Ministry of Primary Industries and Co-operatives
Agricultural Planning and Statistics Division
STATISTICS UNIT

FIJI NATIONAL AGRICULTURAL CENSUS 1991

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Report on the

FIJI
NATIONAL AGRICULTURAL CENSUS 1991

by

Guillermo Otanez
UNDP/FAO Chief Technical Advisor

and

Deo Narayan and Sakiusa Tubuna
Counterpart Statisticians

Suva, Fiji

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F O R E W O R D

It is indeed a great pleasure to be part of this publication on the 1991 National Agricultural Census (NAC) of Fiji. The document will provide comprehensive statistics on the structure of the agricultural sector. Such information will assist in the formulation of the effective development strategies for the agricultural and rural sector.

The 1991 National Agricultural Census is the third Census specially conducted for the agricultural sector. Two previous censuses were conducted in 1968 and 1978. The Ministry of Primary Industries & Cooperatives with the technical assistance of the UNDP/FAO Project FIJ/89/004-Agricultural Census and Statistics are responsible for this publication.

Given the problems experienced in the previous censuses of 1968 and 1978, the new methodology Area Sampling Frame (ASF) was used as an alternative approach. As well as providing a suitable sampling frame, this methodology has the added advantage that it can be used to establish an on-going Agricultural Statistics System, one of the main objectives of the project.

It is pleasing to note that the census has been successfully completed and the final report made available within eight months of the completion of the field work.

The report is divided into nine chapters. Chapter one gives a brief introduction and background of the country. An outline of the census programme is explained in Chapters two and three. Chapters four, five and six contain detailed descriptions of the ASF methodology, including the basic concepts and definitions used in the census. A brief analysis of final census results is presented in chapter seven. Chapter eight presents tables containing the raw final census results at national level and chapter nine has the questionnaires used in data collection. The results at Division and Provincial levels by size of the farms have not been published, but they are available with the Library of Ministry of Primary Industries & Cooperatives.

I take this opportunity to acknowledge the enormous effort made by those involved with this project and up to its successful publication within the eight months after the census data collection. The UNDP/FAO Chief Technical Advisor, Mr. Guillermo Otanez and the census staff of Statistics Unit and Land Use Section of Economic Planning & Statistics Division must be commended for a job well done.

I would also express my sincere appreciation to many of the staff of the Ministry's various Divisions, specially Extension, Animal Health & Production, Drainage & Irrigation in their role as coordinators, supervisors and enumerators, without whom all information relevant to census could not have been collected successfully.

I would also like to thank the farmers who reported willingly to the questions put to them.

I am also grateful to ESCAP/EPOC for the technical assistance rendered through the valuable services of the Area Sampling Frame Consultant, Miss Elsa Albarracin. The UNDP/FAO Regional Project RAS/86/035 also provided back up support.

Special thanks must go to Mr. Chris Lightfoot of Central Planning Office and Australian International Development Assistance Bureau (AIDAB) for their help and the provision of funds for the data processing and publication components.

The project is also indebted to the National Coordinating Committee, the EDP Department for the help in data processing, the Air Survey Section of Department of Lands for the provision and processing of the aerial photographs used in the Area Sampling Frame and the Bureau of Statistics for providing population census maps.

I am now confident that with the comprehensive statistics and information now available to the agricultural sector that more users will have access to the information and statistics. Naturally I am also hopeful that the on-going system will provide bench marks of statistics on the sector whenever the need arises for its use.

In summary the ASF will now provide the basis for uses by other Agencies and even when another census is done it should be capably handled by the local staff.

N. V. Buresova
Deputy Permanent Secretary Services

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A C R O N Y M S

ADP	Australian Development Project
AH & P	Animal Health & Production
AIDAB	Australian International Development Assistance Bureau
ASAS	Australian Staff Assistance Scheme
ASF	Area Sampling Frame
CTA	Chief Technical Advisor
D & I	Drainage & Irrigation
EA	Enumeration Area
ESCAP	Economic and Social Commission for Asia and the Pacific
EPOC	Pacific Operations Center
FAO	Food and Agricultural Organization of the United Nations
GDP	Gross Domestic Product
GOF	Government of Fiji
Has	Hectares
Km2	Square Kilometer
N & N	Nadroga & Navosa
MPIC	Ministry of Primary Industries & Cooperatives
NAC	National Agricultural Census
PAO	Principal Agricultural Officer
RAS	Regional Agricultural Statistics
SAS	Statistical Analysis System
SM	Segment
SMs	Segments
TCP	Technical Cooperation Programme
UNDP	United Nations Development Programme

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CHAPTER 1. BACKGROUND OF THE COUNTRY

1.1. GEOGRAPHY

Fiji is a small independent Republic in the South Pacific and lies between 15 degrees and 22 degrees south and longitudes of 174 degrees east and 177 degrees west. The Fiji group consists of some 364 islands with a total land area of about 18,400 Km2 scattered over 230,000 Km2 of ocean. Approximately one hundred of the islands are permanently inhabited. The two main islands Viti Levu and Vanua Levu contain 87 % of the total land area and 93 % of the population. About 25 % of the total land area is suitable for cultivation and the rest is hilly, too mountainous and rocky with some outcrops of coral limestone.

Fiji lies in strategic location amongst other Pacific Island neighbors and is 3,155km from Sydney and 2,120km from Auckland.

1.2. CLIMATE

The climate is of the tropical oceanic type, but with the tempering influences of the prevalent south-east trade winds that control it. The hot months are December to April when humidity is high.

In rainfall, clear demarcation is shown. The windward sites of the large islands are extremely wet, while on the lee sides sheltered by the mountains, the annual precipitation may be 1,640 millimeters more or less, with well marked dry season favorable to sugar growing. But there is no month without some rain, while the abundant running streams assist both communication and cultivation. Strong winds, excessive rainfall and hurricanes are occasionally more destructive to crops.

1.3.HISTORY

It is believed that the first Fijians arrived in the Fiji group more than 3,000 years ago.

The European discovery of Fiji was the Dutch navigator Abel Janzoon Tasmain, who sailed among some of the north-eastern reefs in 1643 in his vessel Heemskerek; he named them Prins Willems Islands. Captain Cook sighted the small island of Vatoa in 1774, but it was not until 1789 that the main islands were seen. This occurred when William Bligh and some of his crew were making their celebrated open boat voyage from Tonga to Timor following the mutiny on the Bounty.

Sandalwooders began operating in the area in the early years of the 19th Century and brought the first "white" settlers to the group. The trade lasted until 1814. The departure of the last Sandalwooders from Fiji saw the arrival in the early 1820s of the American and other ship calling in search of beach-de-mer. Meanwhile, the first christian missionaries, two tahitians, arrived in the group from Tonga in 1830. Five years later they were joined by two european evangelists. The missionaries made few converts. Little by little however, their pacifism and good examples caused the Fijians to question their own custom.

On the other hand, Cakobau the Chief of Bau had considerable success in extending his influence to the coastal villages of Viti Levu, to the islands of Lomaiviti, to Taveuni and Lau. By 1850 foreigners were beginning to address him as Tui Viti (King of Fiji). Faced with repeated defeats in battle, Cakobau decided on 28 April, 1854 to embrace christianity. In 1858, the first British Consul to be appointed to Fiji, arrived in Laucala.

Pritchard's appointment followed a period in which several French and American warships had visited Fiji. This made Britain afraid that one of the two powers might try to annex the islands. As it turned out, however, an opportunity soon arose that led Britain to annex the islands herself. Cakobau was being pressed to settle a claim by various american residents for $45,000 and turn to Prichard for help. Claiming to have full and exclusive sovereignty and dominion he offered to cede Fiji to Britain, provided Britain would pay her debts.

In September 1874, Sir Hercules Robinson, Governor of New South Wales, arrived to determine the terms of cession. A formal deed of cession was signed at Levuka on 10 October, 1874. Its signatures were Cakobau, Ma'afu and eleven other principal chiefs. The first substantive Governor, Sir Athur Gordon, arrived in the colony in June 1875, and established his headquarters in Levuka.

It was obvious that one of the Gordon's chief problems was to revive the colony economy. Copra and sugar seemed to offer the best possibilities, but these required a large labor forces and Gordon was opposed to Fijians working for Europeans in their own country. It was in these circumstances that Gordon authorized the importation of laborers from India who first arrived in 1879. Many of the Indians felt they were in better situation in Fiji, then they would have been at home and they remained in the colony to become independent farmers on leased land from the Fijians.

Gordon's principal achievement was the introduction of a system of administration whereby fijian institutions were developed to provide chain of activity extending from the village headman to the Governor.

In 1904, the colony Legislative Council which had previously been all Europeans and the nomination of two Fijian members from

the Council of Chiefs. It was not until 1929 that the first elected members took their seats. The councils composition greatly increased over the years.

In 1965, a conference in London led to the adoption of the constitution of 1966 which enlarged the Legislative Council to 40 members. In April, 1970, after the abatement of several years of antagonism between Fiji two main political parties, another constitutional conference was held in London. It was then agreed that Fiji should become independent on October 10, 1970, 96 years after the signing of the Deed of Cession.

1.4. PEOPLE

Fiji is a multiracial country and its population is made up of ethnic Fijians, Indo Fijians, Chinese, Europeans and Pacific Islanders. Ethnic Fijians dominate the population with 51 percent with the Indo Fijians contributing to 48 % of the total population.

The indigenous Fijians are racially classed as Melanesians but they have considerable admixture of Polynesian blood. Of the Fijian people 61 % still live in villages in a largely subsistence economy and with the obligations of communal life.

On the other hand, Indians live in their own family settlement or households. Their individualistic lifestyles are usually geared towards gaining material welfare.

1.6. ECONOMY

The economy of Fiji is primarily agrarian and sugar remains a major commodity. Grown mainly on small holdings, the Government own Fiji Sugar Cooperation that processes the commodity for export.

Other major export earners are gold, copra, fish and coconut oil, timber, ginger, pine and certain processed consumer goods are rising import earners. Together with sugar, Tourism has also been one of the mainstay of the Fiji economy since independence. Fiji has remained one of the most competitive holiday destination in the Pacific.

Secondary industries such as garment manufacturing have grown rapidly in the last four years, as a result of the establishment of tax free zones. They provide an immense impact through the generation of foreign exchange,employment and incomes.

Government is striving to ensure the substantive growth of the overall economy and encouragement of all business and investment through the development of tax free zone and opening up of the economy through deregulation.

CHAPTER 2. THE AGRICULTURAL CENSUS AND STATISTICS PROJECT

2.1 BACKGROUND

There are a number of recognized socio-cultural, economic, technical and institutional constraints in planning for the agricultural sector. Good information and accurate agricultural statistics are prerequisites of the planning process for achieving the development targets. However, very limited data on the agricultural sector was available in Fiji, even if this country has already conducted two agricultural censuses, the first in 1968 and the second ten years later in 1978 (both with technical assistance from UNDP/FAO). Some information on the marketed production of the major crops was available on an "ad-hoc" basis, but no system to produce food and agricultural statistics existed in Fiji.

As a first stage to fill this information gap, the Government of Fiji (GOF) identified the need to conduct the third Agricultural Census. The year 1988 was originally chosen for the agricultural census and in July, 1987 an UNDP project (FIJ/87/009) was approved to provide technical assistance to the census.

As part of the preparation for the census, Fiji received assistance from regional projects financed by UNDP and FAO, such as RAS/79/025 "Proposals for Implementation of Training in Agricultural Statistics", TCP/RAS/4513 "Training for the Preparation of Agricultural Census, and RAS/86/035 "Development of Agricultural Statistics".

However, subsequent political events in 1987 and 1988 created an unfavorable climate in which to undertake the census and the project was postponed and eventually closed.

With the much greater degree of political stability in the country in 1989 the third Agricultural Census project was reactivated by the GOF. The new UNDP/ FAO project FIJ/89/004 "Agricultural Census and Statistics" was formulated with the technical support of the regional project RAS/86/035.

2.2 OFFICIAL ARRANGEMENTS

The project document was signed by the GOF in September, 1989 and by UNDP/FAO in October, 1989. The project was scheduled for a duration of 18 months, with a UNDP input of USD 199,500 and a GOF contribution of F$ 146,000 in kind and F$ 250,000 in cash. FAO was designated as the executing agency and the Ministry of Primary Industries & Cooperatives (MPIC) as the counterpart agency responsible for the project implementation.

The project became operational in May, 1990 with the arrival of Mr. G. Otanez, FAO Chief Technical Advisor (CTA). Previously, MPIC conducted some pre-project activities, such as the establishment of the Statistics Unit (within the Economic Planning & Statistics Division) in charge of the census, provision of some space accommodation and purchase of office equipment, computers and one vehicle.

As a result of the first Tripartite Review Meeting held on 24 April, 1991, the duration of the project was extended to 24 months (with an extension of six man-months for the CTA and the provision of three man-months of consultancies) to allow time to complete the project. The UNDP and FAO/TCP funded seven month extension of the CTA and the resources for short term consultancy were tapped from ESCAP/EPOC. In addition, AIDAB financed local consultancy for computer programme development to complete data processing and for the publication of final census results.

The total UNDP contribution was USD 159,500 and the GOF contribution was around F$ 300,000 in kind and F$ 1,000,000 in cash. The FAO TCP allocated around USD 14,000 and ESCAP/EPOC USD 12 000. AIDAB A$ 16,000. The project terminated in May, 1992.

CHAPTER 3. OBJECTIVES, SCOPE AND METHODOLOGY

3.1 OBJECTIVES

The development objective of the project was to provide a system of agricultural statistics within MPIC which will enable policy and administrative decisions on the improvement of the agricultural sector.

The immediate objectives of the project were:

- To conduct an agricultural census to provide objective criteria for planning and policy decisions in agricultural and rural development.

- The establishment of an on-going work program for the Statistics Unit (MPIC) to enable it to collect and process key agricultural data on a regular basis using the results of the agricultural census as the benchmark and the dissemination of this data in the form of regular reports.

3.2 SCOPE

THE MAIN DIFFERENCE WITH THE SCOPE OF 1968 AND 1978 AGRICULTURAL CENSUSES WAS THAT 1991 NAC DID NOT COLLECT DATA ON CROP PRODUCTION AND YIELDS, SINCE THE FIELD WORK WAS CONDUCTED IN A VERY SHORT PERIOD (TWO MONTHS) INSTEAD OF ONE COMPLETE YEAR AND ONE YEAR AND HALF OF PREVIOUS CENSUSES. THE ESTIMATIONS OF YIELDS AND PRODUCTION OF CROPS WILL BE CONDUCTED FROM 1992 ONWARDS AS PART OF THE ON-GOING AGRICULTURAL STATISTICS SYSTEM TO BE ESTABLISHED IN MPIC.

The 1991 NAC scope was:

- Farmer (Holder): identification, race, age, education, and occupation;

- Farm (holding): legal status, total land, land use, land tenure, type (subsistence only, mainly sale);

- Temporary crops: planted, irrigated, and harvested areas (in pure and interplanted stands);

- Permanent crops: planted, irrigated, and productive age; age and number of planted and bearing trees (in pure, mixed, interplanted, and associated stands);

- Number of scattered plants, trees, and vines (planted and bearing);

- Types of pastures (areas);

- Livestock and poultry: number of cattle by sex, age and use (diary, beef, non dairy and non beef); other livestock; poultry (non-industrial) in the farm;

- Farm employment: with and without remuneration by sex, cash, kind;

- Farmer household population: age, sex, race, and work status (full, part time), and number of hours spent on the farm;

- Stock of machinery by type. Machinery hired and/or borrowed;

- Use of fertilizers: organic, inorganic, agro-chemicals;

- Farm management and existence of fisheries activities in the farm.

3.3 CENSUS METHODOLOGY

The pre-project technical activities of listing commercial producers to select the list sample of commercial farms and the preparation of the sampling frames to select the cluster samples of the subsistence sector, were not conducted at all as they were proposed in the project document signed in October, 1989. Also the use of aerial photography was contemplated in 1989 project document, but budgetary provisions were not made. As a result the entire census project was affected at its very beginning.

The CTA started his work with the comparative study of the methodologies applied in the 1968 and 1978 agricultural censuses. The 1989 project document proposed to use the same methodology of 1978 census.

Available information in public and private institutions, such as agricultural and population censuses, current agricultural statistics, farm lists and different materials like cartography, aerial photography and satellite imagery were analyzed carefully.

Field research conducted on June, 1990 by the CTA and national counterparts showed serious coverage problems (overlapping or duplication and omissions) in the five sampling frames (commercial, minor, peri-urban, mataqali and lists) suggested to be used according to 1978 agricultural census methodology. For example, farmers of a mataqali sector (fijian traditional villages) also can be in the commercial (known farms), minor (unknown commercial farms), peri-urban (city belts) sectors simultaneously. The best lists available in the country are from the Fiji Sugar Corporation (known commercial sector), but also have coverage problems.

It was determined that the screening process applied in the past two censuses to solve these coverage problems, using different quality and out-of-date farm lists and cartography, both from several sources, was very complicated and time consuming.

Due to the problems mentioned above, the alternative **"Area Sampling Frame (ASF) "** methodology was suggested to be used in the 1991 NAC instead of the combination of list and cluster sampling methodology used in previous censuses and also proposed in 1989 project document.

The alternative ASF methodology was discussed between the CTA, MPIC counterparts and the CTA of the Regional Project RAS/86/035 during his visit in May, 1990. The ASF methodology was presented, discussed and approved by the National Agricultural Census Committee in two meetings held in June and July, 1990.

