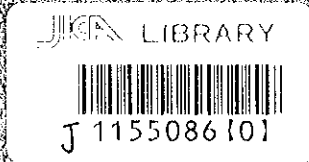Republic of Indonesia
Central Bureau of Statistics

BASIC DESIGN STUDY REPORT
ON
THE PROJECT
FOR
SUPPLY OF STATISTICAL EQUIPMENT
FOR CENSUSES
IN
THE REPUBLIC OF INDNESIA

OCTOBER 1999

JAPAN INTERNATIONAL COOPERATION AGENCY
CRC OVERSEAS COOPERATION Inc.

Republic of Indonesia

Central Bureau of Statistics

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PREFACE

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct a basic design study on the Project for Supply of Statistical Equipment for Censuses and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Indonesia a study team from April 18 to May 17, 1999.

The team held discussions with the officials concerned of the Government of Indonesia, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Indonesia in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the teams.

October, 1999

Kimio Fujita
President
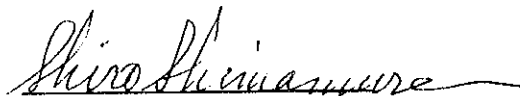Japan International Cooperation Agency

October, 1999

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Supply of Statistical Equipment for Censuses in the Republic of Indonesia.

This study was conducted by CRC Overseas Cooperation Inc., under a contract to JICA, during the period from April 12, 1999 to November 24, 1999. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of the Republic of Indonesia and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Shiro SHIMAMURA
Project manager,
Basic design study team on
the Project for Supply of Statistical Equipment
for Censuses
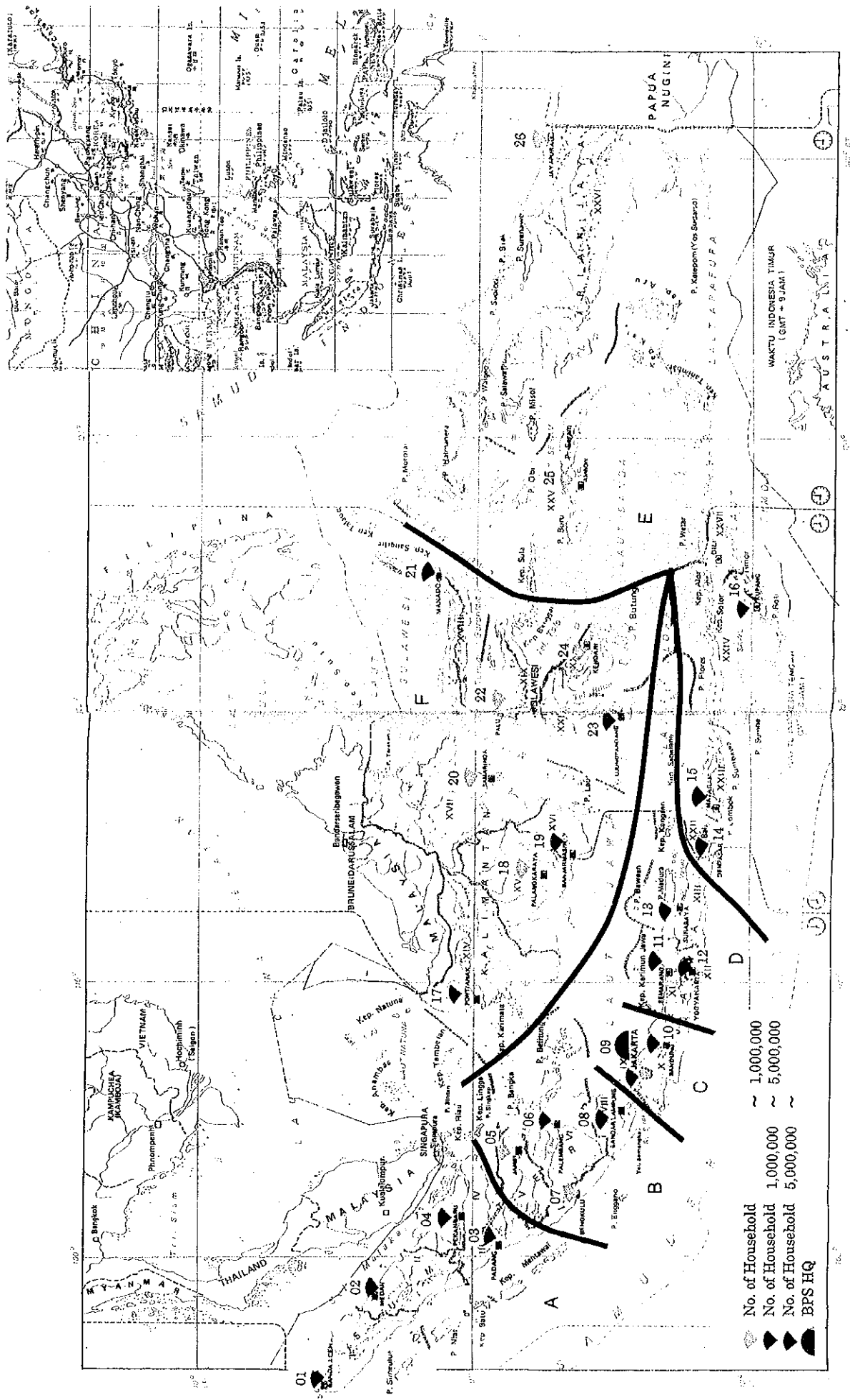CRC Overseas Cooperation Inc.

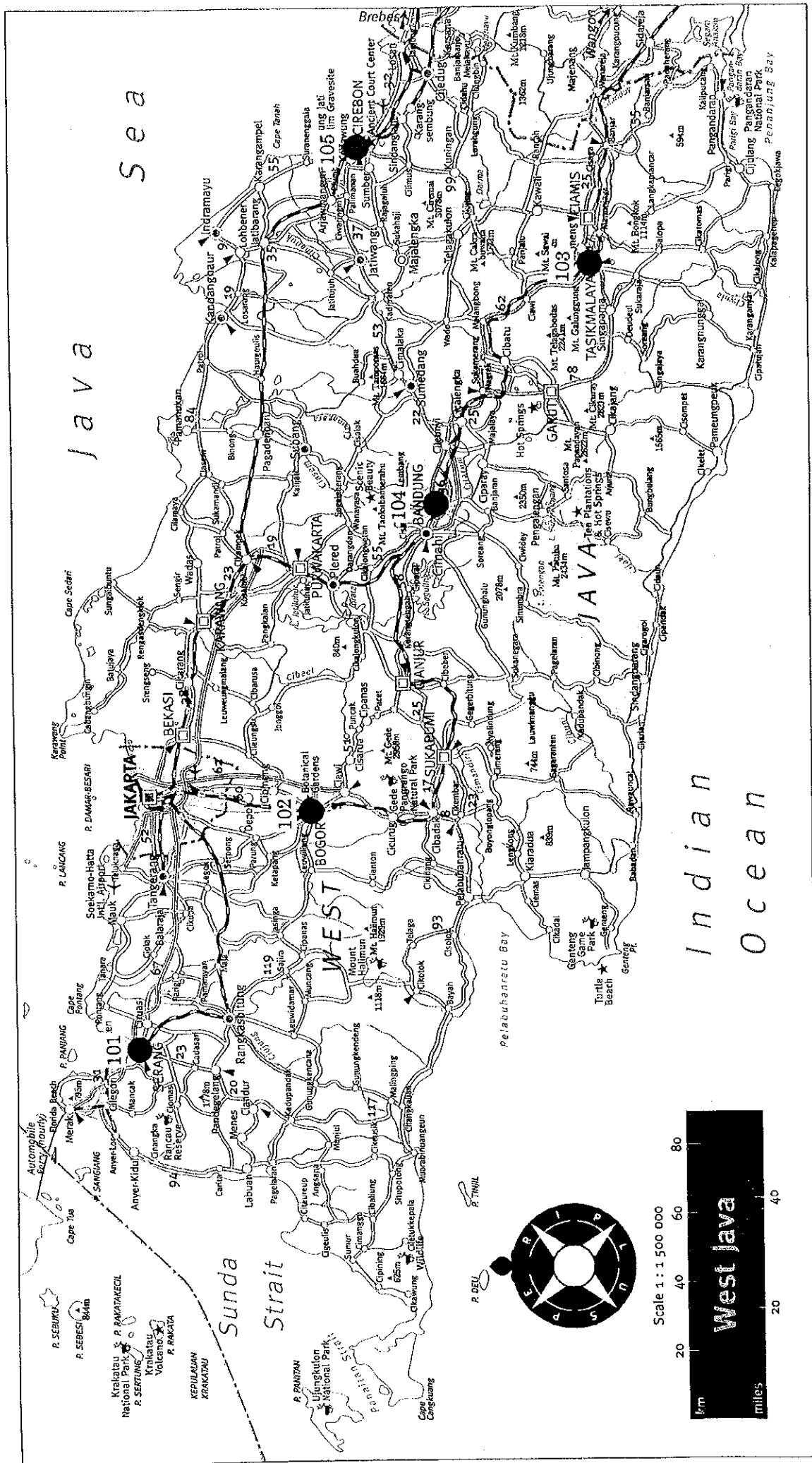*Fig.1 Distribution Map of Processing Site*

