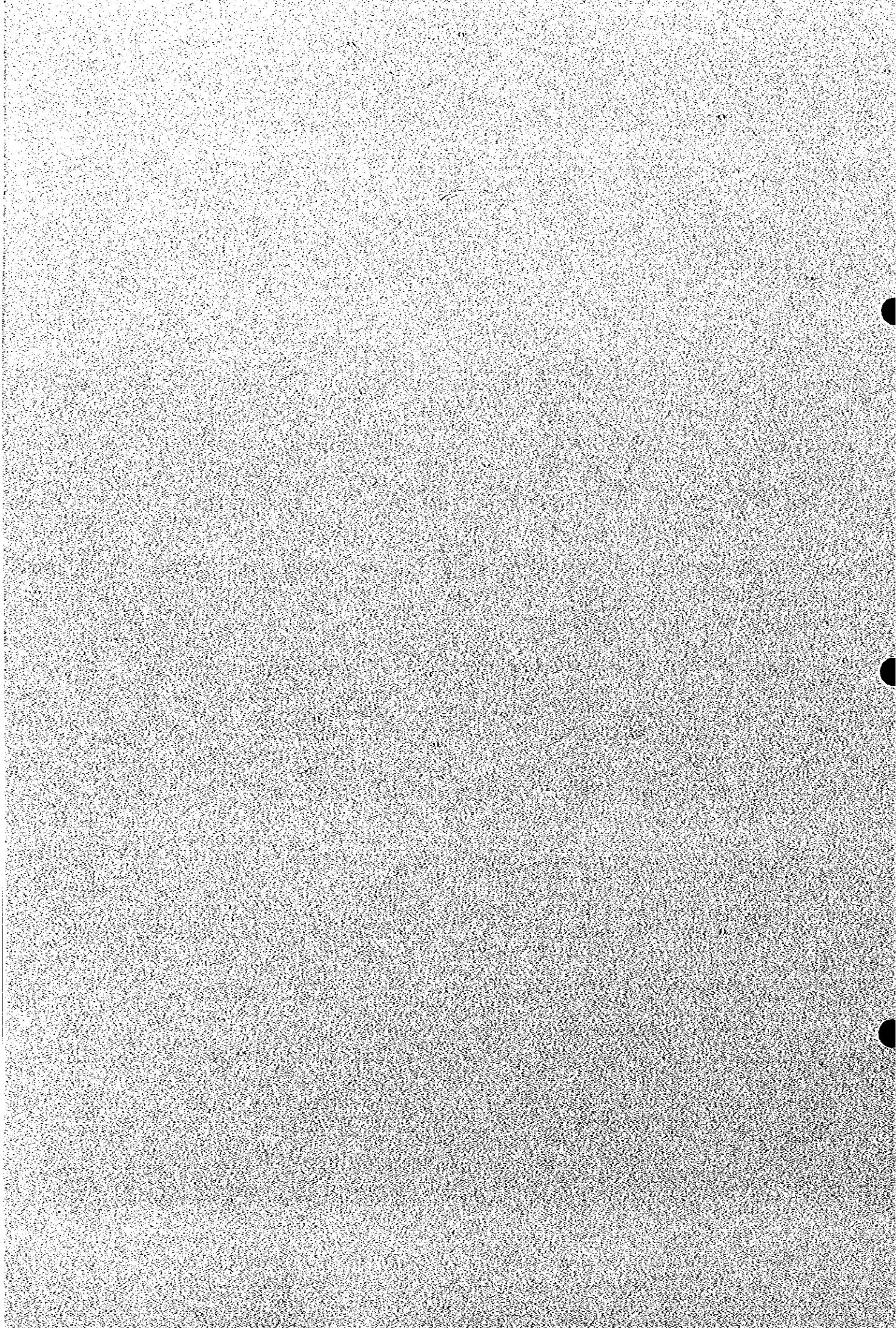
lcd:	litter per capita per day
MARD:	Ministry of Agriculture and Rural Development
MCM:	million cubic meter
M/M:	Minutes of Meeting
MOC:	Ministry of Construction
MOE:	Ministry of Education
MOF:	Ministry of Finance
MOLISA:	Ministry of Labour, Invalids and Social Affairs
M/P:	Master Plan
NGO:	Non-governmental organizations
NIPHEP:	National Institute of Public Health and Environmental Protection
NRWSS:	National Rural Water Supply and Sanitation
ODA:	Official Development Assistance
O&M:	Operation and Maintenance
PCM:	Project Cycle Management
PDM:	Project Design Matrix
PDOSTE:	Provincial Department of Science, Technology & Environment
PDPSC	Provincial Disease Prevention and Sanitation Centre
PPC:	Provincial People's Committee
P/R:	Progress Report
PRA:	Participatory Rapid Appraisal
RWSS:	rural water supply and sanitation
SPC:	State Planning Committee
SRV:	Socialist Republic of Vietnam
S/W:	Scope of Work
UNICEF:	United Nations Children's Fund
VLF-EM:	Very low frequency-electromagnetic (method)
VND:	Vietnam Dong
WB:	World Bank
WATSAN:	Water Supply and Sanitation
WID:	Women in Development
WU:	Women's Union