The ASF methodology was used for two main reasons: First of all, weaknesses in field listings, particularly for the medium and small farms, were identified, as an important source of errors in previous censuses. The CTA Regional Project RAS/86/035, mentions in his "A Proposal for the 1990 Census of Agriculture in Fiji" (May, 1989) that **"GREAT CARE MUST BE THEREFORE BE TAKEN TO ENSURE THIS LISTING EXERCISE IS PROPERLY CONDUCTED AND THAT EVERY AREA IS COVERED"** 1/. ASF has been developed to help to minimize the listing errors, since obtaining and maintaining a complete and up-to-date list of farms, classified by type and size for example, is a very difficult task for developing (even developed) countries. ASF constructed for the 1991 NAC will be the natural starting point to establish the On-going Agricultural Statistics System of Fiji. Full description of the ASF methodology is presented in chapters IV, V and VI.

A new work plan was prepared and to apply the ASF methodology the following new main activities were conducted: 1) Taking aerial photography (see details in section 5.1.2 of chapter V). 2) Construction of the ASF (see details in chapter V). 3) Sample design and selection (see details in section 5.3 of chapter V and chapter VI). 4) Photo-enlargements for selected SMs (see details in section 5.4 of chapter V).

1/ A Proposal for the 1990 Census of Agriculture in Fiji by A. D. Marshall , Chief Technical Advisor, FAO/UNDP Regional Project RAS/86/035-Development of Agricultural Statistics, Suva, Fiji May 1989.

3.4 TABULATION PROGRAMME, QUESTIONNAIRES AND INSTRUCTION MANUALS

A set of three questionnaires and three auxiliary forms were designed to collect the data through direct interview to the farms (see copies in chapter IX). One instruction manual for the field staff (enumerators, supervisors, coordinators and quality controllers) was prepared and tested in a pilot survey. This pilot survey was conducted in four SMs representing different types of the country agriculture (sugar cane, vegetables, dairy farms and coconuts). The field work took one week and some 60 farms were enumerated.

The Government Press printed 25,000 questionnaires and 150 Field Staff Manuals (120 pages each). A manual for data processing (71 pages) and a tabulation plan containing 35 tables also were prepared and printed.

3.5 TRAINING FOR DATA COLLECTION AND OTHER ACTIVITIES

Elaborate training programmes were organized at various levels in order to train national staff in all aspects of 1991 NAC procedures, including ASF construction, data collection, processing, analysis, publication, dissemination, and On-going Agricultural Statistics System.

A group of 13 junior staff (contracted) and six photointerpreters received on-the-job training on all the activities of ASF construction and preparation of photo-enlargements, which were used on the field data collection.

The training for the census field staff was organized in two levels. The first level training course for 40 MPIC staff was conducted in Suva from 21 April through 10 May, 1991. These professionals and technicians, most of them at senior level, were: 12 photointerpreters and their assistants (Land Use Section), 7 junior staff (Statistics Unit), 21 field supervisors (Extension and other Divisions). The program of the course was: the first week (8 hours per day) in classroom training dealing with the Field Team Manual; the second week included three days of field practice (using cartography, aerial photography, questionnaires and auxiliary forms) and two evaluation days in the classroom discussing field errors and problems. The CTA conducted the training assisted by two junior counterparts (Statistics Unit).

In the second level of training three centers were used for the 72 census enumerators (out of the 75 planned) selected from the Extension Division, Animal & Health Division, Drainage & Irrigation Division, Koronivia Research Station of MPIC: Suva (17 enumerators for central division and 14 for eastern division), Lautoka (25 enumerators for western division) and Labasa (16 enumerators for northern division). These courses were conducted from 20 May through 2 June, 1991 and the program was the same as the field supervisor's course. Three instructors were selected

from the best participants of supervisor's course and the remaining supervisors were the instructor's assistants. The CTA coordinated the activities of three training centers.

Two training courses also were organized in data processing; one for manual editing and coding (10 persons) and the second one for data entry and computer validation (six persons) using the Statistical Analysis System (SAS). The Field Team manual and the Coding, Editing and Data Processing manual were used in these training courses. Three persons have been trained in the use of SAS software.

Ten persons received on-the-job training to conduct the coverage analysis and the statistical analysis of the census results. Ten persons were trained in the operation of the On-going Agricultural Statistics System.

The statistical capabilities of the local staff were much enhanced by the training programme. The effectiveness of the training program was reflected in the smooth execution of most census activities, which proceeded without major problems.

3.6 CENSUS DATA COLLECTION

The field organization was: enumerators conformed 20 field teams (5 in central division, 6 in western division, 5 in northern division and 4 in eastern division). Each field team had 3 or 4 or 5 or 6 enumerators, one field supervisor, one vehicle and one driver. A fleet of 25 vehicles from MPIC was used; some enumerators used motorcycles; most of the transportation in the eastern division utilized boats. The Principal Agricultural Officer (PAO) of each division conducted the administrative coordination with the support of his administrative and finance personnel. The technical coordination was conducted by the senior census counterpart (central and western divisions), the junior census counterpart (northern and eastern divisions) and the project manager (overall coordination). Five junior staff of the Statistics Unit worked on the coverage and quality control; also this personnel collected the data in the peri-urban sector. Six photo-interpreters (with their assistants, drivers and vehicles) played an important role in the field organization helping the enumerators to locate the SMs and to identify their physical boundaries on the field.

Data collection started on 10 June, 1991 with only 72 full-time enumerators instead of the 75 enumerators planned. During the field work four enumerators retired for sickness or technical reasons. This activity finished in most of the country during the second week of August, 1991 and in one province (Macuata) in the third week of the same month. Some enumeration occurred after working hours and on the week ends since some farmers were available only during this time.

An Internal Coordination Committee from MPIC headquarters was established. The committee held weekly meetings to monitor the progress of data collection and to solve not only technical but specially administrative and financial problems.

The publicity to promote the 1991 NAC started in April, 1991. The Information Division of MPIC conducted the census promotion through radio broadcasts in three languages: English, Fijian and Hindustani. Two pages on the census objectives, methodology, activities and data needs and uses were published in the special magazine of Fiji Times, the main country newspaper. Other census news were published in all country newspapers in different languages. A census poster was printed in three languages and distributed around the country. The cooperation of the farmers was exceptional. Even the on-going harvest strike of the sugar cane farmers helped census data collection, since enumerators were able to find the farmers at home.

Census data collection was conducted more or less within the allocated time frame (45 working days) with a field staff 10 % less than planned. There was only a problem in one small province (Lomaiviti), which had to be enumerated again. The massive participation of all MPIC technical and administrative divisions, assured the success of census field work. More than 120 persons, 25 vehicles and boats worked full time during three calendar months. It is the first time that the whole MPIC has participated in the census data collection.

3.7 A CLEAN DATA BASE CONTAINING RAW CENSUS DATA AVAILABLE IN A COMPUTER

Since MPIC did not have computer processing capabilities, Electronic Data Processing (EDP) of Fiji processed data from the 1968 and 1978 agricultural censuses. Since an On-going Agricultural Statistics System will be established, it was decided to build up data processing capabilities within MPIC and to use training resources available in EDP. MPIC acquired two IBM-compatible microcomputers (one with an 80386 processor), one dot matrix printer, a laser printer and a back up unit system. Two desktop microcomputers, one Laptop and one dot matrix printer were purchased under the project. Two microcomputers were borrowed from the regional project RAS/86/035 and a third one from EDP.

Since December, 1990 an international EDP consultant, on a part-time basis, helped MPIC in the data processing. Several meetings and discussions were held with the collaboration of the CTA of the regional project RAS/86/035, to select the software for processing the 1991 NAC. Software like USP, DBASE IV and SAS were analyzed and tested. Finally SAS was selected and EDP provided it at no-cost to MPIC since the package is used by other government institutions. A tabulation plan containing a set of 35 tables was prepared. A graduate trainee was contracted by MPIC at end of January, 1991 and has been trained on-the-job in data processing using SAS.

The filing of more than 11,200 questionnaires (around 9,600 main questionnaires containing farm data), manual editing and coding started on 19 August, 1991. Two persons managed the archives of census materials (questionnaires, cartography and photo-enlargements, etc.). Five coders were contracted and trained using the Field Team Manual and the Coding, Editing and Data Processing Manual. Two table heads checked the manual editing and coding.

Data entry into the computers was conducted by four hired persons. Another contracted person validated the data in the computers. This activity finished in January, 1992.

A team of ten persons (coders and data entry clerks) worked under supervision of ESCAP/EPOC Consultant to prepare a clean data base and to produce preliminary and final aggregates of the census results. This activity ended in April, 1992.

The international EDP consultant left Fiji in October, 1991. For this reason production of final results was delayed for another one month and half.

MPIC contracted a local consultant financed by AIDAB to correct, adjust, improve and complete the SAS software development to get the final aggregates. But, due to time constraints it was not possible to develop SAS to produce sampling errors. They were calculated manually for principal variables.

MPIC did not have personnel and equipment capabilities to process large data files produced by an agricultural census. The 1991 NAC allowed to MPIC to build up these capabilities.

3.8 PROVISIONAL AND FINAL REPORTS ON THE AGRICULTURAL CENSUS

Provisional reports were produced as early as October, 1991. Manual tabulations of three important variables (number of farms, total land under farms and number of cattle) were prepared to cross-check the information coming from the computers. Both, provisional reports and manual tabulations, were used together to conduct the coverage analysis and consistency analysis. Then, statistical analysis of the sampling errors (calculated manually under supervision of ESCAP/EPOC Consultant) determined that post-stratification techniques had to be used in one province (Namosi). A basic socio-economic analysis was performed comparing the 1991 NAC with other data sources, such as the 1968 and 1978 agricultural censuses, population censuses and some current "SUBJECTIVE" numerical data produced by MPIC, Fiji Sugar Corporation and other institutions. Finally, the results were presented and analyzed with staff of different divisions of MPIC and other institutions.

3.9 1991 NATIONAL AGRICULTURAL CENSUS STAFF

Name	Function	Dates of Service: Starting Date	Concluding Date
International			
G. Otanez	Chief Technical Adviser	April 1990	April 1992
E. Albarracin	ASF Consultant 1/	Feb. 1992	April 1992
National			
Nemani Buresova	Deputy Permanent Secretary 2/	May 1990	April 1992
Statistics Unit			
Deo Narain	Principal Economist	May 1990	Dec. 1991
Saklusa Tubuna	Economic Planning Officer	May 1990	April 1992
Suman Singh	Senior Computer Operator	Feb. 1991	April 1992
Philiph Rebakis	Data Processing Adviser 3/	Dec. 1990	Sept. 1991
Pabendra Singh	Data Processing Consultant 4/	Jan. 1992	April 1992
Prakash Chand	Senior Agriculture Assistant	May 1990	April 1992
Five	Clerk	Aug. 1990	April 1992
Six	Data Entry Clerk	Aug. 1991	April 1992
Five	Coder	Sept. 1991	April 1992
One	Driver	May 1990	April 1992
Land Use Section			
Valume Tora	Senior Research Officer 2/	Oct. 1990	Aug. 1991
Six	Photointerpreter 5/	Feb. 1991	Aug. 1991
Three	Assistant	May 1991	Aug. 1991
One	Driver	May 1991	Aug. 1991
Extension, AH & P, A.D. P., D & I, and other Divisions			
	20 Field Supervisors	May 1991	Aug. 1991
	72 Enumerators	May 1991	Aug. 1991

1/ Short Term Consultant from ESCAP/EPOC
2/ Part-time
3/ Part-time from EDP
4/ Part-time local Consultant financed by AIDAB
5/ One From Lands Department

3.10 1991 NATIONAL AGRICULTURAL CENSUS TIME-TABLE

ACTIVITY	1990 M	J	J	A	S	O	N	D	1991 E	F	M	A	M	J	J	A	S	O	N	D	1992 J	F	M	A	M
Meetings of Census Committee		J	J			O		D				A												A	
Publicity												AAAAMMMMJJJJJJJJ												AAAA	
Final Recommendation on Census Methodology	MMMMJJJJ																								
New Aerial Photography			JJJJAAAASSSSOOOON																						
ASF Construction						OONNNNDDDD			JJJJFFFFMMMMAAAAMMMM																
Sample Design and Selection of Segments				AAAASSSSOOOONNNNDDDD					JJJJFF																
Preparation of Census Materials						OONNNNDDDD			JJJJFFFFMMMMAAAA																
Training of Field Staff												AMMMM													
Field Data Collection														JJJJJJJAA											
Data Processing																AASSSSOOOONNNNDDDD									
Data Analysis, Publication and Dissemination																					JJJJFFFFMMMMAAAA				
Design of the On-Going Agricultural Statistics System																								MMMMAAAAMM	

CHAPTER 4. THE AREA SAMPLING FRAME (ASF) METHODOLOGY

4.1 A BRIEF HISTORY

The area sampling was regularly used in Europe during the 1920 and 1930 decades in countries, such as Bulgaria, Italy, Poland, Swedish, etc. using large sampling units (areas) selected in the contest of purposive sampling.

For agricultural surveys, the first significant test of probability area sampling in the United States, using small areas as sampling units, occurred in Iowa. Two surveys, one in 1938 and the other one in 1939 were conducted by the Iowa State University in cooperation with the Bureau of Agricultural Economy. A stratified random sample of 900 small areas (each of 0.7 Km2) was selected. One outgrowth of this test of area sampling was the development, by 1945, of an Area Sampling Frame (ASF) for all country. The main objective of this ASF was to produce agricultural data with better degree of precision and opportunity than those produced by the current methodologies being used at that time (mail surveys, random point and quota sampling).

At the same time (1940 decade), but independently, India was developing a similar system to correct, adjust and improve the current data on crop yields. The crop yield data were produced by the field staff of the Ministry of Agriculture of each State Government based on their "SUBJECTIVE JUDGMENT AND PERSONAL KNOWLEDGE" of their working area.

In conclusion, the ASF methodology has been developed and is being applied through the world as an efficient alternative to solve the problems created by other methodologies varying from probability and non-probability sampling to subjective judgment.

4.2 OUTLINE OF THE ASF METHODOLOGY

The AREA SAMPLING FRAME (ASF) methodology was used to conduct the 1991 NAC. This methodology will also set up the basic sampling structure to establish the On-Going Agricultural Statistics System of Fiji.

The concepts of ASF methodology are very simple: divide the total area of the country into **N** small blocks (known as SMs) that have physical boundaries which can be accurately identified on site by the enumerator, without any overlap or omission; select a random sample of **n** blocks (SMs); collect the census data only on the **n** selected blocks (SMs); process (aggregate) in office field data to obtain **sample totals**; and estimate **POPULATION TOTALS** by multiplying the **sample totals** by the **EXPANSION FACTOR N/n**. The minimum requirements for the application of ASF is to have maps and aerial photography.

EXAMPLE: Assume total area of Viti Levu island is 10,000 Km2 and that the MPIC Minister needs to know the area of dalo planted during the first semester, 1991.

STEP 1: Total area of Viti Levu (10,000 Km2) is divided in 1,000 small blocks (SMs) of 10 Km2 each (see figure 4.1).

Then: **N = 1,000**

STEP 2: A random sample of 20 small blocks (SMs) is selected (see figure 4.1).

Then: **n = 20**

STEP 3: The enumerator goes to the field and finds that 136 farms planted dalo in 15 out of the 20 selected small blocks or SMs (this means that in 5 blocks or segments nobody planted dalo).

Then: 136 questionnaires were implemented by enumerator (one for each farm with dalo).

STEP 4: In the office the area planted with dalo on the 136 questionnaires is added (15 out 20 small blocks or SMs), getting a total of 125 Has.

Then: **sample total = 125 Has planted with dalo**

STEP 5: Estimate the **POPULATION TOTAL** by multiplying the **sample total** by **EXPANSION FACTOR.**

Then: **POPULATION TOTAL = EXPANSION FACTOR * sample total**

= N/n * sample total

= 1,000/20 * 125 Has

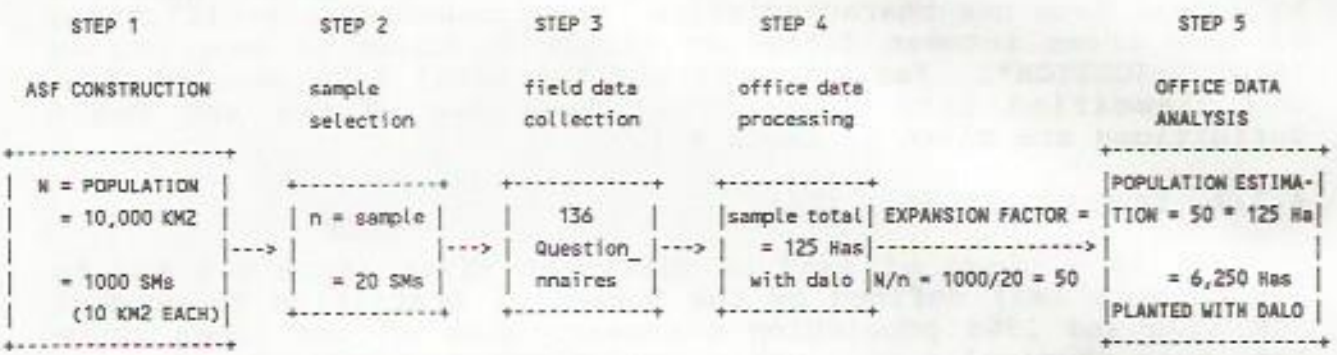
= 50 * 125 Has

= 6,250 Has

CONCLUSION: The answer to the MPIC Minister will be that on Viti Levu island **6,250 Has** have been planted with dalo during first semester, 1991.

FIGURE 4.1

1991 NAC OF FIJI: STEPS OF THE ASF METHODOLOGY



4.3 BASIC TERMS

4.3.1 Reporting Unit

It is the individual unit or element that belongs to the total universe or population defined for the 1991 NAC for data collection (reporting) purposes. The **"FARM"** is the reporting unit for 1991 NAC. One questionnaire **"MUST"** be filled out for EACH farm.

4.3.2 Universe or Population of the 1991 NAC

It is composed of all farms (reporting units) existing in Fiji on the census day.