Fig. 2 Processing Site in West Java
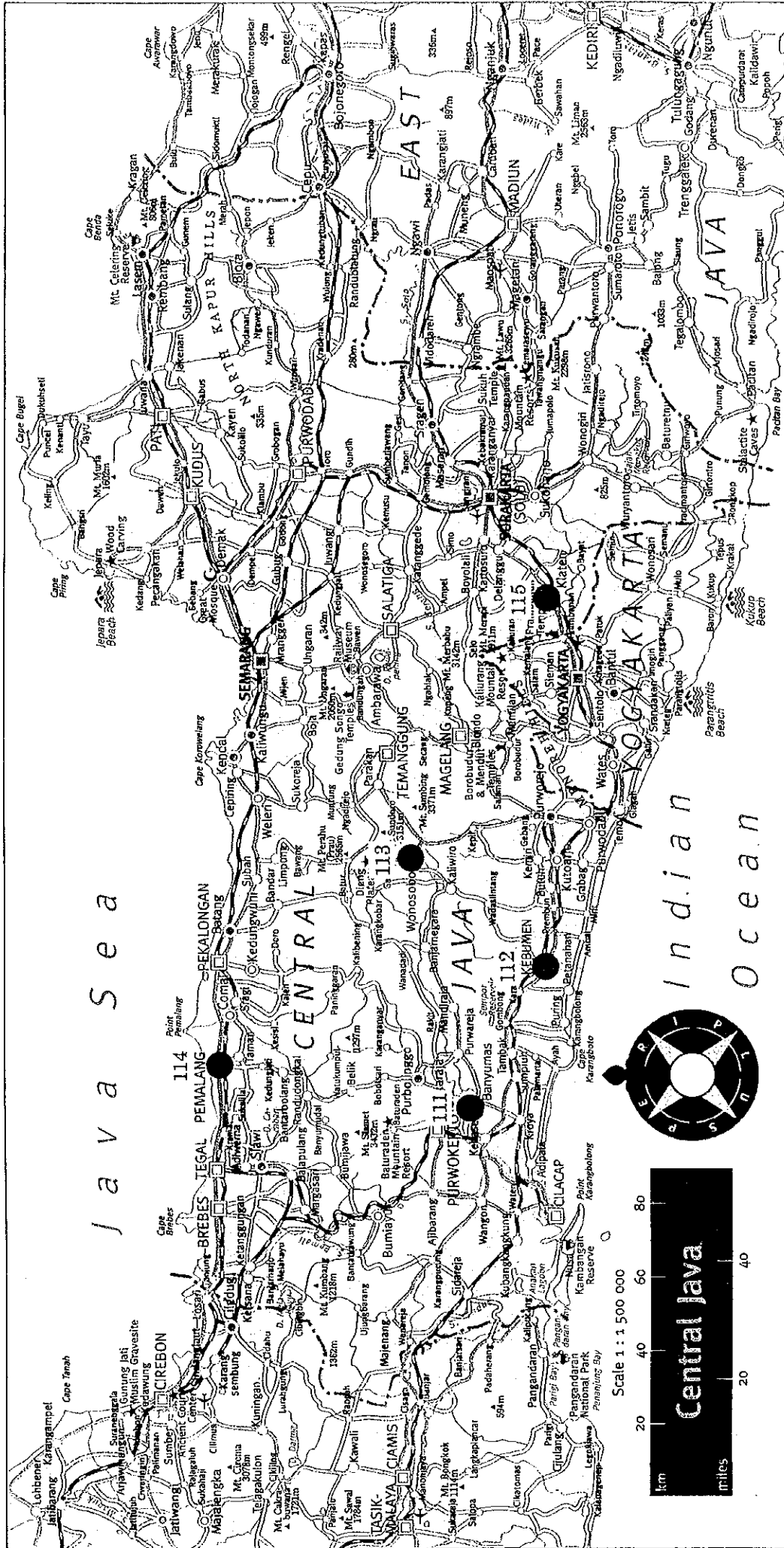
● : Kabupaten Statistical Office

Fig. 3 Processing Site in Central Java

● : Kabupaten Statistical Office

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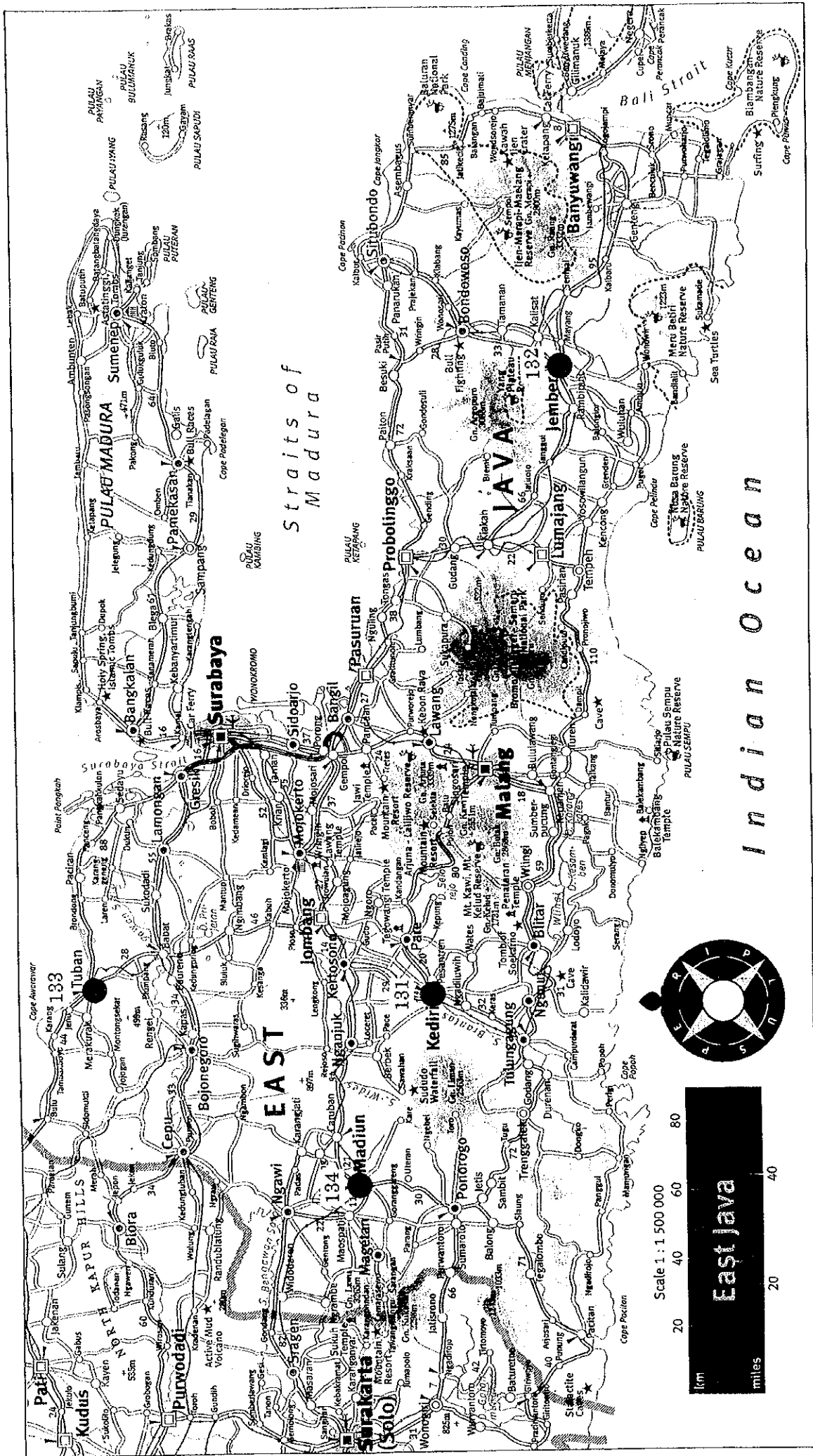
Fig. 4 Processing Site in East Java

● : Kabupaten Statistical Office

PCs Provided by OECF Project (PSO Bandung)

Room Prepared for Scanning
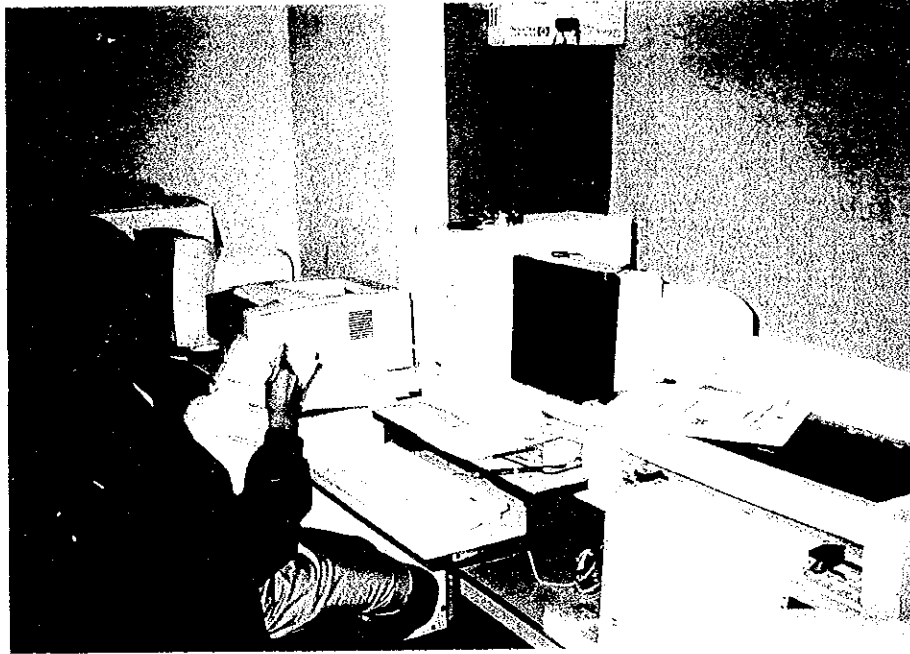
PCs Provided by OECF Project (KSO KEDIRI)

Processing Site (KSO KEDIRI)

Abbreviations

BPS	Badan Pusat Statistik
E/N	Exchange of Notes
GIS	Geographic Information System
JICA	Japan International Cooperation Agency
LAN	Local Area Network
M/D	Minutes of Discussion
OCR	Optical Character Reader
	Optical Character Recognition
ODA	Official Development Assistance
OECF	Overseas Economic Cooperation Fund
OMR	Optical Mark Reader
PCs	Personal Computers
UPS	Uninterruptible Power Supply

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3. List of Party Concerned in the Recipient Country