PART I

GENERAL

PART I

GENERAL



PART I GENERAL

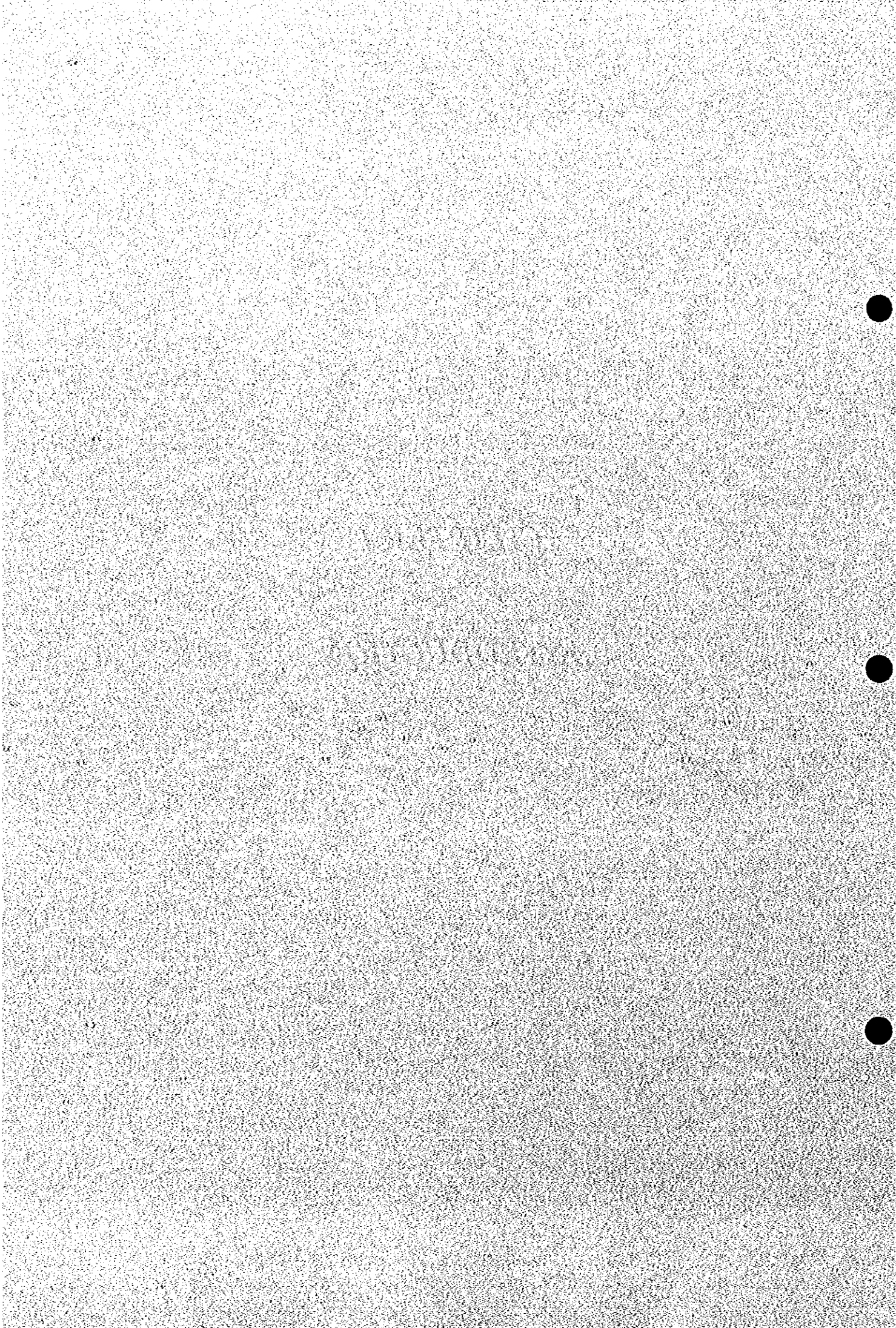
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CHAPTER 1

INTRODUCTION



PART I GENERAL

CHAPTER 1 INTRODUCTION

1.1 Background of the Study

The economy of the Socialist Republic of Vietnam has remarkably developed in recent years. Due to extensive civil strife, however, the development of the nation as a whole has been slow, particularly in the rural area.

In terms of infrastructure, the rural water supply system was underdeveloped until the 1960s, when the Government of Vietnam started a campaign for the construction of shallow wells, bathrooms and latrines. The program was re-implemented after the Vietnam war, and from the 1980s water supply facilities were constructed in some provinces with the financial support of the United Nations Children's Fund (UNICEF).

Urban and rural water supply and sanitary conditions differ considerably. Only about 20 % of the residents in the rural area receive safe water supply services. Shallow wells and rivers are among the number of water sources predominantly used in the rural area. These sources, however, extremely endanger the health of the residents as domestic wastewater discharge contaminate shallow wells and industrial wastewater pollute river water.