4.3.3 Target Population

It is the population which, given full freedom of choice, one might wish to include in the agricultural census; but, for various practical reasons, the population actually enumerated in the agricultural census could be different from the target population. For example, in the case of the 1991 NAC of Fiji, it was decided not to conduct the census enumeration in the urban sector (cities and towns) and in 100 % forestry and non-agricultural lands.

4.3.4 Sampling Unit

It is the unit selected in the sample at random. In 1991 NAC the Segment (SM) is the sampling unit.

4.3.5 Area Sampling Frame (ASF)

It is the complete list of SMs (sampling units) that covers the universe or population of 1991 NAC. This ASF is on topographic maps scale 1:50,000.

4.3.6 Stratum

It is a homogeneous grouping of land areas classified by actual land use characteristics. The process of classification of land areas between different strata is known in sampling as "STRATIFICATION". For the 1991 NAC the total land area of Fiji was classified into nine actual land use strata and their definitions are given in table 5.1.

4.3.7 Enumeration Area (EA)

It is a piece of land of different sizes (from 0.5 km2 to 200 or more km2) defined by the Bureau of Statistics to conduct the 1976 and 1986 population censuses. Most of the times these EAs have physically observable land marks (boundaries), such as roads, streams, rivers, ditches, etc. on the topographic maps scale 1:50,000. Each EA is identified by a permanently assigned identification. The 1991 NAC used these EAs for the stratification, measurements of areas, construction and selection of the SMs in the sample.

4.3.8 Segment (SM)

A SM is a piece of land (block) usually smaller than an EA and always defined by physical land marks (boundaries), that MUST be observable on the photo-enlargements and on the ground. Each SM is identified by a permanently assigned identification number and is outlined in RED on the aerial photo-enlargements (scales around 1:10,000, 1:6,000 and 1:4,000). In fact each EA has been divided in SMs of different sizes (0.1, 0.5, 1, 2 and 3 km2). See column fifth of table 5.1.

4.3.9 Tract

It is a portion or subdivision of a SM under one management. It is either an entire farm, part (s) of a farm or a non-farm area of land. That is, the tract is determined by the definition of a farm and the boundaries of a SM. Then we also could define a tract as any piece of land entirely surrounded by other land, water, road, forest, etc. not forming part of this farm. A farm is composed of one or more tracts. The SM boundaries divide a continuous farm that is overlapping the SM boundaries, in two or more tracts (see figure 6.1 in chapter 6). The farm definition is in section 4.4 of this chapter.

4.3.10 Sampling Efficiency

It refers to the sampling variance for one plan (that is, a specific method of sampling and estimation) in comparison with the sampling variance for another. Sampling variances are usually compared under the assumption of equal sampling fractions or of equal costs. Unless otherwise is specified, "sampling efficiency" will refer to the comparison of alternatives under an assumption of equal sampling fractions.

4.3.11 Cluster Sampling

It is the general term for sampling plans wherein the sampling units are groups (clusters) of reporting units. An area sampling unit is a "cluster" of reporting units (farms) associated with a SM. Therefore, ASF is a form of cluster sampling and the theory of cluster sampling applies.

4.3.12 Coverage Error

It refers to the incorrect determination of the total land area that composes a reporting unit (farm) and a selected sampling unit (SM).

4.3.13 Response Error

It refers to omission and duplication of reporting units (farms) and selected sampling units (SMs).

4.4 BASIC CONCEPTS AND DEFINITIONS OF THE 1991 NAC

4.4.1 Farm

It is an "ECONOMIC UNIT" of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form, or size. Single management may be exercised by an individual or household, jointly by two or more individuals or households, by a clan, village, or by a juridical person such as a corporation, cooperative or government agency. The farm land may consist of one or more tracts, located inside or outside the SM, in one or more separate areas or tikinas, but inside the same province, providing the tracts share the same "PRODUCTION MEANS" utilized by the farm, such as labor, farm buildings, machinery or drought animals.

4.4.2 Characteristics for Identifying a Farm

a. Any piece of land to be considered as an agricultural farm MUST have at least 50 m2 (approximately 0.01 Has) with at least one of the following land uses on the census day:

- Temporary and permanent crops (pure and mixed stands) and forages;
- Fallow one year or less;
- Fallow more than one year, but less than three;
- Improved (planted exotic and native) and unimproved pastures.

b. Any piece of land without any of the conditions mentioned above, but has any of this livestock on the census day, MUST be considered as a farm:

- At least one cattle head.

- At least one goat, or one pig, or one horse, or one sheep.

- At least one poultry.

c. Any livestock or poultry belonging to managers, administrators, workers, or relatives, that graze or stay in lands of farms where these persons are working or staying. In this case, the managers, administrators, etc. are the farmers and the livestock and poultry the farms. This situation is known as FARM WITHOUT LAND, and only chapters I, XII-XIX of questionnaire NAC-2 have to be implemented. Also in this category is any piece of land of less than 50 m2, but it has livestock or poultry.

d. Any land assigned to managers, administrators, workers relatives for their own utilization for service payments, MUST be considered as an independent farm from the main one that is assigning the land.

e. If a land is operated independently by a household member for agricultural production, it MUST be considered as a farm different from the farms operated by other household members.

f. Any land operated by persons who do not have any rights for agricultural use of the land on which the crops, trees or pastures are grown, MUST be considered as a farm.

g. Various economic agricultural production units under the same ownership, or under the same general direction, are considered separate farms if they are operated by different persons.

h. If a member of a cooperative, religious organization, government agency, clan or village (mataqali) is assigned a separate land for agricultural production (including livestock and poultry) that is operated under the member's management, and for which he/she has general technical economic responsibility, then this land MUST be considered as a farm.

i. If a cooperative, religious organization, government agency, clan or village (mataqali) has a specified communal land delimited by fencing, or any other form of boundary demarcation and if its use for agricultural production and specially for grazing purposes is supervised, then this land MUST be considered as a farm.

j. There are many farms operated by farmers having other occupation (s) in addition to being a farmer.

k. The farm definition does not consider its land tenure. This means the land conforming the farm could be total or partially owned, leased, mataqali or under other forms.

1. Economic units engaged solely in the following economic activities are not considered agricultural farms because these economic activities are outside agriculture:

- Hunting, trapping and game propagation;

- Forestry and logging;

- Fishing;

- Agricultural services.

These are considered NON-FARM tracts. Other examples of non-farm tracts are: lakes, swamps, mangroves, buildings, schools, etc.

4.4.3. Farmer

He is a civil or juridical person who exercises management control over the agricultural farm operations and takes major decisions regarding resource use. The farmer has technical and economic responsibility for the farm and may undertake all responsibilities directly, or delegate responsibilities related to day-to-day work management to a hired manager.

The work of a farmer can be material, when he conducts directly by himself the physical agricultural activities of the farm, or only intellectual, like in the case of that farmer who lives in the city, and travels periodically to the farm, or not, but takes the major decisions on the farm operation.

It is important to take in account the following considerations in the determination of a farmer:

a. It always MUST be a one-to-one correspondence between a farmer and a farm.

b. In rural areas, a one-to-one correspondence between a farm (farmer) and a household is quite common. Thus households serve to identify farms.

c. In most of the cases the farmer is a person. But, in some households can be more than one farmer, when each person operates different(s) piece(s) of land. Then, each piece of land becomes a farm. However, if the agricultural operations and the production obtained in all those pieces of land are communal for all members of household, there will be only one farmer and only one farm. In this case, the farmer will be the household member, who spends more time in the farm; and if more than one person spend equal time, the farmer will be chosen accordingly these priorities: father, mother, eldest son and so forth. The other household members participating in the work of the farm will be regarded as members of the labor force of the farm.

d. When two or more persons belonging to different households operate the same farm, each one will be considered as

JOINT farmer. The information related with farmer household will be collected separately from each household of the joint farmers.

e. A farmer can operate a land that is owned and/or leased and/or under any other form of land tenure.

f. A farmer can operate a land without any rights to agricultural use of that land.

g. A hired manager or administrator will not be considered as the farmer of the farm he is managing. However, if he has livestock and poultry in the land of the farm, which he operates, then he will be considered as a farmer of a farm without land.

h. When a manager, administrator or any worker of the farm, has received a land for his own use, then he will be considered as a farmer.

4.4.4 Field

A field is a continuous piece of land inside a tract devoted to one crop in pure or mixed stand or any other land use. A tract may consist of one or more fields adjacent to each other. If a tract has several crops (or mixed crops), the area of each crop is a field. If a crop has been planted on different dates, or on lands with different land tenures then each of these situations is a field.

4.4.5 Census Year

It is the year from 1 July, 1990 to 30 June, 1991.

4.4.6 Census Day

It is the day when the census enumerator effectively conducted the total interview to the farmer (June, July and August of 1991).

4.4.7 Informant

Informant is the person from whom data are collected about the farm or the non-farm. Normally is the farmer or the operator of a non-farm. But sometimes, it could be a qualified person that knows very well about the information being collected, such as the manager, administrator, competent worker or an old farmer's relative.

4.4.8 Hectare

It is a metric unit used universally in measuring land area. One hectare is equal to 10,000 square meters (100 ms by 100 ms).

4.4.9 Acre

It is another unit used in measuring land area in Fiji. One acre is equal to around 4,050 square meters or 0.405 hectares (63.64 ms by 63.64 ms).

4.5 PERIOD OF REFERENCE OF THE 1991 NAC

4.5.1 Census Day

Farm and farmer's identification (names); farmer's information: legal status, sex, age, race, education; total land and actual land use operated by the farm; land tenure of the farm; permanent crops in "Pure Stand" and permanent crops in "Mixed, Interplanted and Associated Stands"; scattered plants, trees and vines; type of pastures; number of livestock and poultry; machinery owned by farm.

4.5.2 Last Week (Monday Through Sunday)

Farmer's main occupation; employment; farmer's household population.

4.5.3 Census Year (From 1 July of 1990 to 30 June of 1991)

Temporary crops in "Pure Stand" and temporary crops in "Mixed and Interplanted Stands"; main purpose of farm produce; hired and/or borrowed machinery; use of fertilizers; farm management; existing of fisheries activities.

4.6 ADVANTAGES OF THE ASF METHODOLOGY

4.6.1 Versatility

Possible uses of ASF are unlimited. The survey population could be composed of reporting units that are households, farms (holdings), persons, plants, animals, suppliers of agricultural inputs, tractors, plots of land, grain storage facilities, processors of agricultural products, or any other definable reporting units that can be uniquely associated with sampling units (SMs).

4.6.2 Coverage

Conceptually an ASF is always current and complete with regard to any definition of reporting unit since the total number of sampling units (SMs) **N** in the population and the number **n** in the sample are always known. Hence, the sample can be expanded regardless of how a reporting unit is defined (the farm in the case of 1991 NAC). It is important to point out that one does not need to know the number of reporting units (farms) in the population in order to apply ASF methodology. In fact, from the ASF one can estimate the number of reporting units (farms) in the population.

4.6.3 Updating

An ASF does not come out-of-date in terms of coverage of a population unless the population extends into areas not covered by the ASF (for example new agricultural settlement areas, which were not included in the original ASF). Changes in land use or number and location of reporting units (farms) have a bearing on the sampling variance but do not introduce bias.

4.6.4 Efficiency

The characteristics of an ASF methodology have an important bearing on the **QUALITY** of results from a survey since serious biases and low sampling efficiency or both might be the result of deficiencies in the sampling frame. For example, obtaining and maintaining a complete and up-to-date list of farms, classified by type and size, it is a very difficult task in developing countries (even developed countries).

4.6.5 Applicability

ASF methodology is often needed because of deficiencies in, or absence of, list frames. As pointed out above an ASF is always conceptually complete. There are three general situations pertaining to the application of ASF methodology: List Frame nearly adequate, List Frame covers part of population, adequate List Frame not available.

4.7 DISADVANTAGES OF THE ASF METHODOLOGY

4.7.1 Less Efficient than a List Frame

An ASF would be less efficient for sampling purposes than an up-to-date list, classified by type of farm and size of farms. However, such a list at the regional and national level seldom exists.

4.7.2 Inadequate for Rare Items

An ASF is not efficient for estimating rare items in a general purpose survey. However, the ASF can be used in conjunction with a List Frame for these rare items to combine the advantages of both frames.

4.7.3 Lack of Sufficient Boundaries

In some countries, or in some regions within a country, there may be a serious lack of acceptable boundaries. The quality of the ASF is reduced by inadequate boundaries.

CHAPTER 5. THE ASF CONSTRUCTION

It is the division of total area of Fiji into SMs, without any overlap or omission, that have physical boundaries. The main activities of the ASF construction in Fiji were: stratification, construction of the SMs and their selection.

5.1 RESOURCES USED

The resources used to construct the ASF can be described in terms of materials (cartography, aerial photography, equipment and other materials), personal and space. It was determined that they were enough adequately available to complete the task of ASF construction.

5.1.1 Cartography

The Lands Department provided topographic maps scale 1:50,000 which were well suited for a permanent record of the ASF and selected SMs. The same maps were available at Bureau of Statistics containing the Enumeration Areas (EAs) for 1976 and 1986 population censuses. Most of these EA boundaries were linked to physical features.

The Land Use Section of MPIC had land use maps scale 1:50,000 prepared with aerial photography used in 1978 agricultural census. These maps contained good information that was utilized in the stratification process. Other institutions had different type of maps, such as land maps and forest maps.

5.1.2 Aerial Photography

MPIC got the financial resources needed to take new aerial photography. A private Australian company was contracted to take new aerial photography on a scale 1:16,000. Since this activity started late, weather conditions permitted coverage of only 70 % of the two main islands. The 1982-86 aerial photography (scale 1:50,000) and sometimes 1978 aerial photography (scale 1:24,000) were used for the areas not covered by the new photographs.* The Aerial Survey Section of Lands Department coordinated, monitored and checked the accuracy and quality of new aerial photography and later on provided the contact prints and photo-enlargements.

5.1.3 Equipment

MPIC purchased portable "Planix 7 Tamaya" digital planimeters calibrated for both English and metric scales. Also a machine was acquired to laminate the photo-enlargements with thin plastic. These enlargements were used by enumerators on the field. Available micro-computers at Statistics Unit of MPIC were used to make the listing of SMs and to record the sample selection.

5.1.4 Miscellaneous Materials

Almost all the miscellaneous materials, such as scissors, paper cuter, rulers, magnifying glasses, colored pencils, light tables, masking tape, china markers were available, either at the Land Use Section of MPIC, or purchased at local market. Only the permanent marking pens (Staedtler) and clear acetate (3 mil in 40 inches wide and 100 feet long) were imported from USA by UNDP/FAO/ FIJ/89/004 project.

5.1.5 Personnel

The Land Use Section of MPIC had enough staff with experience in photointerpretation, knowledge of geographic areas, ability to use cartographic procedures and ability to use independent judgment, who helped in the ASF construction. Besides, a group of 13 junior staff contracted by Statistics Unit of MPIC received on-the-job training and worked through all activities of ASF construction. Also a photointerpreter from Lands Department collaborated in these tasks.

5.1.6 Space and Facilities

Since space at MPIC headquarters was too small, ASF construction was conducted at Land Use Section in Koronivia Research Station, which is located 18 Kms from Suva city. This place had adequate space and storage facilities.

5.2 THE STRATIFICATION

5.2.1 General Definition

Briefly stated, stratification is a sampling technique that consists of four steps. 1) The entire population of sampling units (SMs) is classified into distinct subpopulations called strata according with characteristic(s) of the population. 2) Separate samples are selected independently from each stratum. 3) The separate statistics (totals, means, proportions, etc.,) from each stratum are weighted and combined into overall estimates. 4) Variances of those estimates are weighted and added into overall estimates.

The stratification technique is used for four principal motivations (alone or together). 1) Stratification reduces variances for given effort, measured either in the size of the sample or in costs. 2) Stratification may be used to avoid suffering from bad or distorted random samples. 3) Stratification facilitates to create domains of desired samples sizes. Domains are subpopulations that may contain several, even many, strata; for example, large areas such as provinces may be divided into many strata before selections. 4) Stratification facilitates using different methods and procedures for diverse portions of the sample. For example, farmers may live in villages in some provinces, but in the open country in others and therefore, different procedures may be suited to each.

5.2.2 The Stratification and ASF Construction

The utilization of land for agriculture varies by areas. If, we classify the SMs as either suitable or unsuitable for cultivation, we could improve our sampling efficiency for estimating crop land by sampling the "cultivated" SMs at a higher rate than the "uncultivated" SMs. We also achieve lower sampling errors, thereby giving us more confidence that our sampling provides reliable estimates of the population totals.

Before we try to define the stratification used in Fiji, we should have in mind what types of variables our ASF will be used for and the kind of estimates we want to produce. If we were interested only in sugar cane, for example, we would construct our ASF to maximize its efficiency for sugar cane with little regard for other items, such as corn or livestock or coconuts. In this case we will want to create only two strata, sugar cane and non-sugar cane, greatly simplifying our design. But, this was not the case in the 1991 NAC of Fiji.

In the 1991 NAC data were needed for many components of agricultural production as well as socio-economic data of the farm and farmer. This meant that our design must support multi-use or general purpose survey. While this permits greater utilization of our ASF, it also requires more consideration in our design to assure we could meet various census objectives.

The census estimates were needed at national and provincial levels. Therefore, the 14 provinces and Rotuma island conformed 15 independent "DOMAINS OF STUDY". The land use measured through the percentage of cultivation was used as the stratification variable within each domain of study. The number of strata formed and their definitions can be seen in table 5.1.