4. Minutes of Discussion

5. References

Chapter 1

Background of the Project
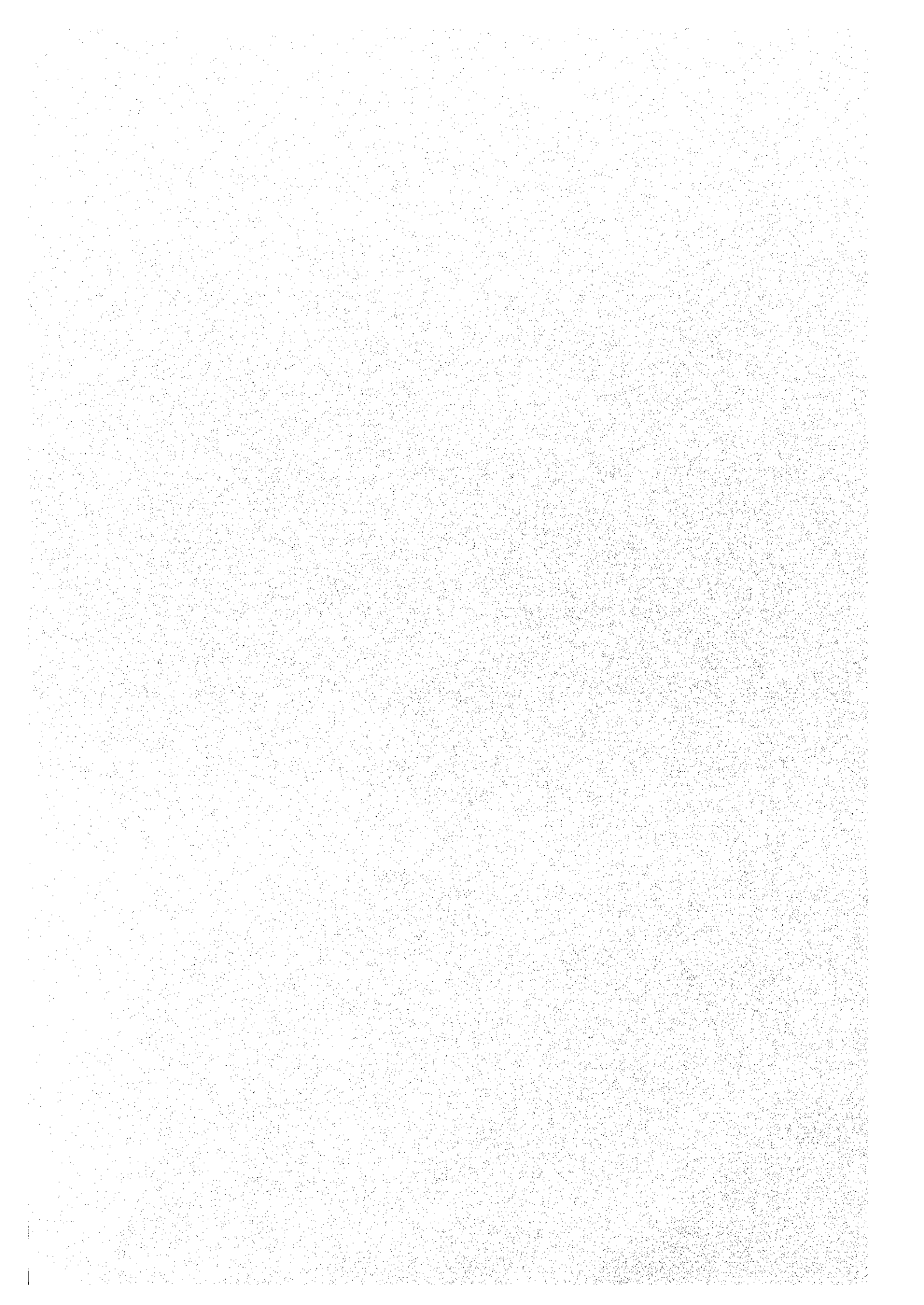
Chapter 1   Background of the Project

1-1   Background

During the Sukarno era following independence in 1945, the domestic situation in Indonesia was in turmoil, characterized by political, social, and economic instability. When Suharto took office as the nation's second president, however, a return to political stability enabled economic development, and in April 1969 the country embarked on a five-year-plan for national development. The Suharto government saw economic development as particularly important, eagerly accepting economic aid from the developed nations of the West, and at the same time encouraging an influx of foreign capital into the country. The country reaped the rewards of economic development through two oil shocks during the 1970s, and became self-sufficient in food. A subsequent slump in oil prices left national income uncertain, and from 1986 onward there was a move away from an oil-dependent economy. However, a policy turnaround that encouraged industry in sectors other than oil and gas resulted in high economic growth rates for Indonesia from the late 1980s through to the first half of the 1990s. Six national development plans that started in 1969 saw the per capita GDP rise from around US$60 to US$1100 in 1996; Suharto was much admired for this achievement, becoming known as "the father of development". However, gaps in development level began to appear between urban and rural areas, and between different regions, and combined with a rapid rise in the urban population and a widening gap between rich and poor, the country is now faced with a number of issues that need to be resolved before it can continue the development. These issues include environmental conservation, building up human resources and education, reorganizing the structure of industry, and creating an industrial infrastructure.

From 1997 on, a growing current account deficit and an increase in the country's massive foreign debt brought financial instability, triggering what is believed to be Asia's worst currency and financial crisis since that involving the Thai baht. This resulted in a major setback for the Indonesian economy, and the country was caught in the grip of a continuing slump, stagnation in industry, inflation, and high unemployment rate.

In 1998, the government raised the price of electricity, and this sparked off widespread social unrest; President Suharto was forced to resign in order to alleviate the situation, and the Habibie government came into power. The change in government, however, brought no improvement in the economy. The economic situation in the country was reduced to that of ten years before, with a per capita GDP falling to around US$400; close to the poverty line of

US$375. The El Niño weather patterns compounded the problem by causing food shortages, and the country found itself in the throes of a political and social crisis.

In an attempt to rectify this situation, Indonesia is now receiving support from the IMF, the World Bank, and governments such as that of Japan; the government is proceeding with economic and financial reforms based on the terms of the agreement with the IMF. In June 1999, the Habibie government conducted the country's first free and democratic elections in an effort to tackle the social problems through economic growth, reducing the gap between incomes, moving away from autocracy, eliminating political corruption, protecting basic human rights, guaranteeing freedom of speech, and taking steps to alleviate poverty. These are the issues that need to be resolved if the country is to pull through the current economic crisis.

Since 1997, social and economic instability has forced the government of Indonesia to rethink its policies at both national and regional levels. In the autumn of 1999, new president will take office, and new policies will be formulated. The creation of a system for conducting reliable statistical surveys will be vital to these activities, and the issue is one of extreme urgency. Statistical surveys, such as population censuses, provide information that will form the basis and ensure the effective implementation of a variety of new policies.

The Indonesian government has conducted four population censuses since independence; in 1961, 1971, 1980 and 1990. In the 1961 census, although the number of survey items was large, the manual tabulation of results was inefficient, resulting in the census figures being tabulated from a sample of 1% of the total questionnaires. Therefore, the processing of data by region was not carried out. In 1971, only four items of the questionnaires were subjected to a complete count tabulation, while the rest of the questionnaire items were tabulated from a 5% sample of households and the results published. The same method was adopted for the 1980 and 1990 censuses. There are, however, a number of problems with the results of censuses conducted in this way; the inability to tabulate data by region and the error that results from a 5% sample means that the results gained from this approach lack sufficient precision for use in the formulation of policy.

In order to improve this situation, BPS has radically reformed of its survey and tabulation methods for use in the 2000 Population Census. The main areas of reform are: 1. an increase in the number of survey items (from four to fifteen), 2. faster tabulation (to be completed by April 2001), 3. regional tabulation (tabulation at provincial and Kabupaten

statistical offices), and 4. mechanization of tabulation (use of the OCR systems). To enable these four changes to be carried out, the government of Indonesia and BPS has decided to introduce OCR systems for use in the 2000 Population Census.

The Indonesian government made the decision to introduce the OCR systems as, in light of the country's current economic and social situation, release of the Population Census results was both urgent and necessary. Since the economic crisis in 1997, the percentage of Indonesian people classified as being poor (those having an income of less than a dollar per day) has risen dramatically from 11.3% in 1997 to 39.1% in 1998 (28.8% in urban areas, 45.6% in rural areas), and the need to alleviate regional poverty has become a pressing issue. Unemployment has risen sharply, and it is estimated that the number of children not attending elementary or junior high school has also risen dramatically; therefore, employment and education policies for each region are also urgently required.

The ministries of the central government in Indonesia want BPS to complete the tabulation of the results of the 2000 Population Census quickly. Table 1-1 shows the items to be surveyed in the 2000 Population Census, and Table 1-2 shows the items requested by each ministry and the intended use of the results.