To cope with these conditions, the government prepared the Rural Socio-economic Development Plan to improve the standard of living and solve prevalent social problems. To attain these objectives, the government acknowledges the importance of constructing water supply facilities and improving sanitary conditions in the rural area. In the recent plan, the government aimed to attain a service rate of 80 % by the year 2005 for use of clean water (NRWSS: No.237/1998/QD-TTg).

The above plan entails the implementation of a groundwater development plan and a water supply plan (deep well construction) in five provinces. However, lack of data and information on groundwater development, water supply facilities, and public health and sanitation, hampered the progress of the plan.

Given these circumstances, the Government of Vietnam requested the assistance of the Government of Japan in September 1996 for the conduct of the study. In response to the

official request, the Government of Japan dispatched the preparatory study team to discuss the Scope of Work (S/W). The S/W was established by the Japanese and Vietnamese sides in January 1998.

Based on the S/W, JICA made a contract with the joint venture of Kokusai Kogyo Co., Ltd. and OYO Corporation in August 1998 for the implementation of the study. The study team, which consists of the expert of the joint venture, was dispatched to Vietnam in August 1998 and conducted the first and the second field work in Vietnam till July 1999. This final report presents the results of study carried out through domestic work from September to October, 1999 and discussion on the draft final report between the study team and the Vietnamese side on November 1999.

1.2 Objectives of the Study

The objectives of the study are as follows:

- ① To study the groundwater potential in the 20 communes of the five northern provinces.
- ② To formulate the master plan (M/P) for groundwater development and water supply targeting the year 2010.
- ③ To implement the feasibility study (F/S) for the priority projects.
- ④ To conduct technology transfer for the counterparts.

1.3 Study Area

The study covers the 20 communes in the five northern provinces of Ninh Binh, Thanh Hoa, Ha Tinh, Thai Nguyen and Ha Noi. Table 1.1 shows the population and area coverage of the communes.

Table 1.1 Population and Area Coverage of Target Communes

Province	District	Village	1998 Population (in thousands)	Area (km ²)	Density (psn/km ²)
Ha Noi	Tu Liem	Xuan Dinh	15.77	5.58	2,826
		Dong Ngac	6.90	3.62	1,906
Ninh Binh	Tam Diep	Quang Son	7.50	25.40	295
	Yen Mo	Yen Thang	8.53	11.70	729
	Nho Quan	Dong Phong	10.00	7.36	1,359
Thanh Hoa	Nong Cong	Nong Cong Town	5.46	1.08	5,056
		Van Thang	6.66	6.12	1,088
	Thieu Hoa	Thieu Hung	6.75	5.26	1,283
		Thieu Do	7.01	4.12	1,701
	Yen Dinh	Dinh Tuong	6.52	6.14	1,062
	Vinh Loc	Vinh Loc Town	5.08	0.72	7,056
		Vinh Thanh	5.98	7.46	802
Ha Tinh	Duc Tho	Duc Yen	5.85*	5.50	1,064
		Yen Ho	5.25	7.70	682
		Trung Le	3.40	3.90	872
		Bui Xa	4.31	4.27	1,009
Thai Nguyen	Dong Hy	Dong Bam	5.28	2.90	1,821
		Hoa Thuong	12.80	12.00	1,067
	Pho Yen	Nam Tien	6.27	8.10	774
	Thai Nguyen City	Thinh Duc	6.24	14.80	422
Total			139.44	143.83	965

*1999 data

1.4 Study Organization

In carrying out the Study, the Ministry of Agriculture and Rural Development (MARD) acted as the counterpart agency and Japan International Cooperation Agency (JICA) acted as the official agency in technical cooperation with the Government of Japan.

The Study was carried out by the Japanese consultant team, the joint venture of Kokusai Kogyo Co., Ltd. and OYO Corporation, in collaboration with Vietnamese counterpart staff of Center for Rural Water Supply and Sanitation (CERWASS) of the MARD.

Study Team

Dr. Akira KAMATA	Team Leader/Water Supply Planning
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Dr. Ngo Ngoc CAT	Hydrogeologist
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Mr. Takaharu IKEDA	Specialist/Sanitation Improvement & Environment
Mr. Shun-ichi HATANO	Specialist/Facility Design & Cost Estimation
Mr. Hirohisa OMORI	Sociologist/Public Participation
Mr. Yoshiyuki SHIGA	Supervisor/Mapping and Social survey
Mr. Shin-ichi MORI	Economist/Economy and Finance

CERWASS

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Mr. Le Thieu SON	Chief of Technical and Capital Construction Department
Mr. Nguyen Thanh LUAN	Chief, Transfer Technology Station
Mr. Nguyen Danh Soan	Vice-head of technical section
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Ms. Nguyen Hanh DUNG	Environmental Department
Ms. Hoang Binh MINH	Technical Department
Ms. Nguyen Thuy Ai	Planning Department
Ms. Nguyen Thuy Nag	Project-UNICEF
Mr. Ha Duc Chunh	Transfer Technology Station
Mr. Duong Quan Truc	Transfer Technology Station
Mr. Nguyen Son Tung	Technical Department

1.5 Reports

The Draft Final Report prepared as follows:

- ① Summary Report
- ② Main Report
- ③ Supporting Report
- ④ Data Book