The entire country was divided into nine strata according to the importance, intensity and type of the agriculture (land use). They were further subdivided into a total of 21 sub-strata (see columns two and three of table 5.1) according with land use too. For example, stratum 10 has five sub-strata for sugar cane (11), other permanent crops (12), rice (13), other temporary crops (14) and mixed crops (15); stratum 40 has two sub-strata for cultivated pastures (41) and grazing lands (42). This sub-stratification technique guaranteed the sample allocation between crops. Stratum 80 was created for special farm areas cultivated by crops which are very well located, such as the research stations of MPIC; stratum 90 contains complete large farms (500 has and more), such as Salialevu freehold in Taveuni (5,560 has), which boundaries were possible to be drawn on the ASF using the existing information on land maps of Lands Department.

TABLE 5.1. 1991 NAC OF FIJI: DEFINITION OF THE STRATIFICATION BY ACTUAL LAND USE.

STRATUM	SUBSTRATUM	DEFINITION IN WORDS	% OF AREA UNDER	SM SIZE (KM2)	COLOR
10		Areas cultivated from 70 to 100 % by temporary, and/or permanent crops	70-100 CROPS	0.5, 1.0	Yellow
	11	Sugar cane			
	12	Other Permanent crops			
	13	Rice			
	14	Other temporary crops			
	15	Mixed crops			
20		Areas cultivated from 30 to 69 % by temporary, and/or permanent crops	30-69 CROPS	0.5, 1.0	Pink
	21	Sugar cane			
	22	Other Permanent crops			
	23	Rice			
	24	Other temporary crops			
	25	Mixed crops			
30		Areas cultivated from 10 to 29 % by temporary, and/or permanent crops	10-29 CROPS	0.5, 1.0	Purple
	31	Sugar cane			
	32	Other Permanent crops			
	33	Rice			
	34	Other temporary crops			
	35	Mixed crops			
40		Areas covered from 91 to 100 % by improved pastures (planted exotic and/or native) and/or unimproved native pastures (grazing lands)	91-100 PASTURES	1.0, 2.0 3.0	Orange
	41	Cultivated pastures			
	42	Grazing lands			
50		Areas covered totally by planted and/or natural forest	100 FOREST	NO CENSUS	Light Green
	51	Planted forest			
	52	Natural forest			

TABLE 5.1. (Continuation)

STRATUM	SUBSTRATUM	DEFINITION IN WORDS	% OF AREA UNDER	SM SIZE (KM2)	COLOR
60		Non-Agricultural land	100 NON-AG	NO CENSUS	Brown
70		Urban and Peri/Urban areas.	100 CITIES		Blue
	71	Cities and towns		NO CENSUS	
	72	Peri-urban		0.1	
80		Special farm areas cultivated by crops located only in few places	100 SPECIAL	Any size	Dark Green
90		List of important farms like big cattle or coconut farms, when their boundaries were possible to be drawn on maps scale 1:50,000	100 COMPLETE FARMS	Any size	Red

The 895 existing EAs (646 rural and 249 peri-urban) from 1886 population census were laid down and shown on the ASF topographic maps scale 1:50,000 to apply the defined stratification according to land use. Each EA was classified into one of the nine strata keeping the same geographical identification codes of population census. Different colors for each stratum (see last column of table 5.1) were utilized to identify the EAs on the maps. Since EAs were ranging from 0.1 km2 to more than 300 km2 and had large areas under 100 % of forest (stratum 50) and/or non-agricultural land (stratum 60) with small areas of agricultural land, they were modified to adjust to defined stratification. The modification was done using physical boundaries. The percentage of area under crops, pastures, forest, etc. (land use) of each EA was estimated "by eye" to check that each EA was classified in the right stratum and sub-stratum. This percentage was recorded in listing sheets containing basic information for ASF construction (see column ninth in table 5.2). When this percentage was very close to the land use interval limits of another stratum (for example, 70 % under crops of stratum 10 is bordering the upper limit of stratum 20), the "eye" estimation was verified by measuring the area by planimeter, dot grid or counting boxes.

The stratification activities were conducted by photo-interpreters using their knowledge of the country, topographic maps, land use maps and contact aerial photographs (new and old ones) and other information, such as forest and land maps.

Then the areas of all EAs (modified and unmodified) were calculated by means of portable digital planimeters and compared with provincial and country areas from the Lands Department and other sources.

5.2 IDENTIFYING, MEASURING AND RECORDING AREAS OF EAs

The 1986 population census EAs were numbered with the same geographical identification codes used by Bureau of Statistics. Each EA had seven digits, the first two for province, the second two for tikina and next three for EA. When an EA was modified a letter was added to the three EA codes, "Z" for stratum 60 (100 % forest), "Y" for stratum 60 (100 % non-agricultural land), "X" for stratum 80 (special farms) and "W" for stratum 90 (large farms in the list). The identification codes of stratum (two digits) and substratum (two digits) were the same of table 5.1 columns one and two. Table 5.2 presents an example of the basic information used in the ASF construction in Cakaudrove tikina of Cakaudrove province. Original EA No 0301011 was modified in three parts: 1) EA No 0301011 itself was stratified in stratum 10, substratum 12; 2) EA No 0301011Y was classified in stratum 60; 3) EA No 0301011W was assigned to stratum 90 (see table 5.2).

Portable digital planimeters were used to measure EA areas. A planimeter reading was obtained for each EA on each map page. The measurement of an area by planimeter was an average reading established by a series of three measurements in km2, accurate within two decimal places. The average reading were recorded in listing sheets of EAs classified by province and tikina (see column fifth in table 5.2).

The topographic maps scale 1:50,000 had grids with two by two cms squares (boxes). Each square (box) was equivalent to 1 km2. Independently, other team members counted complete and incomplete squares (boxes) within each original EA (without modification). Total of incomplete boxes was divided by two and added to the total number of complete boxes to get a new and separate measurement of original EA areas (see columns 6, 7 and 8 of table 5.2).

If the difference between the average planimeter reading and square counting area measurement was more than 10 % both processes were repeated with completely new measurements until agreement was reached. For example, original EA No 0301011 had an area of 22.5 km2 which was obtained by counting boxes. Since this EA was modified the planimetered area of the new three components was 23.6 km2 (EA No 0301011 itself with 15.9 km2, EA No 0301011Y with 2.3 km2 and EA No 0301011W with 5.4 km2). The difference (1.1 km2) is less than 10 %, so the planimetered area (23.6 km2) was accepted.

TABLE 5.2. BASIC INFORMATION OF ASF CONSTRUCTION IN CAKAUDROVE TIKINA OF CAKAUDROVE PROVINCE

EA No	HOUSE-HOLDS 1986	STRA-TUM	SUB-STRA-TUM	PLANI-METERED AREA (km2)	NUMBER OF BOXES (SQUARES) COMP-LETE	INCOM PLETE	AREA (km2)	% LAND USE	REMARKS
0301011	98	10	12	15.9	10.0	12.5	22.5	95	FOREST
0301021	146	30	32	23.5	30.0	22.5	52.5	15	GRASSLAND & FOREST
0301031	81	30	32	30.7	31.0	16.5	47.5	20	GRASSLAND & FOREST
0301041	90	30	32	22.3	14.0	12.0	26.0	25	GRASSLAND
0301051	64	30	32	11.2	14.0	14.0	28.0	18	GRASSLAND
0301061	27	30	32	30.2	12.0	18.0	30.0	12	GRAZING & FOREST
0301071	170	10	12	4.4	6.0	8.5	14.5	70	FOREST
0301081	195	10	12	10.1	10.0	13.0	23.0	80	MANGROVES & FOREST
0301091	144	20	22	20.1	32.0	16.0	48.0	50	FOREST
0301101	136	10	12	20.8	30.0	16.5	46.5	80	FOREST
0301111	180	10	12	19.1	13.0	10.5	23.5	90	LIGHT FOREST
0301121	87	10	12	10.0	97.0	54.5	151.5	70	FOREST
0301131	178	10	12	18.3	27.0	13.5	40.5	80	FOREST
0301141	28	30	32	15.1	18.0	7.5	25.5	10	FOREST
0301121W	-	90	-	39.0	(SALIALEVU FREE/HOLD)			100	-
0301121Z	-	50	52	91.2				100	-
0301101W	-	90	-	16.6	(SALIALEVU FREE/HOLD)			100	-
0301101Z	-	50	52	8.5				100	-
0301091W	-	90	-	5.4	(CATHOLIC CHURCH)			100	-
0301071Z	-	50	52	6.8				100	-
0301071W	-	90	-	3.0	(CARPENTERS)			100	-
0301081Z	-	50	52	8.8				100	-
0301081W	-	90	-	0.4	(CARPENTERS)			100	-
0301081W	-	90	-	0.02	(CARPENTERS)			100	-
0301081W	-	90	-	2.7	(CARPENTERS)			100	-
0301091Z	-	50	52	17.4				100	-
0301011W	-	90	-	5.4	(VUNILAGI MPI FREEHOLD)			100	-
0301011Y	-	60	-	2.3				100	-
0301021Z	-	50	52	32.3				100	-
0301031Z	-	50	52	21.8				100	-
0301041Z	-	50	52	2.8				100	-
0301051Z	-	50	52	8.2				100	-
0301131Z	-	50	52	6.7				100	-
0301131W	-	90	-	1.3	(CARPENTERS)			100	-
TOTAL	1624	-	-	532.3			579.5	-	-

After EA areas were determined and approved, they were up-to-dated in micro-computer using LOTUS 123 software in a format similar to table 5.2. This table also contains the number of households (1986 population census) which was very useful information for stratification and sampling design purposes. The last column of remarks in table 5.2 shows the land use of the remaining area of the EA which was not under cultivation. For example, 95 % of the area of EA No 0301011 is under crops (stratum 10) and the remaining 5 % (0.8 Km2) of its area of 15.9 km2 is under forest. Then, EA areas were added and their total compared with areas from Lands Department and Land Use Section of MPIC by tikina and province. If the differences between the three sources were more than 10 %, ASF areas were checked again. Finally, the EA areas of ASF were accepted since they did not differ more than 10 % in all provinces.

5.3 THE CONSTRUCTION AND SELECTION OF SMs

After the EAs were stratified and identified and their areas were calculated, they were sorted into the nine strata (see table 5.3). The next step was to divide each EA in SMs. Previously the SM sizes were fixed by stratum and province according technical specifications described in numeral 6.1 of chapter 6.

The number of SMs of each EA was calculated based on its planimetered area and the SM size assigned previously (see columns fifth of table 5.1 and table 5.2). For example, ten SMs of 1 km2 were calculated for EA No 0301121 of stratum 10 in Cakaudrove tikina of Cakaudrove province.

The squares or boxes of one km2 (two cms by two cms) existing on topographic maps scale 1:50, 000 were used to divide each EA in SMs (0.5, 1, 2 and 3 km2). Neighboring incomplete boxes were matched to complete the assigned SM sizes. When the SM size was 0.5 km2 each complete box contained two SMs. A special grid with boxes of 0.1 km2 was used to divide the sub-stratum 72 (peri-urban) in SMs. Since 1991 NAC was not conducted in stratum 50 (100 % forest), stratum 60 (100 % non-agricultural land) and sub-stratum 71 (urban: cities and towns) SMs were not formed in these strata. SMs also were not constructed in strata 80 and 90 containing a list of special and large farms (see table 5.3).

The constructed SMs of each EA were numerated in a serpentine pattern, beginning in its northeast corner and proceeding throughout the EA, ending in either the southwest or southeast corner. Then the number of SMs of each EA was cummulated at stratum level (see column 6 of table 5.3). A systematic sample was selected within each independent stratum. For example, a systematic sample of ten SMs out of 105 SMs was selected in stratum 10 of Cakaudrove province as follows:

Selection Interval (SI) = No of Total SMs / No SMs in sample

SI = 105 / 10 = 10.5

Random Star (RS)	=	9.8	First SM selected
	+ SI	10.5	
		20.3	Second SM selected
	+ SI	10.5	
		30.8	Third SM selected
	.....		n SM selected
	+ SI	10.5	
		104.3	Tenth SM selected

5.4 PHOTO-ENLARGEMENT ACQUISITION AND PREPARATION OF MATERIAL

The selected SMs (complete and incomplete boxes) were transferred from topographic maps into new contact aerial photographs scale 1:16,000 (1990 year) or into contact photographs scale 1:50,000 (1982-86 years) or 1978 contact photographs scale 1:24,000. Photo-enlargements scales around 1:4,000 (1990 year), 1:6,000 (1978 year) and 1:10,000 (1982-86 years) were acquired from Air Survey Section of Department of Lands.

Photointerpreters and their assistants prepared the photo-enlargements for the field work. Selected SMs (complete and incomplete boxes) were transferred again from the contact photographs into photo-enlargements with help of topographic maps containing the ASF. Permanent physical boundaries were delineated as close as possible around the perimeter of complete and incomplete boxes. Two basic conditions had to be met in delineating SM boundaries: 1) The SM boundaries had to be permanent physical features which could be positively identified by enumerators in the field. Acceptable boundaries, ranked in order of their acceptability, were given to photointerpreters and they were: paved highways, secondary all-weather roads, railroads, local farm path roads, rivers, streams, creeks, permanent drainage and irrigation canals were top-ranked features; field boundaries, lines of trees, power lines, fences, small gullies, ridges were ranked as second category features. 2) The area of a SM had to be the same as the area defined for each stratum and province (see table 6.3 in chapter 6). The constraint of having good and permanent boundaries determined to allow a range of variation for the size of a SM. For example, the range of variation of SMs of 1 km2 was from 0.9 km2 to 1.1 km2.

TABLE 5.3. SAMPLE SELECTION OF SMs IN CAKAUDROVE PROVINCE

EA No	TIKINA	STRATUM	SUB-STRATUM	TOTAL AREA	No OF SMs	CUMM. OF SMs	No OF SEL. SMs	SELECTION NUMBERS	SELECTED SMs
0301121	CAKAUDROVE	10	12	10.0	10	10	1	9	9
0301111	CAKAUDROVE	10	12	19.1	19	29	1	20	10
0308011	WAINIKELI	10	12	7.1	7	36	1	30	2
0301071	CAKAUDROVE	10	12	4.4	4	40	-	-	-
0301131	CAKAUDROVE	10	12	18.3	18	58	2	41,51	1,12
0301011	CAKAUDROVE	10	12	15.9	16	74	2	62,72	4,15
0301101	CAKAUDROVE	10	12	20.8	21	95	2	83,93	10,20
0301081	CAKAUDROVE	10	12	10.1	10	105	1	104	10
				105.7	105		10		
0304041	SAQANI	20	22	25.0	25	25	2	10,22	10,22
0302061	NASAVUSAVU	20	22	25.2	25	50	2	34,46	9,21
0308031	WAINIKELI	20	22	23.6	24	74	2	58,70	8,20
0302051	NASAVUSAVU	20	22	17.1	17	91	1	82	8
0305041	TUNULOA	20	22	26.8	27	118	3	94,106,118	3,15,27
0302041	NASAVUSAVU	20	22	29.5	29	147	2	130,142	12,24
0301091	CKAUDROVE	20	22	20.1	20	167	2	154,166	7,19
0302031	NASAVUSAVU	20	22	36.7	37	204	3	178,190,202	11,23,35
0302091	NASAVUSAVU	20	22	16.2	16	220	1	214	10
0302021	NASAVUSAVU	20	22	27.2	27	247	2	226,238	6,18
0307021	WAILEVU	20	22	44.1	44	291	4	250,262,274,286	3,15,27,39
0302011	NASAVUSAVU	20	22	20.4	20	311	2	298,310	7,19
0304031	SAQANI	20	22	28.1	28	339	2	322,334	11,23
0305031	TUNULOA	20	22	33.8	34	373	3	346,358,370	7,19,31
0302071	NASAVUSAVU	20	22	23.9	24	397	2	382,394	9,21
0308021	WAINIKELI	20	22	22.2	22	419	2	406,418	9,21
				419.9	419		35		
0303021	RABI	30	30	17.8	18	18	1	11	11
0303011	RABI	30	30	34.6	35	53	3	23,35,47	5,17,29
0306011	VATUROVA	30	31	11.4	11	64	1	59	6
0306031	VATUROVA	30	32	72.7	73	137	6	71,83,95,107,119,131	7,19,31,43,55,67
0307061	WAILEVU	30	32	21.0	21	158	2	143,155	6,18
0307051	WAILEVU	30	32	30.3	30	188	2	167,179	9,21
0302081	NASAVUSAVU	30	32	36.4	36	224	3	191,203,215	3,15,27
0307031	WAILEVU	30	32	25.4	25	249	2	227,239	3,15
0301051	CAKAUDROVE	30	32	11.2	11	260	1	251	2
0307011	WAILEVU	30	32	50.8	51	311	5	263,275,287,299,311	3,15,27,39,51
0301041	CAKAUDROVE	30	32	22.3	22	333	1	323	12
0308051	WAINIKELI	30	32	16.0	16	349	2	335,347	2,14
0305021	TUNULOA	30	32	22.9	23	372	2	359,371	10,22
0306051	VATUROVA	30	32	44.0	44	416	3	383,395,407	11,23,35
0305011	TUNULOA	30	32	39.0	39	455	4	419,431,443,455	3,15,27,39
0303031	RABI	30	32	14.0	14	469	1	467	12
0301141	CAKAUDROVE	30	32	15.1	15	484	1	479	10

TABLE 5.3 (CONTINUATION)