Table 1-1 Survey items for the year 2000 Population Census

① Age	⑨ Place of residence five years ago
② Gender	⑩ Education
③ Relationship to head of household	⑪ Economic activity over the period of a week
④ Marital status	⑫ Industry (occupation)
⑤ Place of birth	⑬ Position at place of employment
⑥ Religion	⑭ Number of children born
⑦ Nationality	⑮ Number of children still alive
⑧ Ethnicity	

(Provided by the BPS planning section)

Table 1-2   Data requested by each ministry

Ministry	Intended use of data	Survey items requested (*Cf.* Table 1-1)
1. Ministry of Education and Culture	- Construction of school buildings - Teaching staff allocation	①, ②, ③, ⑤, ⑥, ⑦, ⑧, ⑩
2. Ministry of Health	- Construction of medical facilities in the regions - Allocation of doctors and pharmacists	①, ②, ③, ④, ⑤, ⑥, ⑨, ⑩, ⑭, ⑮
3. Ministry of Immigration	- Population distribution plans	①, ②, ⑤, ⑥, ⑦, ⑧, ⑨, ⑫, ⑭, ⑮
4. Ministry of Labor	- Unemployment policies	①, ②, ⑥, ⑦, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬
5. Ministry of Industry and Trade	- Development plans for manufacturers	①, ②, ⑪, ⑫, ⑬
6. Ministry of Agriculture	- Fertilizer allocation plans	①, ②, ⑪, ⑫, ⑬
7. Family Planning Coordination Board	- Plans for distribution of contraceptive devices - Family welfare - Policies for alleviating poverty	①, ②, ③, ④, ⑦, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬, ⑭, ⑮
8. Ministry of the Interior	- Development plans for towns and villages - Social welfare policy - Policies for Alleviating poverty	①, ②, ③, ④, ⑤, ⑥, ⑦, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬, ⑭, ⑮
9. Ministry of Town Planning	- National Development Planning Board - Benchmarks for formulation of plans for economic policy, social policy and policies for alleviating poverty	①, ②, ③, ④, ⑤, ⑥, ⑦, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬, ⑭, ⑮
10. Ministry of Religion	- Regional allocation of pilgrims for Mecca - Construction of religious facilities	①, ②, ⑥, ⑧
11. Ministry of Social Welfare	- Policies for different ethnic groups in undeveloped areas - Policies for alleviating poverty - Solving the homeless problem	①, ②, ③, ④, ⑤, ⑥, ⑦, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬, ⑭, ⑮
12. Ministry of Housing	- Housing construction - Housing provision	①, ②, ⑨, ⑫, ⑬

(Provided by BPS)

The year 2000 will see the start of the devolution of authority to the regional governments. These regional governments will take primary responsibility for a range of policies including those dealing with poverty, unemployment, housing, and education. The regional governments will formulate their own regional plans in much the same manner as the central government. Therefore, the results of the 2000 Population Census will also provide the regional governments with important data.

This is the background to the request for aid made to Japan by the Indonesian Central Government; the funds would be used to purchase equipment (OCR systems) to be used in the tabulation of results of statistical surveys.

Chapter 2

Contents of the Project

Chapter 2　Contents of the Project

2-1　Objectives of the Project

The Government of the Republic of Indonesia has requested grant aid from the Government of Japan in the form of OCR systems for use in the BPS-Statistics Indonesia (Badan Pusat Statistik, hereinafter referred to as the "BPS") 2000 Population Census. OCR systems are expected to play a critical role in Indonesia's upcoming census, a role they are expected to maintain in other later statistical surveys. Without these systems, the processing of the 2000 Population Census would take a longer time and the final tables could not be possible to be published by the end of April 2001.

The goal of this project is to provide these OCR systems to the BPS by determining the system requirements necessary to ensure smooth, speedy, and effective implementation of the 2000 Population Census.

(1) Requested Equipment

Items（OCR System）	Amount
Scanner	79 units
OCR Software	79 sets
PC System (for scanner control and recognition)	79 Sets

(2) Project Administration

Recipient Country　　　　　: Republic of Indonesia

Responsible Authority　　　: BPS

Project Sites　　　　　　　: BPS headquarter, Provincial Statistical Offices (PSO),

　　　　　　　　　　　　　　Kabupaten Statistical Offices (KSO),

　　　　　　　　　　　　　　Total 41 locations

2-2　2000 Population Census

Scheduled for June 2000, Indonesia's upcoming census and its results are expected to carry symbolic significance. But recent economic and social instabilities have lent even weightier significance to this census.

While the Government of Indonesia has made four population censuses since independence, insufficient capacity of tabulation of the BPS has meant that past censuses have covered only five survey items for the entire population. The only published results have been statistical tables of population by district and sex. These censuses failed to

provide fundamental data vital for formulating policies on various issues – employment, poverty, social policy, education, housing, etc., at the national and regional levels as well as small area statistics (SAS).

Since 1997, persisting economic and social instability has forced the Government of Indonesia to consider revising its policies at the national and regional levels. To meet the demands from various quarters, the BPS has determined to carry out major reforms for the 2000 Population Census, with improvements planned both for the quantity and quality of available population statistical resources.

The following are the main features of the BPS reform for the 2000 Population Census:

(1) Increased Number of Items Covered by the Census

Up through the 1990 Population Census, the number of survey items covering the entire population (complete count enumeration) was five. For the 2000 Population Census, this has been increased to 15.

(2) Shortening Tabulation Period

In April 2001, the Government of Indonesia is scheduled to begin formulating plans concerning various issues, including employment, poverty, social welfare, education, housing, etc., at central government and local government levels. It will depend on statistical tables of the 2000 Population Census, therefore, the tabulation should be produced and released by that date.

(3) Regional Tabulation

In order to speed up tabulation, the BPS will carry out early regional tabulations of the 2000 Population Census at Provincial Statistical Offices.

(4) Introduction of OCR System for the Tabulation

The BPS will introduce OCR systems to tabulate 2000 Population Census results and has asked for requisite systems from Japan in the form of grant aid. BPS is already designing questionnaires for the 2000 Population Census and planning survey methods, based on the assumption that OCR systems will be introduced. BPS also plans to use these OCR systems, once introduced, for other statistical surveys following the completion of the 2000 Population Census.

2-3 Basic Concept of the Project

To carry out this project, Study Team needs to determine what type of equipment is suitable for use in the OCR systems to be introduced for the census. Study Team also needs to determine where and by what dates this equipment needs to be installed, and examine various measures to ensure that the installed equipment operates and functions smoothly and effectively.

The basic concept of the project must therefore incorporate plans for locating the equipment, equipment to be used, procurement, transport, and maintenance. A list of the basic ideas involved in the formulation of each of these plans is given below.

(1) Location

1) In accordance with the principle of regional tabulation for the 2000 Population Census, OCR systems will be installed at the Provincial Statistical Office.

2) The province of East Timor will not be included in the project.

(2) Equipment

The appropriateness of the OCR system request made by the Government of Indonesia will be verified and an equipment plan formulated in keeping with existing equipment and technology.

(3) Procurement

The final date for installation of the OCR systems will be the end of May 2000. A procurement plan will be devised to meet this deadline.

(4) Transport

Due to the distribution of the OCR systems over the whole of the extensive territory of Indonesia and its numerous islands and the limited time available for delivery, equipment transport requires an efficient plan.

(5) Maintenance

A plan will be formulated to enable maintenance of the OCR systems by the BPS staff.

(6) Coordination with the Government of Indonesia

BPS and Study Team will coordinate efforts with the Indonesian government to expedite procedure between our two nations to allow for the speediest possible delivery of the OCR systems.

(7) Requests to be Made to the BPS

To ensure smooth operation of OCR systems in each location, the BPS will be asked to handle matters such as preparing the locations for the installation of OCR systems, securing adequate power supply, and providing storage facilities for the questionnaires.

(8) Use of OCR Systems in Various Statistical Surveys

The continued use of the OCR systems following the 2000 Population Census for statistical surveys such as agricultural and economic censuses will also be accounted for in equipment planning.

(9) Adaptability to the Basic Plan for the 2000 Population Census

The BPS basic plan for the 2000 Population Census will be adapted to in the provision of the OCR systems.   All possible steps will be taken to ensure the smooth implementation of the plan.

2-4   Basic Design

2-4-1   Design Concept

(1) Scale of Project Plans

Seventy-nine OCR systems will be required to read and process the approximately 63 million questionnaires expected for the 2000 Population Census.   These systems will consist of a total of 79 scanners, 79 sets of OCR software, 79 PCs for scanner control, and 79 PCs for character recognition.

(2) Location

1) As a minimum, one OCR system will be installed in each province.

2) The distribution of OCR systems among the provinces will basically be determined by the estimated number of questionnaires expected to be scanned in each province.

3) Taking into account the capacity of a single scanner, the processing ability of the regional

statistical offices in each province, and the period allowed for tabulation, OCR systems (seven sets) will be installed at the BPS headquarter in Jakarta and in some provinces in the KSO (14 locations), as well as in the PSO.

4) The OCR systems at BPS headquarter will be used not only to process questionnaires sent from the provinces, but as substitute systems in the case of breakdowns in provincial OCR systems.

(3) Equipment

1) Each OCR system set will consist of one scanner, one set of OCR software, and a system of two PCs, one to control the scanner and one for character recognition.

2) Plans will be formulated for the minimum equipment specifications required to complete reading by scanners within the tabulation period specified by BPS for the 2000 Population Census. Equipment specifications for the 2003 Agricultural Census and 2006 Economic Census will also be studied.

3) The equipment specification will be compatible with the prototype system built under the Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census. The existing LAN environment will also be considered.

4) Minimum supply of consumables and spare parts required during the scanning period of the 2000 Population Census should be included in this project.

(4) Procurement

The installation of OCR systems scheduled for the end of May 2000 requires an early decision on tenders. Requests will be made to all concerned parties to bring forward the E/N period.

(5) Maintenance

1) Each scanner required to read an average of approximately one million questionnaires. The most crucial concern here is that operational scanner troubles be kept to minimum. To this end, as part of the Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census, plans will be drawn up to train BPS staff assigned to the OCR system locations in preventive maintenance. Providing staff with a thorough grounding in preventive maintenance is expected to reduce the frequency of troubles and maintenance costs.

2) The warranty period included as part of the project (one year) will allow no-cost on-call

response within 48 hours in the event of troubles. Once this warranty period expires (from 2001 on), BPS will cover maintenance and consumable costs from its ordinary budget.

(6) Equipment Transport

1) Transport between Japan and Jakarta will be by sea.

2) Domestic transport from Jakarta to each province will be by air to a provincial or other closest airport, and from there by truck to the assigned location.

3) Installation will be carried out by six teams of required technicians over a period of approximately one month.

4) The transport period will include approximately two weeks for customs procedures and approximately one month for transport within the country and installation.

(7) Costs to be Borne by the Recipient Nation

1) The minimum consumables required for use during the tabulation period of the 2000 Population Census are to be included in the scope of the project. After this period, any necessary consumables or maintenance costs such as spare parts are the responsibility of BPS. BPS will be asked to make the necessary budgetary provisions.