EA NO	TIKINA	STRATUM	SUB-STRATUM	TOTAL AREA	No OF SMs	CUMM. OF SMs	No OF SEL. SMs	SELECTION NUMBERS	SELECTED SMs
0307041	WAILEVU	30	32	43.9	44	528	4	491,503,515,527	7,19,31,43
0301031	CAKAUDROVE	30	32	30.7	31	559	2	539,551	11,23
0301021	CAKAUDROVE	30	32	23.5	23	582	2	563,575	4,16
0304021	SAQANI	30	32	30.5	31	613	3	587,599,611	5,17,29
0306041	VATUROVA	30	32	63.8	64	677	5	623,635,647,659,671	10,22,34,46,58
0304011	SAQANI	30	32	36.3	36	713	3	683,695,707	6,18,30
0301061	CAKAUDROVE	30	32	30.2	30	743	3	719,731,743	6,18,30
0306021	VATUROVA	30	32	9.4	9	752	-	-	-
0306061	VATUROVA	30	32	113.0	113	865	5	755,767,779,791,803	3,15,27,39,51
							5	815,827,839,851,863	63,75,87,99,111
0308041	WAINIKELI	30	32	34.0	34	899	3	875,887,899	10,22,34
				900.0	899		75		
0304031Z	SAQANI	50	52	29.4					
0308031Z	WAINIKELI	50	52	43.8					
0307021Z	WAILEVU	50	52	69.0					
0301101Z	CAKAUDROVE	50	52	8.5					
0302091Z	NASAVUSAVU	50	52	7.2					
0308021Z	WAINIKELI	50	52	22.5					
0302081Z	NASAVUSAVU	50	52	17.7					
0301071Z	CAKAUDROVE	50	52	6.8					
0304021Z	SAQANI	50	52	92.7					
0304011Z	SAQANI	50	52	67.5					
0301091Z	CAKAUDROVE	50	52	17.4					
0307051Z	WAILEVU	50	52	33.4					
0301041Z	CAKAUDROVE	50	52	2.8					
0301051Z	CAKAUDROVE	50	52	8.2					
0301021Z	CAKAUDROVE	50	52	32.3					
0307021Z	WAILEVU	50	52	106.4					
0307011Z	WAILEVU	50	52	38.9					
0301041Z	CAKAUDROVE	50	52	6.7					
0307131Z	WAILEVU	50	52	34.2					
0302061Z	NASAVUSAVU	50	52	37.3					
0305021Z	TUNULOA	50	52	10.3					
0301081Z	CAKAUDROVE	50	52	8.8					
0305041Z	TUNULOA	50	52	60.3					
0306011Z	VATUROVA	50	52	16.1					
0301121Z	CAKAUDROVE	50	52	91.2					
0306031Z	VATUROVA	50	52	99.9					
0305011Z	TUNULOA	50	52	10.4					
0306041Z	VATUROVA	50	52	88.8					
0306061Z	VATUROVA	50	52	88.4					
0305031Z	TUNULOA	50	52	36.4					
0301031Z	CAKAUDROVE	50	52	21.8					
0306051Z	VATUROVA	50	52	31.6					
				1246.6					

TABLE 5.3 (CONTINUATION)

EA NO	TIKINA	STRATUM	SUB-STRATUM	TOTAL AREA	No OF SMs	CUMM. OF SMs	No. OF SEL. SMs	SELECTION NUMBERS	SELECTED SMs
0304031Y	SAQANI	60		0.7					
0302071Y	NASAVUSAVU	60		0.9					
0301011Y	CAKAUDROVE	60		2.3					
0302091Y	NASAVUSAVU	60		1.2					
0307031Y	WAILEVU	60		0.3					
0307021Y	WAILEVU	60		1.2					
0307011Y	WAILEVU	60		3.2					
				9.8					
	-	70		-				No SELECTED SMs IN STRATUM 70	
0308011X	WAINIKELI	80		3.8				(6.) MPI Mua Research Station	
0302041X	NASAVUSAVU	80		1.0				(15.) Wainigata MPI Freehold.	
				4.8					
0307011	WAILEVU	90		23.0				(1.) Church of England	
0307021	WAILEVU	90		5.6				(2.) H.Thaggard Freehold (Former Natoavau Freehold)	
0307021	WAILEVU	90		1.7				(3.) Santa Singh Freehold (Former Natoavau Freehold)	
0307031	WAILEVU	90		6.3				(4.) Ned Simpson (Former Natoavau Freehold)	
0307061	WAILEVU	90		4.1				(5.) Catholic Church Freehold	
0308011	WAINIKELI	90		5.2				(7.) Narova Freehold	
0301121	CAKAUDROVE	90		39.0				(8a.) Salialevu Freehold	
0301101	CAKAUDROVE	90		16.6				(8b.) Salialevu Freehold	
0301091	CAKAUDROVE	90		5.4				(9.) Catholic Church Freehold	
0301071	CAKAUDROVE	90		3.0				(10a.) Carpenters Freehold	
0301081	CAKAUDROVE	90		0.4				(10b.) Carpenters Freehold	
0301081	CAKAUDROVE	90		0.02				(10c.) Carpenters Freehold	
0301081	CAKAUDROVE	90		2.7				(10d.) Carpenters Freehold	
0301131	CAKAUDROVE	90		1.3				(10e.) Carpenters Freehold	
0305031	TUNULOA	90		7.3				(11a.) Tuvamila Freehold	
0305041	TUNULOA	90		0.8				(11b.) Tuvamila Freehold	
0305041	TUNULOA	90		8.3				(12.) Nukudamu Freehold	
0301011	CAKAUDROVE	90		5.4				(13a.) Vunilagi MPI Freehold	
0302071	NASAUSAVU	90		3.7				(13b.) Vunilagi MPI Freehold	
0304031	SAQANI	90		4.0				(14.) Vatukaro Freehold	
				143.8					
	TOTAL CAKAUDROVE RURAL			2830.6			120		

TABLE 5.3 (CONTINUATION)

RESUME OF TABLE 4 OF CAKAUDROVE: RESUME OF SAMPLE DESIGN & SELECTION

STRATUM	AREA SM (km2)	SIZE	No. OF SM (Nh)	SIZE OF SAMPLE(nh)	SELECTION INTERVAL(SI)	RANDOM START(RS)
10	***	1.0	105	10	10.5	9.8
20	***	1.0	419	35	12.0	10.9
30	***	1.0	899	75	12.0	11.9
SUB TOTAL	***		1423	120		
50	***		-	-	-	-
60	***		-	-	-	-
70			-	-	-	-
80	***		2	2	-	-
90	***		13	13	-	-
SUB TOTAL	***					
TOTAL	***		1438	135		

The area of each SM was again planimetered on the photo-enlargement. Each enlargement contained the north indication, EA identification (province,tikina and EA), stratum, sub-stratum and SM numbers, SM area in km2, scale of enlargement, flight number, year when the photograph was taken and the equivalence of 1 cm2 in hectares and acres. This identification and SM boundaries were delineated using red china markers. The main topographic features and their names were illuminated on the photo-enlargement using blue color for hydrographic features, such as rivers and creeks and yellow color for roads, path roads, etc. Also the SM identification was written on the back of photo-enlargement. Then the photo-enlargement was laminated with thin plastic. The enumerators used green permanent marking pens (staedtler) to delineate the tract boundaries of the farms.

CHAPTER 6. SAMPLING DESIGN

The sampling design has two well defined aspects: 1) Design and selection process. 2) Estimation process.

Design and selection process is the set of rules and operations by which some members of the population of SMs are included in the sample. The determination of the optimum size of a SM and the establishment of the final sample size are activities of this process.

Estimation process is the computation of the sample statistics, which are "sample estimates" of the population values.

6.1 THE OPTIMUM SIZE OF SEGMENT (SM)

"Size of segment" is a general term. It could refer, for example, to the land area of a SM, to the number of farms in a SM, to the number of households in a SM, to the amount of cultivated land, to the number of cattle. However, in the ASF construction in Fiji, "size of SM" was considered in terms of the number of farms "in" a SM and the total land area "of" a SM.

Several related factors were taken in consideration when the sizes of SMs were defined. These factors included: Sampling variance, costs, difficulty in determining boundaries, topographic details on available mapping and photography materials and the methods of associating the reporting units (farms) with one and only one segment. It is difficult to isolate each of these factors because they can affect each other. However, the following paragraphs will present how they affected the choice of the optimum size of a SM.

Cost considerations have often given rise to strong intuitive impressions that favor sampling units (SMs) that are larger than they should be. This evidently comes from the fact that, for a given cost, more farms can be included in the sample when the sampling units (SMs) are large. But empirical results of many surveys have indicated a very large loss in sampling efficiency when area sampling units (SMs) have large number of reporting units (farms).

The choice of a reporting unit is important, because it establishes the point of reference to associate crops, livestock and other variables with a unique SM. The farm was the reporting unit in the 1991 NAC.

6.1.1 Relations of Reporting Units (farms) with SMs

Rigorous application of ASF methodology requires that each sample SM be divided into tracts and that all land within the SM be carefully accounted for as illustrated in figure 6.1. This is necessary to minimize COVERAGE ERROR.

In order to know all characteristics of a farm, it is necessary to collect information, not only from the tracts that are inside the SM, but also from the tracts that belonging to a farm are outside of the SM. There are three approaches to do this: CLOSED, WEIGHTED, AND OPEN SEGMENT METHODS.

a. Closed-Segment Method

The idea is to collect data on specific items or activities within the boundaries of the sample SMs. This means to collect information only from the tracts located inside the boundaries of selected SM. For example, if information on land use is required, data are collected on the use of all land within the boundaries of each sample SM. Or if information about cattle is wanted, the goal is to get information about all cattle within the boundaries of the selected SM at the time of the interview.

b. Open-Segment Method

The general idea of the open-segment method is to formulate practical rules that associate every farm in the population with one and only one SM. To do this a unique reference point called "HEADQUARTERS" is defined and located for each farm. A farm then belongs to the SM in which its headquarters is located. In most cases the headquarters is defined through the farmer's household. But when there is not a household in the farm the definition and location of the headquarters is more difficult.

c. Weighted-Segment Method

The weighted-segment method calls for collecting data from every farm that is within or partly within a selected SM. The data for each farm are then weighted by the proportion of the entire farm that is within the SM.

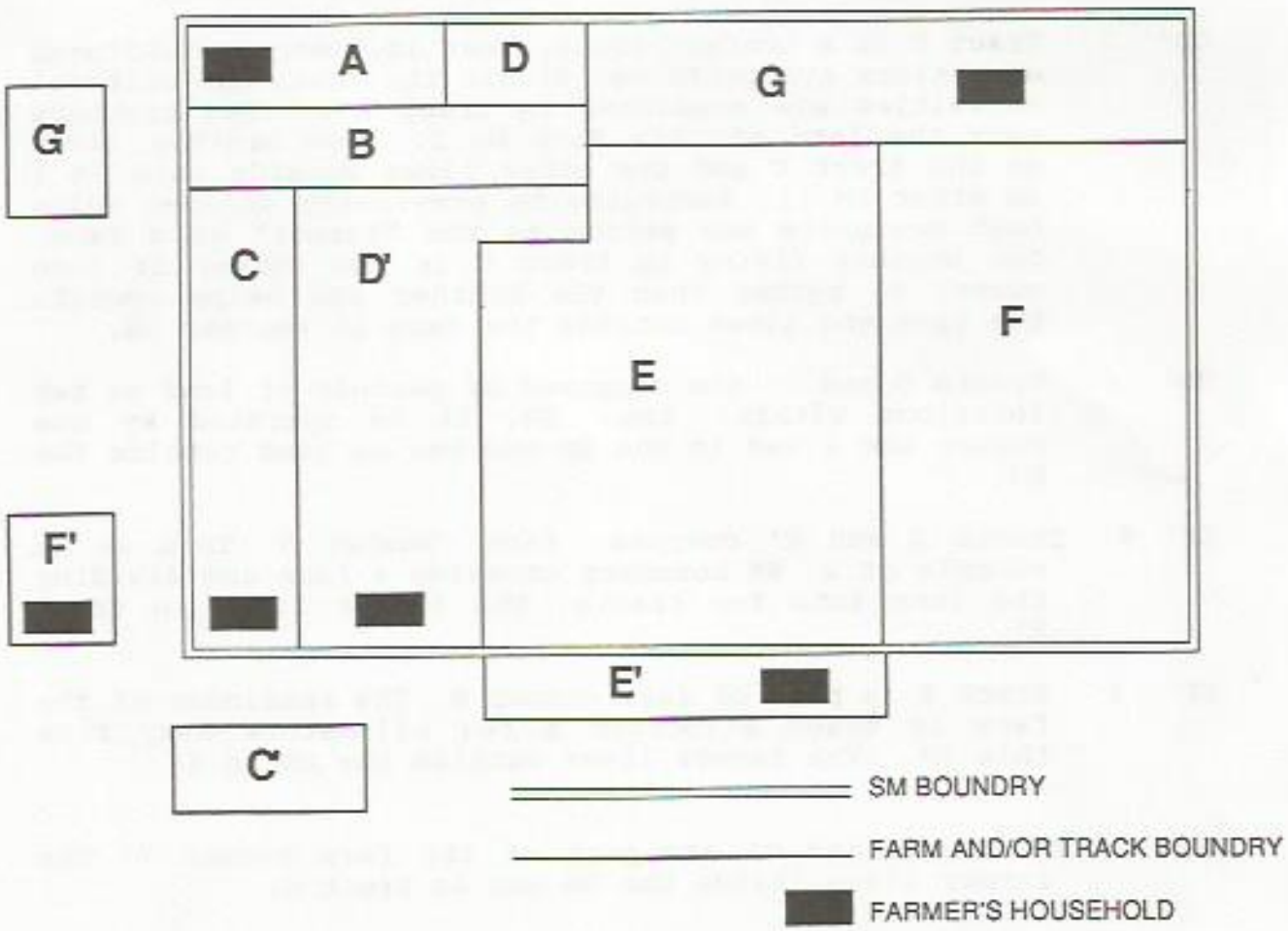
The closed-segment of the figure 6.1 is composed of eight tracts. The information MUST be collected only for tracts A, B, C (even if it is a non-farm tract), D, D', E, F, and G.

With reference to figure 6.1 farms numbered 1 (A), 3 (CC'), 4 (DD') and 7 (GG') will be assigned by the open-segment method when the headquarters is the household.

In the weighted method information MUST be collected tract by tract for all farms numbered 1 (A), 2 (B), 3 (CC'), 4 (DD'), 5 (EE'), 6 (FF'), and 7 (GG') in 7 questionnaires. See figure 6.1.

THE WEIGHTED METHOD WAS APPLIED IN 1991 NAC USING THE FARM LAND INSIDE THE SELECTED SM OVER THE FARM TOTAL LAND (INSIDE PLUS OUTSIDE) AS THE WEIGHTING FACTOR

FIGURE 6.1 DIVISION OF A SM INTO TRACTS



DESCRIPTION OF FIGURE 6.1

TRACT	FARM	DESCRIPTION
A	1	Tract A is an entire farm. The farmer lives on his farm.
B	2	Tract B is a farm, but the farmer does not live on his farm or inside the SM. He lives in the city of Suva, where the 1991 NAC enumerator will not go.
CC′	3	Tract C is a nonfarm tract. That is, non-agricultural operations are performed within it. But, agricultural activities are conducted in tract C′. Two brothers work the land of this farm No 3. One brother lives on the tract C and the other lives outside this SM (in other SM). According to previously defined rules that designate one person as the "farmer" of a farm, the brother living in tract C is the farmer of farm number 3, rather than the brother who helps operate the farm and lives outside the farm in another SM.
DD′	4	Tracts D and D′ are composed of parcels of land at two locations within the SM. It is operated by one person who lives in the SM and has no land outside the SM.
EE′	5	Tracts E and E′ compose farm number 5. This is an example of a SM boundary crossing a farm and dividing the farm into two tracts. The farmer lives in tract E′.
FF′	6	Tract F is part of farm number 6. The remainder of the farm is tract F′located a few kilometers away from this SM. The farmer lives outside the SM in F′.
GG′	7	Tracts G and G′ are part of the farm number 7. The farmer lives inside the SM and in tract G.

6.1.2 Variance and Mean Square Error

Sampling variance is a function of the variation among SMs. Therefore, one objective in defining the size of SMs was to make the variation among SMs as small as possible. The sampling variance is related to the variation in the size of SM and to the average size of SM.

With regard to variation in size of SMs (between variability), they were constructed nearly equal in "size" with respect to total land area. With regard to average size of SMs (within variability) and considering only sampling variance, they

were constructed so there were the minimum of reporting units (farms) as possible.

Optimum size of SM was very difficult to define and determine in practice, because the estimates were calculated for many characteristics and for several domain of study (15) as well as for the whole country. Accumulated experience pointed to very small SMs; that was, small in terms of reporting units (farms) as defined for the 1991 NAC.

However, optimum size of SM must refer, not only to sampling variance, but also to mean square error, which is a combination of sampling variance and bias. This means bias associated with SM boundaries. Topographic features suitable to use as SM boundaries become less prevalent as the size of SM decreases. Therefore, in terms of square error, the optimum size of SM could be larger than the optimum based only on sampling variance. Experience strongly indicated that high priority must be given to delineating SMs that had boundaries which could be positively identified by enumerators in the field. The question of average size of SM (number of farms per SM) was resolved by determining the smallest average size that was practical with regard to topographic detail.

6.1.3 Optimum Size of SM in Fiji

Available information of number of households per EA from 1986 population census was used to determine the optimum size of SMs in Fiji. Household density per km2 was calculated by province and stratum. Different sizes of SMs (ranging from 0.1 km2 to 3 km2) were combined with the number of households. Also variances for the number of households per EA were calculated and studied (see size of sample in numeral 6.2). It is important to remember that the number of households in rural areas is highly correlated with number of 1991 NAC reporting units (farms).

Other factors taken in consideration in determining the optimum size of SMs were definition of stratification, possible sample sizes and probability of selection.

For example, several sizes of SMs were studied before determining the optimum size in Cakadrove province (see table 6.1) . Last four columns of table 6.1 show expansion factors, that are the inverse of the probability of a SM included in the sample (it is also known as sampling fraction) with a sample size of 120. If the size of SM would be 0.5 km2, 2,852 SMs had to be constructed and the expected number of reporting units was 2.3 farms in average at provincial level; the probability of including one SM in the sample was 1/24 with a sample size of 120 SMs or a sample of 4.2 % (120/2852=0.042). On the other hand, 475 SMs had to be formed with a SM size of 3 km2 and a sampling fraction of 1/4 (25 % sample). In this case 13.7 farms were expected as reporting units at provincial level.

One km2 was determined as the optimum size of SM for Cakaudrove province in all three strata (there was not stratum 70 of peri-urban), expecting 4.6 farms as reporting units with a sampling fraction of 1/12 (8.4 % sample). But the expected farms were 12.1 in stratum 10, 5.0 in stratum 20 and 3.5 in stratum 30. SMs were not constructed in stratum 80 and 90 since the farms were in the List Frame and all of them were included in 1991 NAC with a probability or expansion factor (Fh) of one (1.0).

6.1. DETERMINATION OF OPTIMUM SIZE OF SM IN CAKAUDROVE PROVINCE

STRA-TUM	No HOUSEHOLD AREA (KM2)		No OF SMs (KM2)				No OF HH/SM				EXPANSION FACTOR (Fh)			
	1986	1991	0.5	1	2	3	0.5	1	2	3	0.5	1	2	3
10	1160	1281	106	212	106	53	35	6.0	12.1	24.2	36.6	21.2	10.6	5.3	3.5
20	1902	2100	420	840	420	210	140	2.5	5.0	10.0	15.0	24.0	12.0	6.0	4.0
30	2823	3117	900	1800	900	450	300	1.7	3.5	6.9	10.4	24.0	12.0	6.0	4.0
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUBT.	5885	6498	1426	2852	1426	713	475	2.3	4.6	9.1	13.7	23.8	11.9	5.9	4.0
70	115	127	-	Small peri-urban area was added to rural											
80	-	-	5	Any size. Two special farms belonged to this list stratum (Fh=1)											
90	-	-	144	Any size. 13 large farms belonged to this list stratum (Fh=1)											
SUBT.	115	127	149												
50	-	-	1247	It was not included in 1991 NAC											
60	-	-	10	It was not included in 1991 NAC											
TOTAL	6000	6625	2832												

945 questionnaires were filled by enumerators during data collection in 119 SMs out of the 120 SMs selected in the sample (see table 6.2). An average of 7.9 questionnaires per enumerated SM was obtained which was higher than average (4.9) expected before field operation. Taking in consideration that questionnaire NAC-2 was applied to farms and NAC-3 to non-farms,

the average number of questionnaires NAC-2 used for only farms decreased to 6.9. This is important to take in consideration when studying cost factor since questionnaire NAC-2 (farms) had 17 pages and questionnaire NAC-3 (non-farms) had only one page. The number of farms per SM estimated from the 119 SMs of the sample was 5.4 which was closer to the expected 4.9 farms per SM (see last column of table 6.2).

198 questionnaires were obtained from stratum 80 and 90 instead of the 15 questionnaires NAC-2 expected for the 15 special and large farms registered in the List Frame. Therefore, the real average was 13.2 questionnaires or farms per special and large farm. The List Frame of special and large farms provided by land registers was not up-to-date any more, because they were freeholds that have already been subdivided for different reasons (sale, inheritance, squatters, etc.) and/or had workers operating small farms inside them.

The last fact that a List Frame is not up-to-date is very important to take in consideration while designing the On-going Agricultural Statistics System of Fiji.

6.2. NUMBER OF FARMS (REPORTING UNITS) AND QUESTIONNAIRES IMPLEMENTED IN DATA COLLECTION OF 1991 NAC IN CAKAUDROVE PROVINCE

STRATUM	No OF SMs	No OF QUESTIONNAIRES			QUESTION. PER SM	No OF FARMS	FARMS PER SM
		NAC-2	NAC-3	TOTAL			
10	10	74	4	78	7.8	62	6.2
20	34	340	42	382	11.1	272	8.0
30	75	412	73	485	6.5	310	4.1
SUBT.	119	826	119	945	7.9	644	5.4
80	2	13	0	13	6.5	13	6.5
90	13	185	0	185	14.2	185	14.2
SUBT.	15	198	0	198	13.2	198	13.2
TOTAL	134	1024	119	1143	8.5	842	6.3

Table 6.3 shows the optimum sizes of SMs for entire country by province.

TABLE 6.3. OPTIMUM SIZES OF SMs DETERMINED FOR 1991 NAC BY PROVINCE AND STRATUM

PROVINCE	SIZE PER STRATUM (km2)						
	10	20	30	40	72	80	90
I. CENTRAL DIVISION	-	-	-	-			
1. Naitasiri	0.5 *	0.5 *	1.0 *	1.0 *	0.1	ANY SIZE	
2. Namosi	-	-	1.0	-	-	ANY SIZE	
3. Rewa	0.5 *	0.5 *	0.5	-	0.1	ANY SIZE	
4. Serua	-	1.0 *	1.0 *	1.0	0.1	ANY SIZE	
5. Tailevu	0.5	0.5	1.0	1.0	0.1	ANY SIZE	
II. WESTERN DIVISION	-	-	-	-			
6. Ba	0.5	0.5	0.5	3.0	0.1	ANY SIZE	
7. Nadroga & Navosa	0.5	1.0	1.0	2.0	0.1	ANY SIZE	
8. Ra	1.0 *	1.0 *	1.0	2.0	0.1	ANY SIZE	
III. NORTHERN DIVISION	-	-	-	-			
9. Bua	-	1.0	1.0	-	-	ANY SIZE	
10. Cakaudrove	1.0	1.0	1.0	-	-	ANY SIZE	
11. Macuata	0.5	1.0	1.0	-	0.1	ANY SIZE	
IV. EASTERN DIVISION	-	-	-	-			
12. Kadavu	-	0.5	0.5	-	-	ANY SIZE	
13. Lau	1.0	0.5	1.0	-	-	ANY SIZE	
14. Lomaiviti	0.5	0.5	0.5	-	-	ANY SIZE	
15. Rotuma	0.5	0.5	-			ANY SIZE	

* COMBINATION OF STRATA

NAITASIRI - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
- STRATUM 30 AND 40 ARE COMBINED TOGETHER IN STRATUM 30
REWA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
SERUA - STRATUM 20 AND 30 ARE COMBINED TOGETHER IN STRATUM 30
RA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20

The minimum SM size was 0.1 km2 in stratum 70 corresponding to peri-urban sector that had high population density, but with minimum agricultural activities. The maximum SM size was 3 km2 in stratum 40 of Ba province expecting 2.3 reporting units (farms) per SM. During data collection 264 questionnaires (207 NAC-2 for farms and 57 NAC-3 for non-farms) were filled in 50 selected SMs in stratum 40, with 5.3 questionnaires in average per SM. After applying the weighting segment method to the questionnaires collected from field, 168 farms were estimated in stratum 40 of Ba out of 207 questionnaires NAC-2 filled for farms; the average of reporting units was 3.4 farms per selected SM which is closer to the expected average (2.3 farms per SM). But, number of questionnaires to be implemented on the field also has to be taken in consideration in determining the optimum size of SM, since that number is highly correlated with the cost of enumerating a SM.

At national level 11,207 questionnaires were filled on the field (9,605 NAC-2 for farms and 1,603 NAC-3 for non-farms). But, 9,273 NAC-2 questionnaires were implemented for strata 10, 20, 30, 40 and 70 (without strata 80 and 90 of Frame List) with an average of 7.3 questionnaires per selected SM. The final average number of farms estimated from 1991 NAC was 5.8 per SM for the total country. This average of number of farms per SM was similar to the expected average before field data collection.

6.2 THE FINAL SAMPLE SIZE

Many factors have to be considered to calculate the sample size of any survey. The most important are: 1) The general and specific objectives of the survey or census which generally require to obtain many estimates. 2) The "needed" or "adequate" precision to achieve survey or census objectives measured in cost-benefit terms. 3) The magnitude of non-sampling errors that could affect sampling design. 4) The geographical and administrative levels needed for the estimates (for example national, regional or provincial levels). A larger sample size will be required if precise regional or provincial level estimates are needed. 5) The quality and completeness of sampling frame and existing information to use stratification techniques or the cost to produce this information. 6) The proportion of sampling units (SMs) reporting different items and their distribution in the population.

Present discussion will concentrate in second factor related with "needed" or "adequate" precision. The element variance is the key term in any formula used to calculate the sample size. In practice this is unknown and it must be "estimated" or "guessed". The sources for those "estimations" or "guesses" are the following. 1) Past sampling surveys of similar variables in the country or similar countries. 2) Seek the advise of an expert sampler, with his knowledge of past surveys and his ability to unearth relevant aspects of past surveys. 3) often, instead of the variance, it is more easy to guess the coefficient

of variation because it is less variable than the variance; hence, this facilitates borrowing data from the results of similar variables. 4) The frequent problem of estimating proportion is relatively easy to treat. The variance of a proportion is not sensitive to change in the middle range of 0.2 to 0.8 and generally a reasonable guess of the proportion can be made. Of course, the "safe" choice is the maximum variance of 0.25 corresponding to a proportion of 0.5. 5) Conduct an adequate pilot study prior the survey, to obtain information for designing the sample if there is enough time and money.

Above paragraphs presented basic theoretical considerations to calculate sample size in the case of one variable distribution maximizing the precision degree for a given cost or vice versa. But data were required for many variables in 1991 NAC and a different sample sizes could be calculated for each item with a given degree of precision. On the other hand, if that degree of precision is increased or decreased, the sample sizes also are going to change.

When the sample size was being calculated in Fiji there was not information available for census variables related with sampling units (SMs) directly to determine the population variances. For example,.there was not information on number of farms per SM, crop land per SM or number of livestock per SM. Therefore, the approach of "estimating" or "guessing" the variances was used to establish the sample size of 1991 NAC.

Information for two variables was produced or was available to "estimate" or "guess" those variances in order to have preliminary indicators of possible sample sizes. The first variable was the total area per EA measured by counting boxes in the process of ASF construction (see table 6.4.A). The second variable was the number of households per EA in 1986 population census (see table 6.4.B). Agricultural censuses of 1968 and 1978 showed that number of households was 100 % correlated with number of farms in rural areas (in fact both censuses used the number of households to determine the expansion factors).

Ba is the largest and most important province for many agricultural and demographic characteristics, such as number of farms, cattle, sugar cane, population, according population and agricultural censuses. The strategy proposed was to establish a sample size for the largest and most important province and use it as a bench mark to determine the sizes of other provinces and for entire country.

First of all, the 191 EAs were tabulated according to their area measured by counting boxes (see table 6.4.A).

The element variance of EA total areas (km2) of Ba province was calculated (538.3) and the sample sizes were determined for precisions of 1 %, 5 % and 10 % and 95 % of confidence level, using the formula to estimate totals assuming simple random sampling (see table 6.5.A).

TABLE 6.4.A. FREQUENCY DISTRIBUTION OF EAs BY THEIR AREA SIZES IN THE RURAL SECTOR OF BA PROVINCE

AREA OF EAs (KM2)	NO OF EAs (fi)	SQUARE ROOT OF (fi)	CUMM. \/ (fi)
0 - 4.9	70	8.4	8.4
5 - 9.9	63	7.9	16.3
10 - 14.9	16	4.0	20.3
15 - 19.9	11	3.3	23.6
20 - 24.9	6	2.5	26.1
25 - 29.9	3	1.7	27.8
30 - 34.9	3	1.7	29.5
35 - 39.9	2	1.4	30.9
40 - 44.9	1	1.0	31.9
50 - 54.9	1	1.0	32.9
55 - 59.9	4	2.0	34.9
65 - 69.9	1	1.0	35.9
70 - 74.9	1	1.0	36.9
85 - 89.9	1	1.0	37.9
90 - 94.9	2	1.4	39.4
100 - 104.9	3	1.7	41.1
105 - 109.9	1	1.0	42.1
110 - 114.9	1	1.0	43.1
115 - 119.9	1	1.0	44.1
TOTAL	191	-	-

TABLE 6.4.B. FREQUENCY DISTRIBUTION OF EAs BY THEIR NUMBER OF HOUSEHOLDS IN THE RURAL SECTOR OF BA PROVINCE

No OF HH PER EA	No OF EAs (fi)	SQUARE ROOT OF (fi)	CUMM. \/ (fi)
0 - 19	0	0.0	0.0
20 - 39	6	2.5	2.5
40 - 59	20	4.5	6.9
60 - 79	18	4.2	11.2
80 - 99	34	5.8	17.0
100 - 119	35	5.9	22.9
120 - 139	27	5.2	28.1
140 - 159	22	4.7	32.8
160 - 179	14	3.7	36.5
180 - 199	7	2.7	39.2
200 - 219	4	2.0	41.2
220 - 239	1	1.0	42.2
240 - 259	1	1.0	43.2
300 - 319	1	1.0	44.2
320 - 339	1	1.0	45.2
TOTAL	191	-	-

Square roots of the frequency of number of EAs within each interval and its accumulation were used to define three strata and their boundaries (see columns 3 and 4 of table 6.4.A). The element variances for each stratum were calculated and samples sizes were established with same precisions and confidence levels as for simple random sample. The formula to estimate totals in stratified sampling with optimum allocation was applied to these computations. Similar calculations were repeated for two strata and four strata. Results are shown in table 6.5.A.

Because the areas of EAs are smaller and correlation between households and farms in peri-urban sector are lower than the rural sector, although with higher population density, sample size computations were made independently, but only for simple random sampling (see table 6.5.B bellow).

6.5. SAMPLE SIZES FOR DIFFERENT DEGREES OF PRECISION AND 95 % CONFIDENCE LEVEL BY STRATIFICATION USED IN BA PROVINCE

VARIABLE USED	No OF STRATA	VARIANCES PER STRATUM				SAMPLE SIZE (95% CONF.)		
		1	2	3	4	1%	5%	10%
A. RURAL FOR AREAS PER EA								
AREA/EA	0	538*	-	-	-	191	182	161
AREA/EA	2	19	1062	-	-	80	53	26
AREA/EA	3	6	40	717	-	71	33	13
AREA/EA	4	1	12	77	488	68	24	8
B. PERI-URBAN FOR AREAS PER EA								
AREA/EA	0	1*	-	-	-	41	40	37
C. RURAL FOR HOUSEHOLDS (HH) PER EA								
No HH/EA	0	2384*	-	-	-	186	116	53
No HH/EA	3	405	100	1429	-	108	13	4
D PERI-URBAN FOR HOUSEHOLDS (HH) PER EA								
No HH/EA	0	9663*	-	-	-	41	39	35
No HH/EA	3	545	412	9486		24	14	6

* Without stratification (simple random sampling)

Similar tabulation (table 6.4.B) and calculations were done for the characteristic number of households per EA in the rural sector (see table 6.5.C) using simple random sample and stratification, but only for three strata. In peri-urban sector simple random sampling and stratification with three strata were tested (see table 6.5.D).

Before analyzing results of table 6.5 it is very important to remember that sample sizes calculated for different sampling designs and precisions refer to areas and number of households (farms) per EA and not per SM which is the sampling unit. The 3,587 SMs constructed in the 191 EAs of Ba had an average of 19 SMs per EA.

The main conclusions from table 6.5 were: 1) Two variables produced different sizes for same precision. Variable number of households had smaller sample sizes than variable areas of EAs. 2) Stratification produced large gains comparing with simple random sampling. 3) Increasing number of strata from two to three is more efficient than increasing from three to four. The gains of efficiency are larger for 10 % of precision than for 5 % and 1 %. 4) Simple random sampling required to include in the sample more than 85 % of the 41 EAs in the population for the peri-urban sector. 5) When stratification (three strata) was defined, the sample size decreased by a factor of more than twelve (10 % of precision) with respect to simple random sampling in the case of areas of EAs; for number of households per EA this factor is more than 13.

Considering both variables together and that Ba had four strata to be included in the sample (10, 20, 30 and 40) and that census estimates were "desired" to have 10 % precision at provincial level, the maximum sample size was 8 EAs. Since an EA had 18.8 SMs in average a sample size of around 150 SMs would be required to satisfy above conditions. But, other factors also had to be considered.

Each EA is a cluster of SMs which are more or less similar with relation to their areas. Nevertheless, SMs could differ greatly with respect to other variables, such as number of reporting units (farms), area planted with dalo, cattle, workers. This homogeneity or heterogeneity is measured through the "intraclass" correlation coefficient (r) and it is positive generally. The effect of a positive "intraclass " correlation coefficient (r) is to increase the sample size of a clustering design compared with a stratified design without clustering. Experience has shown that, for large clusters, the value of "r" for many agricultural characteristics is 0.05 or less. Assuming a "r" of 0.02 and knowing that, the average number of SMs per EA is 19, the sample size was increased by a factor of 1.38. The new sample size was 11 EAs or around 200 SMs with an overall sampling fraction of 1/18 (200 SMs/3,587 SMs = 5.6 %).

The number 200 SMs was a first approximation to the sample size needed for 10 % precision and 95 % confidence for he largest

province of Ba (only rural). But this first approximation was used as key indicator to work out the final sample size for the entire country and other provinces.

Basic sampling theory says that, if estimates of totals for each province are "desired" with same precision and confidence as Ba province and their variances are similar, then a sample size of 200 SMs would be needed for each province. In this case small provinces like Rotuma (91 SMs) had to be enumerated completely having large sampling fractions (for example, Lau with 1/3 or Nausori with 1/1.5). Therefore, the final sample size for the entire country would be 3,000 SMs with an overall sampling fraction of 1/5 (20 %).