2) The recipient nation is responsible for expanding power supply capacity, securing storage space for questionnaires, and for performing improvements to some of the locations to permit installation. BPS will be asked to make budgetary provisions for these activities.

3) One of the tender conditions will be inspections for scanner accuracy. The required data for the inspection will be prepared by BPS.

4) The OCR software will be supplied on CD-ROM format. During systems installation, the OCR software will be installed by the BPS local staff and checked by the contractor.

2-4-2 Basic Design

(1) Overall Plan

As the basic plan was formulated, the highest priority was granted to the following:

1) Ensuring that OCR systems are operationally ready by the start date of the 2000 Population Census

2) Planning equipment specifications and its scale to enable all scanning to be completed within scheduled as part of the 2000 Population Census

3) Formulating plans suitable to those being implemented under the Mini-Project Type

Technical Cooperation for Improvement of the 2000 Population Census

(2) Location of Equipment

Apart from the seven sets at BPS headquarter, 1-7 OCR systems will be installed in Statistical Offices in 26 provinces, excluding East Timor. In the densely populated provinces of West Java, Central Java and East Java, 1-2 sets will be installed in designated Kabupaten (District) Statistical Offices, in addition to those assigned to the Provincial Statistical Offices.

Tables 2-1 and 2-2 show the processing sites of the OCR systems, number of sets, and estimated number of questionnaires to be scanned at each location.

Table 2-1   Processing Sites (BPS HQ and PSO)

No	PSO	Estimated No. of Questionnaire	Revised No. of Questionnaire to be Processed	No. of OCR Set
01	Dista Aceh	1,191,992	902,441	1
02	North Sumatra	3,498,602	3,498,602	4
03	West Sumatra	1,403,063	1,403,063	2
04	Riau	1,319,840	1,319,840	2
05	Jambi	801,858	801,858	1
06	South Sumatra	2,346,990	2,346,990	3
07	Bengkulu	483,057	483,057	1
08	Lampung	2,228,429	2,228,429	3
09	DKI Jakarta	2,715,651	2,715,651	4
10	West Java	6,412,418	6,412,418	7
11	Central Java	4,316,171	4,316,171	5
12	DI Yogyakarta	943,965	802,370	1
13	East Java	3,902,233	3,316,898	4
14	Bali	937,194	937,194	1
15	West Nusa Tenggara	1,230,468	1,230,468	2
16	East Nusa Tenggara	1,056,208	844,966	1
	East Timor	-	-	-
17	West Kalimantan	1,193,695	920,593	1
18	Central Kalimantan	588,540	588,540	1
19	South Kalimantan	1,035,455	828,364	1
20	East Kalimantan	774,668	774,668	1
21	North Sulawesi	888,300	888,300	1
22	Central Sulawesi	687,606	687,606	1
23	South Sulawesi	2,307,715	2,307,715	3
24	South East Sulawesi	508,310	508,310	1
25	Maluku	669,919	669,919	1
26	Irian Jaya	692,878	692,878	1
27	BPS HQ		5,381,204	7
	Subtotal(1)	44,135,225	47,808,513	61

Source : BPS and Study Team
PSO   : Provincial Statistical Office
OCR   : Optical Character Reader

Table 2-2   Processing Sites (KSO)

No	KSO	Estimated No. of Questionnaire	Revised No. of Questionnaire to be Processed	No. of OCR Set
10	West Java			
101	Serang	1,025,616	871,774	1
102	Bogor	1,308,027	915,619	1
103	Bandung	2,172,735	869,094	1
104	Cirebon	908,336	908,336	1
105	Tasikmalaya	1,172,685	879,514	1
11	Central Java			
111	Banyumas	880,355	880,355	1
112	Kebumen	769,890	769,890	1
113	Wonosobo	982,458	835,089	1
114	Pemalang	1,063,071	850,457	1
115	Klaten	1,029,036	874,681	1
13	East Java			
131	Kediri	1,905,996	1,620,097	2
132	Jember	2,074,486	1,763,313	2
133	Tuban	2,094,079	1,675,263	2
134	Madiun	1,460,487	1,460,487	2
	Subtotal (2)	18,847,257	15,173,969	18

	Estimated No. of Questionnaire	Revised No. of Questionnaire to be Processed	No. of OCR Set
Subtotal (1)	44,135,225	47,808,513	61
Subtotal (2)	18,847,257	15,173,969	18
(1)+(2) Total	62,982,482	62,982,482	79

Source : BPS and Study Team
KSO   : Kabupaten Statistical Office
OCR   : Optical Character Reader

(3) Equipment

1) Scanners (79 units)

The equipment specifications will account for the anticipated need to scan approximately 63 million census questionnaires within the specified period.

a. The BPS plans to use the scanners not only for the 2000 Population Census, but for the 2003 Agricultural Census and 2006 Economic Census.   Thus, the specifications should also account for the needs of these surveys.   For example, the 2000 Population Census questionnaires are legal size, whereas questionnaires for the 2003 Agricultural Census and 2006 Economic Census are to be A3 size, requiring specifications to suit.

b. Processing speed: Plans will address the minimum speed required to read 63 million questionnaires.   Study Team has set the required specification at 50 questionnaires per minute (double-sided scan, 200 dpi, A4 size), based on test figures from the Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census and on figures from the pilot survey.

c. Image data processing: taking into account compatibility with the prototype OCR system designed under the Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census, the required specifications will include the feasibility of G3/G4 image output.

d. The interface will be SCSI-2 compatible.

2) OCR software (79 sets)

Equipment specifications will be suitable to the OCR system prototype developed under the Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census. Because the software for correction and confirmation included in the prototype has been developed as part of the NestorReader (Ver 5.2i) software produced by NCS International, it is incompatible with other software. Plans for the 2000 Population Census do not provide time to develop correction and confirmation software following bidding and confirmation of equipment details. For this reason, NCS International NestorReader (Ver 5.2i) Software will be deployed.

3) PC systems (79 sets)

Each PC system will consist of a PC for controlling the scanner (with scanner control software installed) and a PC for character recognition (with OCR software installed).

Existing equipment related to that to be procured under the project consists of PCs provided by the OECF project. At local statistical offices (PSO and KSO) equipped with LANs, much of the installation will be possible via connections with existing LAN, requiring only a SCSI-2 (for interfacing with external equipment). Two scanners are to be installed in each of the four KSO of Kediri, Jember, Tuban, and Madiun in East Java, but owing to the lack of LANs at these offices, HUBs will be attached to the installed PCs.

In some regions, frequent power outages make Uninterruptible Power Supply (hereinafter referred to as "UPS") deployment essential. One UPS will be attached to each PC. The character recognition PCs will include a compact desktop printer to enable checking of details.

Table 2-3 gives the short specifications for scanners, OCR software, and PCs.

Table 2-3   Short Specification

Item	Amount	Short Specification
1) Scanner	79	1) Scanning speed : 50 sheets or more per minute when scanning double–sided A4 size forms, printed in two color (Black and a dropout color) 2) Resolution : 200 and more 3) Form size : A3 / A4 / legal 4) Acceptable quality of paper : 80g or more 5) Drive bundled with scanner : TWAIN 6) Format of output image : One Tiff(G3,G4) image file per one-side of form 7) Dropout color : (RED) 8) Interface : SCSI -2 9) Feeding capacity : 150 or more
2) OCR Software	79	NestorReader (Ver 5.2i) 1) Requested OS: Windows 98 2) Application development tools: Visual C++, Visual Basic, Delphi 3) Type of characters and marks: Hand-print, machine print, and mark-sense data, Images 4) Image Pre-processing: Image pre-processing for image noise removal 5) Word and Character Segmentation: The ability to determine character and word boundary where characters overlap or touch 6) Recognition: Neural network algorithm for predicting the next letter in a word, is preferred. Neural networks contribute to very accurate recognition of both hand-print and machine-print data. 7) Additional Recognition Memory : Indonesia Memory 8) Character Decision: Context based and dictionary based recognition for character decisions Language context and user-definable dictionary support 9) Form Processing Capabilities: Form ID, deskewing, and form template removal 10) Format of output: Recognition results data:ASCII format Character/mark data: CSV format, text format Form Image data: TIFF format (G4)
3) Scanner Control PC	79	1) Pentium II 450 MHz, Pentium III 450 or Higher 2) 64MB Memory 3) SCSI-2 card and Cable 4) 8 GB or more SCSI-2 Hard disk 5) 1.44 MB Floppy Disk Drive 6) 10/100 Ethernet Card 7) CD-ROM(SCSI) 8) VGA with 1 MB VRAM or higher 9) 17 inch or more SVGA Color Monitor 10) UPS (5 min) 11) OS (Windows 98)
4) Recognition PC	79	1) Pentium II 450 MHz, Pentium III 450 or Higher 2) 64MB Memory 3) SCSI-2 card and cable 4) 8 GB SCSI-2 Hard disk 5) 1.44MB Floppy Disk Drive 6) 10/100 Ethernet Card 7) CD-ROM,CD-R (SCSI-2) 8) VGA with 2MB VRAM or higher 9) 17 inch or more SVGA Color Monitor 10) UPS (5 min) 11) OS (Windows 98) 12) Desktop Laser Printer

Source : Study Team

(4) Procurement

1) Final Delivery date for OCR Systems

Adherence to the final delivery date for equipment (end of May 2000) requires that bidding occur as quickly as possible. All concerned parties will be requested to implement E/N immediately following the cabinet meeting in October, and all required documentation will be prepared beforehand.

2) Scanners

Since Japanese products will be insufficient to fulfil equipment specifications and maintenance system requirements, scanners will be procured from a third-party nation (the U.S.), as well as from Japan and Indonesia.

3) PCs (for scanner control / character recognition)

Since the PCs will be composed of a number of components produced in several different countries, it will not be possible to indicate Japan as the sole nation of procurement for most Japanese PCs. Countries of procurement will also include third parties such as Thailand, Malaysia, Singapore, and Taiwan, in addition to Japan and Indonesia.

4) OCR Software

OCR software has been chosen as compatible with the existing environment (the prototype constructed under the Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census).

If software other than NestorReader is introduced into this project, the software for correction and confirmation developed over a period of several years under the Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census will be incompatible. Since the OCR systems need to be up and running within six months following bidding (confirmation of equipment), any revision of existing software or new software development is impossible.

(5) Transport

The OCR systems must be transported to each location and installation completed by the end of May 2000. Assuming that customs procedures will require two weeks and equipment transport within the country and installation one month, the equipment must arrive in Jakarta by the middle of April 2000. To meet this timetable, the following transport plans

have been drawn up.

1) Transport from Japan to Jakarta will be by sea.

2) Equipment transport from Jakarta to the provinces will be by air, owing to time restrictions, from provincial airports or most convenient airport, then by truck to assigned locations.

3) For installation planning, the country will be divided into six regions and installation carried out by 6 teams of 2 to 4 members each (one team per region). Table 2-4 shows these regional divisions.

Table 2-4   Installation Team and Sites

Team	No. of Person	Processing Sites
A	2	Dista Aceh, North Sumatra, West Sumatra, Riau
B	2	Jambi, South Sumatra, Bengkulu, Lampung
C	4	BPS-HQ, DKI Jakarta, West Java, Serang, Bogor, Bandung, Cirebon, Tasikmalaya
D	4	Central Java, Banyumas, Kebumen, Wonosobo, Pemalang, Klaten DI Yogyakarta, East Java, Kediri, Jember, Tuban, Madiun
E	2	Bali, West Nusa Tenggara, East Nusa Tenggara, Maluku, Irian Jaya
F	2	West Kalimantan, Central Kalimantan, South Kalimantan, East Kalimantan, North Sulawesi, Central Sulawesi, South Sulawesi, South East Sulawesi

(6) Maintenance

Following completion of the June 2000 Population Census, the OCR systems will be operating at full capacity. The following steps are required to ensure that the OCR systems operate smoothly and efficiently during this period.

1) Consumables, spare parts

A minimum supply of consumables and spare parts required for the period of the 2000 Population Census is to be procured as part of this project. Following the expiration of the warranty period (2001 onward), BPS will be required to provide funds for maintenance and procurement of consumables and spare parts from its ordinary budget.

2) Provision of equipment environments

   a. Securing locations for the installation of OCR systems

Separate rooms, provided with air conditioning, will be made available for the OCR systems. Each OCR system will require approximately 24m² floor space in PSO and 16 m² in KSO.

b. Expansion of power supply capacity

The power supply capacity at all locations except BPS headquarters will be expanded by 3.5KVA.

c. Storage space for questionnaires

Smooth operation of the OCR systems requires storage space for questionnaires. Storage space will be divided into space leased in buildings outside the Statistical Offices, and storage space at the Statistical Offices. Table 2-5 shows the areas at each location that BPS plans to have available for storage space. The requisite funds are already part of the budget request for FY2000.

Table 2-5   Storage Space and Budget

Processing Sites	Storehouse* (m^2)	Storage in Office (m^2)	Amount of Budget (1000 Rp)
Dista Aceh	100	-	10.000
North Sumatra	400	80	10.000
West Sumatra	139	25	10.000
Riau	131	28	10.000
Jambi	104	36	10.000
South Sumatra	232	86	8.000
Bengkulu	100	24	10.000
Lampung	221	-	10.000
DKI Jakarta	269	-	10.000
West Java	635	110	10.000
Serang	86	50	3.000
Bogor	91	30	3.000
Tasikmalaya	87	40	3.000
Bandung	86	40	3.000
Cirebon	90	40	3.000
Central Java	427	20	10.000
Banyumas	87	50	3.000
Kebumen	80	26	3.000
Wosonobo	83	30	3.000
Pemalang	84	70	3.000
Klaten	87	43	3.000
DI Yogyakarta	79	-	8.000
East Java	328	20	10.000
Kediri	160	12	3.000
Jember	175	10	3.000
Tuban	166	7	3.000
Madiun	145	59	3.000
Bali	165	65	10.000
West Nusa Tenggara	175	85	10.000
East Nusa Tenggara	84	18	5.000
East Timor	-	-	-
West Kalimantan	110	15	10.000
Central Kalimantan	100	20	10.000
South Kalimantan	82	20	10.000
East Kalimantan	77	24	5.000
North Sulawesi	88	21	9.000
Central Sulawesi	95	47	7.500
South Sulawesi	228	60	6.000
South East Sulawesi	100	62	5.000
Maluku	66	9	10.000
Irian Jaya	69	12	10.000
TOTAL	6,111	1,394	275.000

Resource   : BPS and Study Team
Storehouse : Space leased in buildings outside the Statistical Offices

3) Personnel
   a. Two staff members trained to operate OCR systems will be assigned to each OCR system at all times.
   b. Staff will be dispatched from each regional Statistical Office and assigned to an OCR system to receive technical training under the Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census. They will learn techniques for preventive maintenance and other necessary skills and will retain as skilled personnel.

4) Accident prevention

The assigned personnel will receive training in accident prevention involving the OCR systems in addition to training to be conducted as part of the Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census. Training will involve measures for reducing the risk of accidents, such as changing rolls at the appropriate time, and corrective steps if an accident should occur.

5) Countermeasures when accidents occur

The following measures will be adopted in the event that OCR systems stop operating as a result of accidents.
   a. Repair within 48 hours by the company supplying the equipment at any of the locations will be made a tender condition, in case of technical troubles involving an OCR system.
   b. Depending the specifics of the case, if a trouble occurs with an OCR system, the OCR system at the assigned location will be exchanged with an OCR system at BPS headquarters. The defective OCR system will be transported to Jakarta and repaired there, then deployed at BPS.

Chapter 3

Implementation Plan

Chapter 3 Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Concept

The Project will be carried out after the signing of the Exchange of Notes (E/N) by the two governments concerned in accordance with Japan's Grant Aid Scheme.

After the Notes are exchanged, the entire scope of the Project, from design, installation, and inspection to procurement, should be completed smoothly and promptly. Therefore, plans involving work and personnel should be formulated so that each stage of the Project can be executed efficiently and effectively.

To ensure smooth execution of the Project, a time and location should be arranged for representatives from the relevant organizations of the government of Indonesia (e.g. the Ministry of Foreign Affairs) and from The BPS to meet with staff from a Japanese consulting firm and supplier of the equipment, so as to discuss plans and other details.

After the project is approved by the governments of both countries involved and the Exchange of Notes is concluded, a Japanese consulting firm that is currently under contract with the Government of Indonesia and BPS will supervise the plan's execution as well as actual procurement of the equipment. Also, a supplier of the equipment will be determined on the basis of open tender as specified in the Exchange of Notes, and this supplier will be responsible for procurement and installation of the equipment to Project sites.

(1) Party responsible for the implementation of the Project

The responsible party in the Recipient Country is BPS. BPS will act as the contracting party of the Recipient Country, and shall be responsible for implementing the Project. The BPS is required to cooperate in regard to the appointment of the responsible persons concerned for the BPS local statistical office and work necessary for unpacking, delivery, Installation of OCR software and assembly/trial run of the equipment.

The Ministry of Foreign Affairs and BPS shall be responsible for customs clearance, supporting internal transportation.

(2) Consultant

Following the signing of the Exchange of Notes (E/N) between two governments

concerned, BPS shall sign a consultation agreement with a Japanese consulting firm for the detailed design of the equipment to be procured. The work will also be associated with tendering and supervision of project implementation. The Japanese Government will verify the agreement subject to approval. The consultant shall be responsible for implementation of the following work under the agreement:

1) Detailed design phase

The final confirmation of the Project, reviewing the equipment specifications, preparation of tender documents, supervision of tender procedure, and evaluation of the contents of the tender

2) Implementation phase

Supervision of project implementation including control of the work schedule, inspections of equipment, supervision of transportation and installation work, and issuance of certificates

(3) Suppliers of the equipment

Based on the Exchange of Notes (E/N) and in accordance with the "Guidelines for Procurement" under Japan's Grant Aid Scheme, BPS shall sign a procurement agreement with Japanese national suppliers that shall be determined on the basis of open tenders on the equipment to be provided. The agreement shall be verified subject to the approval of the Japanese Government. The suppliers shall implement the following tasks under the agreement:

Procurement, transport, and delivery of the equipment

Installation of the equipment

Technical guidance concerning operation, maintenance, and repair

3-1-2 Implementation Conditions

All possible measures shall be taken to ensure the implementation and a complete procedure for installation, which will conduct the quick and efficient completion of the procurement, transport, delivery, and installation of the equipment. As the project site is in the wide spreading Indonesia, plans for transport and installation of the equipment shall be carefully prepared. Therefore, consultations with officials concerned are essential prior to customs clearance, inland transportation, and storage area for the procured

equipment, etc.

3-1-3 Scope of Work

The work provided for the Project by the Recipient Country and covered by Japan's Grant Aid will be described below.

1) Work to be carried out by the Recipient Country

    Expansion of power supply capacity on each project site

    Connection of utilities at the designated points for the equipment to be procured

    Preparation of storage space for questionnaires

    Preparation of test data for tender evaluation

2) Work to be covered by Japan's Grant Aid

    Procurement of the equipment

    Transport of the equipment to be procured

    Delivery, installation, and trial run of the equipment to be procured

    Technical transfer on operation and maintenance of the equipment to be procured

3-1-4 Consultant Supervision

A Japanese consulting firm shall provide fair guidance, advice, and coordination throughout the detailed design phase and implementation phase of the Project. Furthermore, this consulting firm shall do whatever is necessary in order to ensure the smooth implementation of the Project in accordance with the Japan's Grant Aid Scheme and the Basic Design Study Report. The consultant will be deemed to have completed its work when the equipment is completely installed, it is confirmed that all conditions of the contract have been met, the official delivery of the equipment is witnessed, and the approval of the Recipient Country is obtained.