Nevertheless, time and budget constraints did not allow to afford such a big sample for 1991 NAC. In fact, original project document contemplated to conduct data collection with around 70 enumerators during two months. Under these conditions, specific assumptions and parameters were set up to determine the final sample size for entire country:

- 75 enumerators would be used in data collection;
- One enumerator would spend two and half days in average for data collection. Pilot census and later on census field work proved that this assumption was true;
- There were 42 working days during June and July, 1992;
- A country sample size of 1,260 SMs was calculated using above assumptions;

The final sample size of 1,270 SMs was fixed for Fiji allocating 1,220 SMs to the rural sector (strata 10, 20, 30 and 40) and 50 SMs to the Peri-urban sector (sub-stratum 72). The sampling fraction for rural sector was around 1/12 (1,220 SMs/14,413 SMs = 8.5 %) and for the peri-urban sector the sampling fraction was 1/39 (50 SMs/1,933 SMs = 2.6 %). The 24 special and large farms of stratum 80 and 90 were not included in the above sample size, since they belonged to the list frame and were enumerated 100 %.

The sample size of 1,270 SMs was 6.4 times larger than the sample size of Ba province. Therefore, estimations of sampling errors (coefficients of variation) for totals at country level will be reduced 2.5 times. Smaller provinces would have smaller sample sizes than Ba, but will larger sampling errors.

6.3 1991 NAC POPULATION

It was mentioned before that the "target population" was the entire physical area of Fiji (18,492 km2 measured in ASF); but, for various practical reasons, the population (physical area) included in 1991 NAC was different from the target population.

For example, there were not reasons to send enumerators to the field to look for farms in areas covered by 100 % forest or in the urban area of Suva city. Stratum 50 (100 % forest), stratum 60 (100 % non-agricultural land) and substratum 71 (urban areas) were not included in the 1991 NAC. Therefore, the 1991 NAC population was 13,123 km2 (see table 6.6.A).

In the rural sector 14,413 SMs of different sizes were constructed in 12,568 km2 with an average of 0.9 km2 per SM. The expected number of reporting units was 5.7 farms in average per SM (82,611 households/14,413 SMs). Since many households had more than one farm (sons and other relatives) 89,000 farms were estimated from 1991 NAC with an average of 6.2 farms per SM.

The 1,933 SMs constructed in the peri-urban sector (sub-stratum 72) had an average size of 0.1 km2. It was not possible to determine an expected number of farms before the census, but around 6,000 farms were estimated after census data collection giving an average of 3.1 farms per SM. See number of SMs constructed in ASP in table 6.6.B

6.4 ALLOCATION OF SAMPLE SIZE BETWEEN PROVINCES (DOMAINS OF STUDY

The final sample size of 1,220 SMs for the rural sector was allocated between provinces (domains of study) taking in account the following considerations:

a. "Domains of Study" are divisions, usually partitions, of the population for which separate estimates are planned in the sample design. The main purpose of domains is to serve the substantive analysis of data. On the other hand, strata and SMs denote partitions of the sample, but they are used to improve the sample design and are often numerous.

b. Proportional allocation was utilized to test possible sample sizes of each domain of study or province (see column 4 of table 6.7). Proportional allocation is self-weighting sampling. This means that each domain of study (province) has same sampling fraction 1/12 (8.5 %). But, sample size of 303 SMs in BA was considered too high due to cost factors (more than 2,000 reporting farms were expected to be enumerated in census data collection). A sample size of 8 SMs in Rotuma island was considered too low, because only 45 reporting units (farms) were expected to be enumerated in the field.

c. A maximum sample size of 200 SMs was fixed for Ba province that had the largest area included in the census and number of SMs (2,604 km2 and 3,587 SMs); a minimum sample size of 30 SMs was determined for Rotuma island that had the lowest area and number of SMs (46 km2 and 91 SMs). Also 30 SMs were allocated to Namosi which agriculture was not very important.

TABLE 6.6.A. TARGET POPULATION (AREA) AND 1991 NAC POPULATION (AREA) BY STRATUM AND PROVINCE

DIVISION AND PROVINCE	TARGET POPULATION (km2)												LANDS DEPARTMENT (km2)
	1991 NAC POPULATION (km2)									NOT INCLUDED		TOTAL	
	10	20	30	40	SUB-TOTAL	72	80	90	SUB-TOTAL	50	60		
CENTRAL													
NAITASIRI	22 *	4 *	728 *	- *	754	86	3	-	89	827	-	1670	1665
NAMOSI	-	-	286	-	286	-	-	-	-	291	-	577	569
REWA	- *	45 *	124	-	169	20	-	-	20	66	-	255	267
SERUA	-	- *	136 *	154	290	2	-	-	2	497	-	789	779
TAILEVU	22	68	155	387	632	8	-	-	8	350	-	990	941
WESTERN													
BA	588	541	501	975	2605	33	-	-	33	-	47	2685	2551
N & N	193	393	197	1116	1899	3	3	-	6	513	-	2418	2414
RA	- *	234 *	425	351	1010	7	-	91	98	225	-	1333	1323
NORTHERN													
BUA	-	182	795	-	977	-	-	116	116	276	34	1403	1392
CAKAUDROVE	106	420	900	-	1426	-	5	144	149	1247	10	2832	2916
MACUATA	196	410	767	-	1373	33	1	-	34	660	76	2143	2181
EASTERN													
KADAVU	-	115	218	-	333	-	-	-	-	139	9	481	470
LAU	55	198	169	-	422	-	-	-	-	47	-	469	424
LOMAIVITI	41	267	38	-	346	-	-	-	-	53	2	401	411
ROTUMA	46	-	-	-	46	-	-	-	-	-	-	46	47
TOTAL FIJI	1269	2877	5439	2983	12568	192	12	351	555	5191	178	18492	18350

* COMBINATION OF STRATA

NAITASIRI - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
- STRATUM 30 AND 40 ARE COMBINED TOGETHER IN STRATUM 30
REWA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
SERUA - STRATUM 20 AND 30 ARE COMBINED TOGETHER IN STRATUM 30
RA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20

TABLE 6.6.B. NUMBER OF SMs CONSTRUCTED IN THE 1991 POPULATION BY STRATUM AND PROVINCE

DIVISION AND PROVINCE	STRATA								
	10	20	30	40	SUB-TOTAL	72	80	90	TOTAL
CENTRAL									
NAITASIRI	-*	10 *	90	-	100	15	2	-	117
NAMOSI	-	-	30	-	30	-	-	-	30
REWA	-*	15 *	25	-	40	5	-	-	45
SERUA	-	- *	20 *	20	40	2	-	-	42
TAILEVU	5	15	15	45	80	3	-	-	83
WESTERN									
BA	50	50	50	50	200	10	-	-	210
N & N	25	35	15	45	120	2	1	-	123
RA	- *	20 *	40	20	80	3	-	2	85
NORTHERN									
BUA	-	15	65	-	80	-	-	3	83
CAKAUDROVE	10	35	75	-	120	-	2	13	135
MACUATA	30	30	60	-	120	10	1	-	131
EASTERN									
KADAVU	-	25	35	-	60	-	-	-	60
LAU	5	40	15	-	60	-	-	-	60
LOMAIVITI	10	40	10	-	60	-	-	-	60
ROTUMA	30	-	-	-	30	-	-	-	30
TOTAL FIJI	165	330	545	180	1220	50	6	18	1294

NOTE : * : COMBINATION OF STRATA

NAITASIRI - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
- STRATUM 30 AND 40 ARE COMBINED TOGETHER IN STRATUM 30
REWA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
SERUA - STRATUM 20 AND 30 ARE COMBINED TOGETHER IN STRATUM 30
RA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20

TABLE 6.7. ALLOCATION OF FINAL SAMPLE SIZE BY PROVINCE (DOMAINS OF STUDY) IN FIJI

DIVISION AND PROVINCE	STRATA 10, 20, 30, 40					SUB-STRATUM 72		
			ALLOCATION OF SAMPLE SIZE (nh)					
	AREA (km2)	No OF SMs (Nh)	PROPOR-TIONAL	FINAL	SAMPLING FRACTION	AREA (km2)	No OF SMs (Nh)	ALLOCA-TION OF SAMPLE (nh)
CENTRAL								
NAITASIRI	754	784	66	100	1/8	86	864	15
NAMOSI	286	283	24	30	1/9	-	-	-
REWA	169	339	29	40	1/9	20	197	5
SERUA	290	291	25	40	1/7	2	25	2
TAILEVU	632	726	61	80	1/9	8	82	3
WESTERN								
BA	2605	3587	303	200	1/18	33	330	10
N & N	1899	1527	129	120	1/13	3	31	2
RA	1010	837	72	80	1/10	7	72	3
NORTHERN								
BUA	977	978	83	80	1/12	-	-	-
CAKAUDROVE	1426	1423	120	120	1/12	-	-	-
MACUATA	1373	1568	133	120	1/13	33	332	10
EASTERN								
KADAVU	333	665	56	60	1/11	-	-	-
LAU	422	620	52	60	1/10	-	-	-
LOMAIVITI	346	694	59	60	1/12	-	-	-
ROTUMA	46	91	8	30	1/3	-	-	-
TOTAL FIJI	12568	14413	1220	1220	1/12	193	1933	50

d. Final sample sizes for 12 remaining provinces were fixed taking in consideration the proportional allocation, the expected number of reporting units (farms estimated through households), precision, importance of the agriculture and overall sampling fraction (column sixth of table 6.7). Final sample sizes can be seen in column fifth of table 6.7.

e. In peri-urban sector (sub-stratum 72) proportional allocation assigned less than one SM to Serua and Nadroga & Navosa. A minimum sample size of two SMs were allocated to these provinces in order to be able to estimate sample variances. Final sample sizes for this stratum are shown in the last column of table 6.7.

6.5 ALLOCATION OF FINAL SAMPLE SIZES BETWEEN STRATA

The allocation of final sample sizes between strata for each province was a "compromise" of three methods: 1) Proportional allocation. 2) Equal allocation. 3) Optimum allocation.

Two variables of total land and crop land of each EA measured during the stratification in the ASF construction were used to calculate variances by stratum in order to apply the optimum allocation. Other factors considered in the allocation of sample sizes between strata were population density (number of households per km2), importance of the agriculture and the sampling fractions. Table 6.8.A contains the results of sample allocation between strata for Cakaudrove province.

TABLE 6.8.A. ALLOCATION OF FINAL SAMPLE SIZES BETWEEN STRATA IN CAKAUDROVE PROVINCE

STRA- TUM	AREA (KM2)	HH/KM2	SM SIZE (KM2)	No SMs (Nh)	VARIANCES TOTAL LAND	VARIANCES CROP LAND	ALTERNATIVES OF ALLOCATION OF FINAL SAMPLE SIZE (nh): PRO-PORTIONAL	Fh	EQUAL	Fh	OPTIMUM ALLOCATION TOTAL LAND	Fh	OPTIMUM ALLOCATION CROP LAND	Fh	FINAL "COMPROMISE" SIZE	FINAL Fh
10	106	11.0	1.0	105	6.1	5.6	9	11.9	40	2.6	3	35.0	10	10.5	10	10.5
20	420	4.5	1.0	419	7.2	3.8	35	11.9	40	10.5	15	27.9	28	15.0	35	12.0
30	900	3.1	1.0	899	22.2	5.2	76	11.9	40	22.5	102	8.8	82	11.0	75	12.0
TOTAL	1426	4.1	-	1423	-	-	120	11.9	120	11.9	120	11.9	120	11.8	120	11.9

Next table 6.8.B contains the allocation of final sample size between strata of each province in the rural sector. It also shows allocation for peri-urban sector (sub-stratum 72) and for stratum 80 (special farm list) and stratum 90 (large farm list).

TABLE 6.8.B. ALLOCATION OF FINAL SAMPLE SIZES BETWEEN STRATA BY PROVINCE IN FIJI

DIVISION AND PROVINCE	STRATA								
	10	20	30	40	SUB-TOTAL	72	80	90	TOTAL
CENTRAL									
NAITASIRI	-*	10 *	90 *	- *	100	15	2	-	117
NAMOSI	-	-	30	-	30	-	-	-	30
REWA	-*	15 *	25	-	40	5	-	-	45
SERUA	-	- *	20 *	20	40	2	-	-	42
TAILEVU	5	15	15	45	80	3	-	-	83
WESTERN									
BA	50	50	50	50	200	10	-	-	210
N & N	25	35	15	45	120	2	1	-	123
RA	- *	20 *	40	20	80	3	-	2	85
NORTHERN									
BUA	-	15	65	-	80	-	-	3	83
CAKAUDROVE	10	35	75	-	120	-	2	13	135
MACUATA	30	30	60	-	120	10	1	-	131
EASTERN									
KADAVU	-	25	35	-	60	-	-	-	60
LAU	5	40	15	-	60	-	-	-	60
LOMAIVITI	10	40	10	-	60	-	-	-	60
ROTUMA	30	-	-	-	30	-	-	-	30
TOTAL FIJI	165	330	545	180	1220	50	6	18	1294

* COMBINATION OF STRATA

NAITASIRI - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
- STRATUM 30 AND 40 ARE COMBINED TOGETHER IN STRATUM 30
REWA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
SERUA - STRATUM 20 AND 30 ARE COMBINED TOGETHER IN STRATUM 30
RA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20

6.6 ESTIMATION PROCESS

It is the second aspect of the sample design for computing the sample statistics, which are "sample estimates" of the population values.

6.6.1 Estimation of Aggregates

The number of sampling units (N) in the population called SMs and the number of SMs in the sample (n) are known. Hence, the "DIRECT EXPANSION FACTOR (F = N/n)" was used to estimate the aggregates of different census characteristics. The direct expansion method provides unbiased estimates.

The 1991 NAC had an area stratified sampling design and systematic independent samples were selected for each stratum. Therefore, the direct expansion factors were calculated at stratum level (Fh = Nh/nh). The weighted total of any census variable was multiplied by the direct expansion factor (Fh) to obtain the aggregates at stratum level. Stratum aggregates were added to get estimates for each province (domain of study). The province estimates were added together to have aggregates at national level.

It is important to remember that, the "WEIGHTED SEGMENT METHOD" was used to assign a reporting unit (farm) to one and only one selected SM. Therefore, each census variable, such as number of farms, total land, pastures, crops, number of cattle, population, age, sex, "MUST" be weighted at farm level (questionnaire NAC-2) previous multiplication by direct expansion factor (Fh) to obtain aggregates at SM, stratum, province and national levels. The weighting factor (Wh) used was:

$$Wh = \frac{\text{FARM TOTAL LAND INSIDE SELECTED SM}}{\text{FARM TOTAL LAND (INSIDE + OUTSIDE)}}$$

Table 6.9 contains the final direct expansions factors (Fh) calculated to estimate the aggregates for each stratum within a province (domain of study). These "Fh" were calculated using the basic information from tables 6.6.B (Nh in 1991 NAC population) and 6.8.B (nh in sample). Four original expansion factors (Fh) were modified due to negligible non-respond rate. In fact, only one SM in Ba and one on Rotuma were not enumerated during field data collection; on the other hand, one SM in Macuata and other one in Cakadrove had to be invalid after field work because they were overlapping (duplication) with two special farms of stratum 80 (MPIC research stations). The "POST-STRATIFICATION" technique (described in 6.6.2 section) was applied in Namosi.

TABLE 6.9 1991 NAC DIRECT EXPANSION FACTORS (Fh) BY STRATUM AND PROVINCE IN FIJI

DIVISION AND PROVINCE	EXPANSION FACTOR (Fh = Nh/nh)						
	10	20	30	40	72	80	90
CENTRAL							
NAITASIRI	- *	52/10 *	732/90 *	- *	864/15	2/2	-
NAMOSI	-	-	120/18 **	-	-	-	-
REWA	- *	92/15 *	247/25	-	197/5	-	-
SERUA	-	- *	138/20 *	153/20	25/2	-	-
TAILEVU	45/5	136/15	156/15	389/45	82/3	-	-
WESTERN							
BA	1187/50	(1072/49)	1003/50	325/50	330/10	-	-
N & N	386/25	391/35	198/15	552/45	31/2	1/1	-
RA	- *	235/20 *	427/40	175/20	72/3	-	2/2
NORTHERN							
BUA	-	182/15	796/65	-	-	-	3/3
CAKAUDROVE	105/10	(419/34)	899/75	-	-	2/2	13/13
MACUATA	392/30	(411/29)	765/60	-	332/10	1/1	-
EASTERN							
KADAVU	-	230/25	435/35	-	-	-	-
LAU	55/5	395/40	170/15	-	-	-	-
LOMAIVITI	84/10	534/40	76/10	-	-	-	-
ROTUMA	(91/29)	-	-	-	-	-	-

* COMBINATION OF STRATUM

NAITASIRI - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
- STRATUM 30 AND 40 ARE COMBINED TOGETHER IN STRATUM 30
REWA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20
SERUA - STRATUM 20 AND 30 ARE COMBINED TOGETHER IN STRATUM 30
RA - STRATUM 10 AND 20 ARE COMBINED TOGETHER IN STRATUM 20

** WITH POST STRATIFICATION

( ) MODIFIED EXPANSION FACTORS (Fh)

6.6.2 Post-stratification Technique in Namosi

Namosi was one of the two provinces that had the smallest sample size (30 SMs). Enumerators found that only 18 SMs (60 %) had agricultural activities. The remaining 40 % (12) SMs were under 100 % forest. Obviously, the original stratification did not work well and the sampling error of total land under farms had a high sampling error (coefficient of variation) of 28.3 %. The sampling theory has designed the "POST-STRATIFICATION" technique to solve this kind of problems, which are common in any kind of census or survey sampling.

If the sample design was not stratified, post-stratification is a sampling technique used to create strata after the sample has been selected. If the sample was already stratified, post-stratification can be used to establish "further" strata within the actual strata. Post-stratification is an "adjustment" or "correction" of the original estimation of aggregates.