(1) Framework of Implementation Supervision

1) Management of the completion dates for installation

2) Maintaining close contact among all parties concerned

3) Supervision of installation work

4) Suggestions for maintenance after the official delivery of equipment

(2) Personnel Plan

The consultants required for the supervision of detailed design and implementation shall be as follows:

1) Project Manager   One (1)

This project manager shall be responsible for the comprehensive supervision of work.

2) Equipment Planner   One (1)

This person shall be responsible for the re-examination of the Project and the confirmation of the equipment specification, and for the preparation of tender documents and evaluation of the contents of the tender.

3) Supervisor of inspection and installation I   One (1)

This person shall be responsible for the supervision of the pre-shipment inspection and installation of the equipment at the following site;

1)Dista Aceh, 2)North Sumatera, 3)West Sumatera, 4)Riau, 5)Jambi, 6)South Sumatra 7)Bengkulu, 8) Lampung

4) Supervisor of inspection and installation II   One (1)

This person shall be responsible for the supervision of the pre-shipment inspection and installation of the equipment at the following site;

1)BPS-HQ, 2)DKI Jakarta, 3)West Java, 4)Serang, 5)Bogor, 6)Bandung, 7)Cirebon, 8)Tasikmalaya, 9) Central Java, 10)Banyumas, 11)Kebumen, 12)Wonosobo, 13)Pemalang, 14)Klaten, 15)DI Yogyakarta, 16)East Java, 17)Kediri, 18)Jember, 19)Tuban, 20)Madiun

5) Supervisor of inspection and installation III   One (1)

This person shall be responsible for the supervision of the pre-shipment inspection and installation of the equipment at the following site;

1)Bali, 2)West Nusa Tenggara, 3)East Nusa Tenggara, 4)Maluku, 5)Irian Jaya, 6)West Kalimantan, 7)Central Kalimantan, 8)South Kalimantan, 9)East Kalimantan, 10)North Sulawesi, 11)Central Sulawesi, 12)South Sulawesi, 13)South East Sulawesi

3-1-5 Equipment Procurement Plan

(1) Matters for Consideration in the Procurement of Equipment

The equipment to be procured should be of a type that will allow BPS to access maintenance services, spare parts, consumables, cheaply and quickly after the handover. There are ASEAN nations in the vicinity that are able to provide statistical equipment of excellent quality with performance and prices in particular on a par with Japanese products. The technical service involved in the maintenance and supply of spare parts and consumables for this statistical equipment, which can be procured from third-countries, has clear advantages over Japanese products.

Provided that quality and supply without delays in the implementation schedule can be guaranteed, local products will be given preference. Imports will also be treated as local products if they are available freely in the recipient country (i.e. if they are readily available on the market when ordered without any need for specialized import procedures).

(2) Internal Transportation

Equipment will be transported from Jakarta by air to the airport closest to the assigned location for scanner installation, and by truck from the closest airport to the assigned location.

(3) Plan for Assignment of Technical Personnel

The labor required for the installation of equipment will primarily be sourced from the area where equipment is to be located. However, for equipment requiring specialized technical knowledge, technicians will be assigned as a rule from Japan or the country from which the equipment was procured. A process will also be devised that allows a suitable length of time for a satisfactory transfer of technical knowledge to the staff in charge, mainly BPS staff, in terms of trial runs of and adjustments to the operation procedures for the procured equipment. Advance discussions on this technical-knowledge transfer period with BPS and the regional statistical offices will therefore be required.

3-1-6 Implementation Schedule

When the time arrives for the Project to be carried out, the consulting firm will investigate the specifications of the equipment. Then, the supplier of the equipment, who will be decided through open tender, will procure the equipment.

The Project implementation schedule is given in Table 3-1.

3-5

Table 3-1 Project Implementation Schedule

	1	2	3	4	5	6	7	8	9	10	11	12
Detail Design	▧ (Consultation Agreement & Final Project Confirmation) □ (Preparation of Tender Document) ▧ (Approved by the Recipient Country) ▭ (Preparation for Tendering) ▧ (Tendering & Evaluation)									(Total 2.00 months)		
Procurement	▭ (Procurement in Japan and/or third-party countries) ▨ (Transportation) ▨ (Installation) □ Works in Japan ▧ Works in the Recipient Country									(Total 5.00 months)		

3-1-7 Obligations of the Recipient Country

The Recipient Country shall perform the following in accordance with the Exchange of Notes (E/N), for the smooth implementation of the Project.

1) To exempt customs duties, internal taxes, and other fiscal levies that may be imposed in the Recipient Country with respect to the supply of the equipment and the provision of services under the verified contracts;

2) to ensure both prompt customs clearance in the Recipient Country and a procedure for internal transportation therein of the equipment brought from Japan and third-party countries;

3) to provide Japanese nationals and third-party country engineers working on the Project with every convenience to facilitate their entry into the Recipient Country and their stay therein;

4) to ensure the issuance of permits required by the laws of the Recipient Country for the implementation of the Project, and other permits, including tax exemptions;

5) to ensure that the equipment procured under the Grant Aid Scheme is maintained and used properly and effectively for the Project; and

6) to confirm that the Recipient Country bears all expenses except for those agreed to be covered by the Japanese government.

3-2 Project Cost Estimation

3-2-1 Expenses Borne by the Recipient Country

To ensure smooth operation of OCR systems in each location, the BPS will be asked to handle matters such as preparing the locations for the installation of OCR systems, securing adequate power supply, and providing storage facilities for the questionnaires.

Table 3-2   Expenses Borne by the Recipient Country

Item	Total Amount (Unit : Rps)	Total Amount (Unit : US$)	Fiscal Year
(1)Expanding power supply capacity	48,000,000	6,115	2000/2001
(2)Preparation of office equipment	355,500,000	45,287	2000/2001
(3)Providing storage facilities for the questionnaires	275,000,000	35,032	1999/2000
(4)Renovating work at processing site, with air-condition	380,000,000	48,408	2000/2001
Total	1,058,500,000	134,841	

Source: BPS   USD 1.00= Rps 7,850

3-2-2 Operations and Maintenance Plan

BPS employees currently possess more than adequate technical skill to manage the equipment to be supplied for this project, and staff sizes are also sufficient. The employees forming the nucleus of those involved in the 2000 Population Census have already clocked up a satisfactory amount of training in "The in-country training programe" at the Jakarta training center. BPS staffs who have received this training will return to regional statistical-research offices in to work as trainers for local staff.

Technical and preventive-maintenance training in OCR systems for BPS local staff will also be conducted, as part of the Mini-Project-Based Technical Cooperation for the Improvement of the 2000 Population Census, in two sessions. This training will provide a maintenance framework for OCR systems within BPS.

The introduction of the equipment procured for this project will involve outlays on operations and maintenance such as the cost of equipment maintenance and the cost of purchasing replacement parts and consumables. The main pieces of equipment requiring replacement parts and consumables will be the scanners. During the 2000 Population Census, demand for the replacement parts and consumables required to scan an enormous number of questionnaires will be concentrated in the brief time span. The consumables that

will be required during this period will be included in procurement orders for equipment such as rollers, belts, and pads.

The projected costs of operations and maintenance after the introduction of the equipment are shown in Table 3-4, and the details related to the consumables are shown in Table 3-3.

These trial calculations assume an evaluation period of seven years between 2000 and 2006. Due to variation in the life of replacement parts, there will be fluctuations in the cost of maintaining the installed equipment.

Table 3-3   Contents of consumable

Equipment name	Contents of consumable
(1) Scanner	Belt Assembly, Roller Assembly, Lamp, Pad, etc
(2) PCs	Toner Cartridge (printer), Image drum (printer)

Table 3-4   Operation and Maintenance Cost

Fiscal Year	2000	2001	2002	2003	2004	2005	2006	2007	Total
Total Inflow from National Budget	134	50	50	105	50	50	70	50	559
Total Expenditure	134	50	50	105	50	50	70	50	559
Maintenance cost	0	40	40	40	40	40	40	40	280
Spare parts, consumable	0	10	10	65	10	10	30	10	145
Expanding power supply capacity	6	0	0	0	0	0	0	0	6
Preparation of office equipment	45	0	0	0	0	0	0	0	45
Providing storage facilities for the Questionnaires	35	0	0	0	0	0	0	0	35
Renovation work at the processing site (Preparation of Air –condition, etc)	48	0	0	0	0	0	0	0	48

Exchange rate: USD 1 = Rps 7,850

Basic Assumption for Maintenance cost , Spare part and consumable;
1) 1 year Contract for 79 scanners and 158 PCs
2) No onsite support
3) All defective equipment will be send to Service Center in Jakarta
4) BPS will be responsible for delivery and return cost, with insurance
5) Repair time will take 2 or 3 day
6) Cost of Spare part and consumable should be covered by BPS program budget

The budget required by BPS will be provided entirely from that of the government. For the 2000 Population Census, BPS will need to revise its calculations of the costs required and produce a revised budget proposal. The total figure (approximate) for additional costs generated by the introduction of OCR systems is estimated at US$134,000, requiring a roughly 0.5% addition to the original budget (FY2000) of US$28,887,700. Failure to secure this funding will endanger the implementation of the population census itself, making it crucial that BPS put its every possible of effort into obtaining the budget it requires.

The trial calculations also revealed that a minimum of US$50,000 (FY2001) will be required annually to maintain the scanners. This sum equals approximately 0.3% of the BPS ordinary budget of US$16,925,600 (FY1999), and this extra amount must be obtained by an increase in the BPS ordinary budget. BPS has been charged with the tasks of drawing up a revised budget proposal based on these trial calculations and requesting the cooperation of the relevant ministries to secure the required amount.

Chapter 4

Project Evaluation and Recommendation

Chapter 4   Project Evaluation and Recommendation

4-1   Project Effects

The United Nations has indicated that population censuses are to take place at the same time worldwide.   Therefore, Indonesia's decision to conduct its population census in July 2000 is also significant from an international perspective.   However, in the previous census in 1990, data from questionnaires were keyed in manually for computer tabulation, and the limited input capability meant that population by gender was the only item for which a complete count was tabulated for the entire country, while items that needed to be tabulated for the entire population, such as age, relationship to head of household, and marital status, were restricted to a 5% sample.   Problems such as sampling error lead to further problems with the accuracy of the basic statistical information compiled, and the accuracy of the results has been deemed insufficient for use in the formulation of policies.

This project will enable complete tabulation of all items surveyed, it will resolve the problem of sampling error, and it will provide reliable statistical information.

The Asian currency crisis and the effects of drought have left Indonesia facing an economic crisis of severe proportions.   Emergency aid from Japan has been limited to health, medicine, food, and employment benefits.   Obtaining accurate statistical information concerning the poorest people in the country is important not only to Indonesia but to the donor nations as well, so that demand among the poor for aid in the form of everyday necessities and employment opportunities may be gauged.   Without reliable statistical data it will be impossible to construct policies to improve the lives of the nation's citizens, or to provide effective assistance such as BHN policies.   Therefore, the adoption of this project (the introduction of OCR systems for the input of statistical information) is of great significance.

(1) Policies to Help Disadvantaged Members of Society

A lack of accurate statistical information has meant that the numbers, spatial distribution, and regional characteristics of the poorest people in society are not known.   Conducting a population census and obtaining accurate statistical data is critical for the efficient distribution of aid from overseas, such as food and medical supplies, to these people in need.

(2) Tackling Unemployment

The whole of Indonesia is in the throes of an economic crisis resulting from the Asian

currency crisis and the effects of drought. While it is recognized that the crisis has brought about massive unemployment, the government does not have an accurate picture of the number of people unemployed or their regional distribution. The Indonesian government has a number of plans for dealing with unemployment in the 21st century, and the acquisition of accurate statistical data will be of great importance for implementing these projects effectively.

(3) Education Issues

The worsening economic situation has resulted in a dramatic decrease in the number of children attending school. However, the number of children, their spatial distribution, and in which regions they live are not known to any accurate degree. Obtaining accurate statistical data will be a major step toward providing educational assistance to the children who carry with them the nation's hopes for the 21st century.

(4) Social Problems

In Indonesia, rivalry between different ethnic groups and religions is a contributing factor of social instability. Determining how many members of which ethnic group live in what regions will be beneficial in formulating responses to these social problems.

The following is an outline of both the positive effects to be gained from the project, and the negative effects of not proceeding with it.

Positive Effects of the Project

1) Introduction of OCR system for the tabulation will shorten the time required for entering Population Census data (from two years to four months) and enable the results to be tabulated more quickly.

2) Tabulated results from the Population Census will provide a more complete picture of the country's situation, particularly in terms of regional data (an increase from four to fifteen items; an improvement from a 5% sample tabulation to a complete count tabulation).

3) Early tabulation of the results of the Population Census will enable the central and regional governments of Indonesia to make effective economic and social plans.

4) The project will contribute to the improvement of methods for conducting the Agricultural Census (2003) and the Economic Census (2006).

5) The necessary number of personnel with appropriate skills in the tabulation of statistical surveys results will be trained.

6) Data that will enable economic cooperation and private sector investment from overseas,

including Japan, will become available.

Negative Effects of not Proceeding with the Project

1) The means would be lost of improving methods for conducting the Population Census in 2000, meaning that tabulation of results for the 2000 Population Census would have to be conducted using the same methods of data entry and results would be of the same level as in the last census in 1990.

2) Information on the population would be insufficient for the following ten years until the next census in 2010. The central and regional governments of Indonesia would therefore be unable to effectively formulate economic and social plans.

3) Not having sufficient information would seriously hinder the efficient use of international aid, including that from Japan, and the formulation and implementation of economic and social plans.

4-2 Technical Cooperation

A "Mini-Project Type Technical Cooperation for Improvement of the 2000 Population Census" was set up in November 1997 by JICA to provide technical assistance for implementing the necessary improvements to the survey and tabulation techniques for the 2000 Population Census. This project should run for three years, and it involves contracting two long-term specialists. One of the improvements this project team has indicated as necessary is mechanization of data entry (a change to OCR systems). As the statistical material is required, the 2000 Population Census is planned to be a complete count tabulation. Because this requires the upgrading of the data entry system to OCR, BPS, and the project team have implemented the following tests:

(1) Questionnaires designed with OCR equipment in mind have been used to conduct actual surveys and data entry tests. Pilot tests have already been carried out at a number of locations.

(2) A prototype OCR system has been constructed with the 2000 Population Census in mind. It includes OCR equipment and software, designs for the questionnaires to be read and input, methods for completing the questionnaires, and outlines for their administration.

The processes outlined above have allowed BPS and the project team to confirm the propriety of introducing the OCR systems, and they have formulated plans for conducting the

2000 Population Census based on the assumption that the OCR systems will be introduced. The plans include technical training of BPS staff on the use of the OCR systems (operation, maintenance etc.), with total support from the project team. Smooth operation of the OCR systems will be impossible without this training; therefore, assistance from the project team is an essential element in the smooth implementation of the project.

4-3　Recommendation

As indicated in 4-1, the implementation of the project is expected to benefit the people of Indonesia while contributing to an improved BHN. The project is, therefore, one of great significance. Furthermore, Indonesia has made available sufficient funds and personnel to cover the operations and management of the project, and no problems are envisaged in this area.

However, the following improvements and preparations would allow the project to be carried out in an even smoother and more effective manner.

(1) Speedy Conclusion of the E/N

For the 2000 Population Census to be conducted in July 2000 as planned, a deadline of late May 2000 has been set for delivery of the OCR systems. Therefore, a decision on the best tender needs to be made at an early stage, and the full cooperation of the Indonesian government will be required to ensure that E/N takes place soon after the cabinet meeting at the end of October.

(2) BPS Responsibilities

1) Maintenance costs after 2001

Following expiry of the warranty period (i.e. from 2001 onward) BPS will draw up a maintenance contract directly with manufacturers and pay for maintenance and consumables from its ordinary budget. Budgeting for these costs will be the responsibility of BPS.

2) Preparations to be made by BPS prior to and during installation of the equipment

a) Examples include increasing the capacity of the power supply, securing storage space for the questionnaires, and improving some of the locations where equipment is to be installed. BPS will be responsible for securing the funds for these preparations.

b) Scanner accuracy will need to be checked as part of the conditions of tender. BPS is to

be responsible for procuring the data required for these checks.

c) The OCR software will be supplied in CD-ROM form. During system installation BPS will be responsible for the installation of the OCR software as performed by its staff, following which the contractor will carry out an inspection.

(3) Maintenance

The period designated for scanner operations as part of the 2000 Population Census is brief - approximately four months - and during this period, each scanner will be required to read approximately one million questionnaires (including operational tests). Keeping scanner breakdowns to a minimum will be the most critical factor in the successful completion of the 2000 Population Census.

Training in preventive maintenance will therefore be carried out by the Mini-Project Type Technical Cooperation (Mini-Project) for all BPS staff assigned to locations where the OCR systems are to be installed. BPS needs to make every effort to reduce the frequency of breakdowns by obtaining the full cooperation of the Mini-Project team to ensure its staff receive thorough training in preventive maintenance. This will enable a smooth, reading by the scanners, as well as reductions in maintenance costs.

(4) Reducing the Frequency of Unreadable Questionnaires

Statistics are inherently never entirely correct, always including element of error. The problem faced by analysts is to keep this error within predefined limits. When statistical comparisons are made over a period of time, if there are marked changes in the rate of error-readings with each statistical survey, the error-reading rate itself becomes a major factor affecting analysis of changes over time, hindering accurate statistical analysis. Various countries around the world have introduced OCR systems for the first time to tabulate of their 2000 Population Censuses. In Europe and North America in particular, the rate of reading error related to these systems has become a major issue. This is because the existing errors in population censuses (i.e. errors arising in the survey process such as misinterpretation of information and mistakes in filling in questionnaires) are exacerbated by reading errors inherent to the OCR system (i.e. reading accuracy). For the tabulation of population censuses, the error-reading rate of OCR systems must be kept to an absolute minimum.

1) The Causes of Reading Errors

Reading errors are the result of two problems: 1. The performance of the scanner as a piece of hardware and 2. The condition of the questionnaires (folded, creased, soiled, etc.) and the manner in which they have been completed.

To tackle 1., the specifications for the OCR software will include a dictionary (Indonesia Memory) which recognizes Indonesian language patterns, in an effort to reduce the rate of error-readings. The OCR software manufacturer declares that the rate of error will be 3% or less.

The second cause involves the quality of the enumerators employed for the Census, which is a training and QC management issue for these enumerators.

Reading errors are inevitable under the following conditions;

a. When the condition of the questionnaire (folded, creased, or soiled) causes distortions in the image picked up by the scanner, preventing accurate character identification

b. When questionnaires are fed into the OCR diagonally, causing distortions in the image

c. When questionnaires have been completed incorrectly, preventing accurate character identification

2) Measures to Reduce the Rates of Reading Errors and Unreadable Characters

In a population census trial (in a limited survey area) conducted by BPS, the level of unreadable characters in surveys taken around the city of Bekasi, where both the standard of enumerators and the educational level of the population is high, was 6.05%. It is predicted that the rate of unreadable characters on the remoter islands will be even higher than this. BPS therefore needs to take the following steps to solve the problem in 1) 2. to improve this rate.

a. Improve the quality of the paper used for the questionnaires, within the confines of the budget

b. Simplify the questionnaire format to make the questionnaire easier to complete

c. Distribute writing instruments to the enumerators to facilitate correct completion of questionnaires

d. Teach enumerators how to fill in numbers correctly as part of their training

e. Have supervisors check carefully the questionnaires completed by enumerators and rewrite correctly any numbers they think the OCR system may have trouble reading.

f. Ensure that enumerators take special care to avoid soiling the questionnaires