All the 283 SMs constructed in Namosi were classified in stratum 30 of marginal agriculture (areas under crops from 10 % to 29 %). After data collection, the 283 SMs were "further" stratified in two groups: SMs with some agriculture (a =120 SMs) and SMs without agriculture (b = 163 SMs). Then new direct expansions factors (Fa = 120 SMs/18 SMs and Fb = 163 SMs/12 SMs) were calculated to estimate the aggregates for Namosi. The results for the aggregates of total land under SMs and their sampling errors can be seen in the table 6.10 bellow.

TABLE 6.10. ESTIMATION OF TOTAL LAND UNDER SMs WITHOUT AND WITH POST-STRATIFICATION IN NAMOSI

POST-STRATUM	No SMs			TOTAL LAND UNDER SMs			TOTAL LAND UNDER FARMS		
	Nh	nh	Fh	SAMPLE	ESTIM.	ERROR	SAMPLE	ESTIM.	ERROR
ORIGINAL STRATUM									
30	283	30	9.4	3024	28500	1.8 %	527	4967	28.3 %
POST-STRATA									
a	120	18	6.7	1809	12000	1.9 %	527	3510	24.0 %
b	163	12	13.6	1215	16500	2.8 %	0	0	0
30= a+b	283	30	-	3024	28500	1.8 %	527	3510	24.0 %

As it was expected, estimation of total land under SMs (28,500 has) and its sampling error (1.8 %) did not change after post-stratification. But, total land under farms decreased 1.4 times from 4,967 Has (before post-stratification) to 3,510 Has (after post-stratification) and sampling errors decreased around 1.2 times from 28.3 % to 24.0 %. Similar results were obtained for other census variables in this province.

6.6.3 Estimation of Sampling Errors

Estimation of sampling errors or coefficients of variation for different census characteristics were made at stratum, province and national levels. It is important to remember that, all sample variables "MUST" be weighted by the weighting factor (Wh) before doing any calculation to estimate sampling errors.

Table 6.11 presents an example to estimate the sampling errors or coefficients of variation for Ba province. The variable used is "TOTAL LAND UNDER FARMS" in the province of Ba. The general formula to compute sampling errors and its specific application to stratum 10 of Ba province are also presented bellow.

a. Stratum Level

$$\text{Coefficient of Variation in Stratum h} = \frac{\sqrt{\text{Variance of Aggregate in Stratum h}}}{\text{Estimate of Aggregate in Stratum h}} * 100$$

$$= \frac{\text{Standard Deviation in Stratum h}}{\text{Estimate of Aggregate in Stratum h}} * 100$$

To apply this formula two basic computations are needed.

COMPUTATION 1

$$\text{Variance of Aggregate in Stratum h} = Nh^2 * \text{Variance of Sample Mean in Stratum h}$$

Where:

$$\text{Variance of Sample Mean in Stratum h} = (1-nh/Nh) * \frac{\text{Sum of } (yi - \bar{y}h)^2}{nh * (nh - 1)}$$

$$= (1 - nh/Nh) * \frac{\text{Sum of } (yi)^2 - nh * (\bar{y}h)^2}{nh * (nh - 1)}$$

Where:

Nh = No of Population SMs in Stratum h

nh = No of Sample SMs in Stratum h

yi = Total Value of Sample Variable in i-th SM

yh = Total Value of Sample Variable in Stratum h

$\bar{y}h$ = Sample Mean of Stratum h

= Sum of (yi)/nh

= yh/nh

COMPUTATION 2

Estimate of Aggregate in stratum h = Fh * Total Value of Sample Variable in Stratum h

= Fh * yh

Where:

Fh = Nh/nh = Direct Expansion Factor

Therefore:

Variance of Aggregate in Stratum 10 = $(1{,}187)^2$ * Variance of Sample Mean in Stratum 10

Where:

$$\text{Variance of Sample Mean in Stratum 10} = (1 - 50/1{,}187) * \frac{105{,}432 - 50 * (2{,}036/50)}{50 * (50 - 1)}$$

= 8.8

And:

Estimate of Aggregate in Stratum 10 = (1,187/50) * 2,036 = 48,335 Has

Finally:

Variance of Aggregate in Stratum 10 = $(1,187)^2$ * 8.8 = 12,398,927

and

$$\text{Coefficient of Variation in Stratum 10} = \frac{\sqrt{12,398,927}}{48,335} * 100$$

$$= \frac{3,521}{48,335} * 100 = 7.3\ \%$$

b. Province Level

Variance of Province Aggregate = Sum of Variances of Strata Aggregates

= (12,398,927 + 11,372,465 + 8,454,247 + 22,155,865 + 283,735)

= 54,665,239

Estimate of Province Aggregate = Sum of Estimates of Province Aggregates

= (48,335 + 36,492 + 18,796 + 15,125 + 2,871)

= 121,619

Therefore:

$$\text{Coefficient of Variation of Ba Province} = \frac{\sqrt{54,665,239}}{121,619} * 100 = \frac{7,394}{121,619} * 100$$

= 6.1 %

c. National Level

Variance of National Aggregate = Sum of Variances of Province Aggregates

Estimate of
National Aggregate = Sum of estimates of Province Aggregates

$$\text{Coefficient of Variation of National Aggregate} = \frac{\sqrt{\text{Variance of National Aggregate}}}{\text{Estimate of National Aggregate}}$$

TABLE 6.11. ESTIMATION OF SAMPLING ERRORS (COEFFICIENTS OF VARIATION) IN BA PROVINCE

STRA-	TOTAL LAND UNDER FARMS (Has)					
TUM (1)	SAMPLE (2)	Fh (3)	AGGREGATE (4)=(2)*(3)	VARIANCE (5)	SD* (6)= /(5)	CV (%)* (7)=(6)/(4)
10	2036	1187/50	48335	12408555	3523	7.3
20	1668	1072/49	36492	11372465	3372	9.2
30	937	1003/50	18796	8454247	2908	15.5
40	2327	325/50	15125	22155865	4707	31.1
70	87	330/10	2871	283735	533	18.5
TOTAL	7055	-	121619	54674867	7394	6.1

* SD = Standard Deviation
CV = Coefficient of Variation or Sampling Error

6.14 SAMPLING ERRORS

Table 6.12 contains the sampling errors (coefficient of variation) calculated manually for the most important variables: Number of farms, total land under farms, number of cattle at national level and for Ba province which was utilized as bench mark to determine the final sample size.

TABLE 6.12. SAMPLING ERRORS (COEFFICIENT OF VARIATION) FOR NUMBER OF FARMS, TOTAL LAND UNDER FARMS AND NUMBER OF CATTLE FOR TOTAL COUNTRY AND BA PROVINCE

COUNTRY AND PROVINCE	COEFFICIENT OF VARIATION (%)		
	No FARMS	TOTAL LAND UNDER FARMS	No CATTLE
TOTAL COUNTRY	3.6	2.6	3.9
BA	7.9	6.1	6.5

It is important to remember that the final sample size of Ba (200 SMs) was established with around 10 % of precision at 95 % of confidence. Therefore, it was expected to get lower sampling errors (coefficient of variation) at national level (see table 6.12). Since the sample sizes of other provinces were lower than Ba province, their sampling errors are also expected to be higher.

CHAPTER 7. ANALYSIS OF CENSUS DATA

7.1 RESPONSE RATE

Only two SMs (one in Ba and one in Rotuma) out of the 1,270 SMs selected were not enumerated on the field. Other two SMs (one in Macuata and one in Cakaudrove) were invalid after field work, since they were duplicated with two special farms (MPIC research stations) of stratum 80. Therefore, the 1991 NAC had a very low non-response rate of 0.3 % or a very high response rate of almost 100 %.

7.2 COVERAGE RATE

The area estimated from 1991 NAC was 13,066 Km2 and the planimetered physical area of ASF was 13,123 Km2 with a negative non-coverage rate of less than half percent (- 0.4 %). See columns fourth and fifth of last line in table 7.1. The estimated area at national level (13,066 Km2) had a very low sampling error (0.6 %) which is an indicator of the good quality of 1991 NAC (see column sixth of last line in table 7.1).

Of course, the non-coverage over-coverage rates and their corresponding sampling errors were greater at province level (see columns fifth and sixth of table 7.2), but within the expected levels of precision and confidence.

TABLE 7.1 THE 1991 NAC COVERAGE RATES AND THEIR SAMPLING ERRORS BY PROVINCE AND NATIONAL LEVELS

DIVISION AND PROVINCE	AREA INCLUDED IN 1991 NAC (KM2)				
	1991 ASF	1991 NAC	DIFFERENCE	NON-COVERAGE (%)	SAMPLING ERROR (%)
CENTRAL					
NAITASIRI	843	851	+ 8	+ 0.9	1.5
NAMOSI	286	285	- 1	- 0.3	1.8
REWA	189	192	+ 3	+ 1.6	5.7
SERUA	292	293	+ 1	+ 0.3	1.7
TAILEVU	640	660	+ 20	+ 3.1	1.9
WESTERN					
BA	2638	2670	+ 32	+ 1.2	1.4
N & N	1905	1867	- 38	- 2.0	2.0
RA	1108	1097	- 11	- 1.0	2.3

TABLE 7.1 (CONTINUATION)

DIVISION AND PROVINCE	AREA INCLUDED IN 1991 NAC (KM2)				
	1991 ASF	1991 NAC	DIFFE-RENCE	NON-COVE-RAGE (%)	SAMPLING ERROR (%)
NORTHERN					
BUA	1093	1095	+ 2	+ 0.2	1.4
CAKAUDROVE	1575	1523	- 52	- 3.3	1.1
MACUATA	1407	1370	- 37	- 2.6	1.6
EASTERN					
KADAVU	333	343	+ 10	+ 3.0	1.4
LAU	422	420	- 2	- 0.5	5.0
LOMAIVITI	346	353	+ 7	+ 2.0	1.7
ROTUMA	46	47	+ 1	+ 2.2	1.6
TOTAL	13123	13066	- 57	- 0.4	0.6

One of the important features of the ASF methodology is that the area estimated from the sample can always be compared with the physical area of the country obtained from external sources, such as the measurements on topographic maps. Table 7.2 contains the comparisons between three sources: areas measured by Department of Lands, areas measured during the construction of ASF and areas estimated from the sample after data were collected from the field. The differences between areas measured by Department of Lands and by ASF and estimations produced from 1991 NAC were not statistically significant at national and province levels.

It is important to remember that areas of stratum 50 (100 % forest), stratum 60 (100 % non-agricultural land) and substratum 71 (urban area) were not included in the 1991 NAC.

TABLE 7.2 AREAS INCLUDED AND EXCLUDED FROM 1991 NAC COMPARED WITH AREA MEASUREMENTS OF DEPARTMENT OF LANDS BY PROVINCE AND NATIONAL LEVELS

DIVISION AND PROVINCE	ASF (KM2) TOTAL	ASF (KM2) INCLUDED	ASF (KM2) EXCLUDED	1991 NAC (KM2) TOTAL	1991 NAC (KM2) INCLUDED	1991 NAC (KM2) EXCLUDED	LANDS DEPARTMENT (KM2)
CENTRAL							
NAITASIRI	1670	843	827	1678	851	827	1665
NAMOSI	577	286	291	576	285	291	569
REWA	255	189	66	258	192	66	267
SERUA	789	292	497	790	293	497	779
TAILEVU	990	640	350	1010	660	350	941
WESTERN							
BA	2685	2638	47	2717	2670	47	2551
N & N	2418	1905	513	2380	1867	513	2414
RA	1333	1108	225	1322	1097	225	1323
NORTHERN							
BUA	1403	1093	310	1405	1095	310	1392
CAKAUDROVE	2832	1575	1257	2780	1523	1257	2916
MACUATA	2143	1407	736	2106	1370	736	2181
EASTERN							
KADAVU	481	333	148	491	343	148	470
LAU	469	422	47	467	420	47	424
LOMAIVITI	401	346	55	408	353	55	411
ROTUMA	46	46	-	47	47	-	47
TOTAL	18492	13123	5369	18435	13066	5369	18350

7.3 TOTAL LAND UNDER FARMS AND NON-FARMS

The total area of each selected SM was classified under farms and under non-farms. From 1,306,601 Has estimated in 1991 NAC at national level (see last line of table 7.3), the 45.3 % (591,407 Has) was estimated under farms and the 54.7 % (715,194 Has) was classified under non-farms. The land use of the non-farm areas was: 453,603 Has (63.4 %) were covered by natural forest, 196,967 Has (27.6 %) were non-agricultural land and the remaining 64,624 Has (9.0 %) were planted forest. Similar considerations can be made about information of provinces and divisions in table 7.3.

TABLE 7.3 TOTAL LAND UNDER FARMS AND NON-FARMS IN THE 1991 NAC BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	TOTAL (Has)	UNDER FARMS (Has)	UNDER NON-FARMS (Has)			
			TOTAL	NATURAL FOREST	PLANTED FOREST	NON-AGRI-CULTURE
CENTRAL	228150	76719	151404	130536	3492	17376
NAITASIRI	85115	30502	54613	47730	1117	5766
NAMOSI	28500	3510	24990	22351	1107	1532
REWA	19223	5588	13635	10653	471	2511
SERUA	29321	7567	21754	17604	38	4112
TAILEVU	65991	29552	36439	32225	759	3455
WESTERN	563414	269743	293671	120332	41773	131566
BA	267026	121697	145329	52630	30448	62251
N & N	186683	101817	84866	25702	9349	49815
RA	109705	46229	63476	42000	1976	19500
NORTHERN	398737	190039	208698	165284	15207	28207
BUA	109484	34170	75314	52789	12707	9818
CAKAUDROVE	152305	69467	82838	74862	1379	6597
MACUATA	136948	86402	50546	37633	1121	11792
EASTERN	116327	54906	61421	37451	4152	19818
KADAVU	34291	6125	28166	13036	1627	13503
LAU	41968	29492	12476	8671	1710	2095
LOMAIVITI	35348	15209	20139	15124	815	4200
ROTUMA	4720	4080	640	620	-	20
TOTAL	1306601	591407	715194	453603	64624	196967

7.4 NUMBER OF FARMS AND TOTAL LAND UNDER FARMS

The 95,400 farms existing in Fiji on the census day had 591,407 Has of total land. The average of total land under farm was 6.2 Has which is lower than 1968 average (7.2 Has) and higher than 1978 (4.5 Has). See table 7.4. But, if the 13,068 farms without land in 1991 are not considered, the average total land per farm increases to 7.2 Has, similar to 1968 average. About 93 % of the 95,400 existing farms were in the rural sector and the remaining in the peri-urban sector.

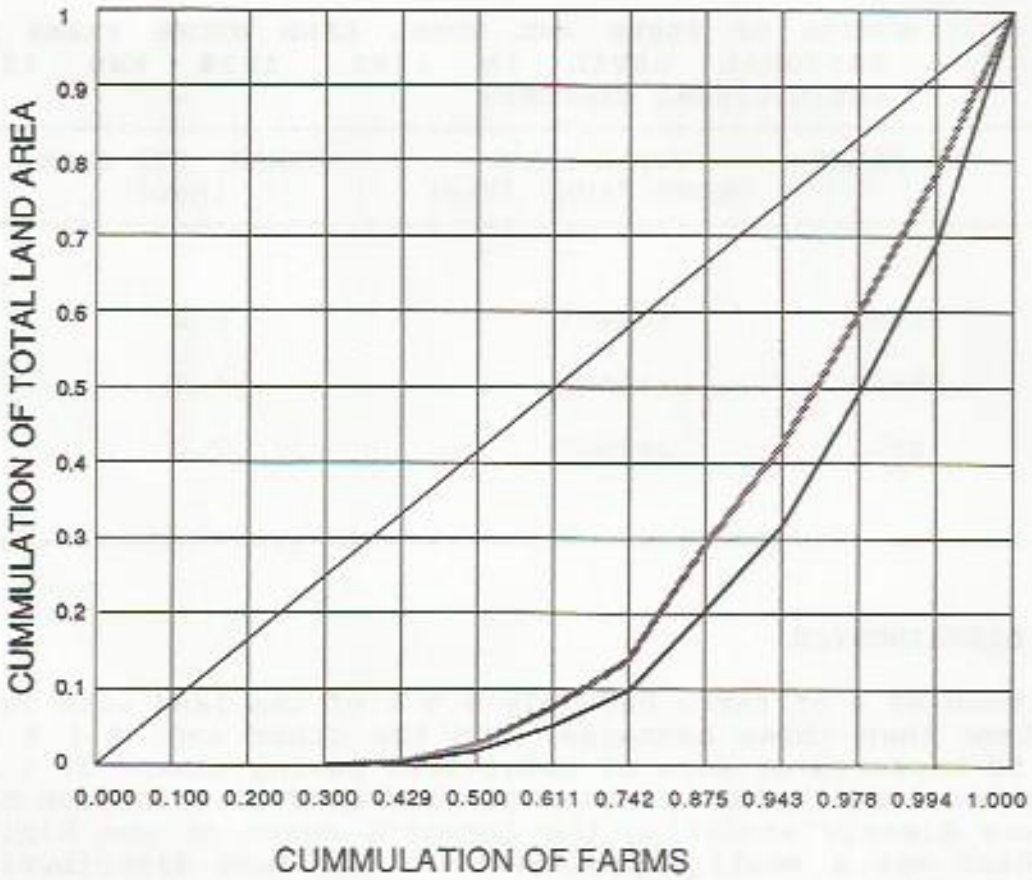
TABLE 7.4 NUMBER OF FARMS AND TOTAL LAND UNDER FARMS AT NATIONAL LEVEL IN 1991, 1978 AND 1968 AGRICULTURAL CENSUSES

CENSUS YEAR	No FARMS	TOTAL LAND UNDER FARMS (Has)	AVERAGE PER FARM (Has)
1991	95400	591407	6.2
1978	66600	319800	4.8
1968	33500	242500	7.2

7.5 LAND DISTRIBUTION

More than 60 % of farms had only 7.3 % of the land with farm sizes of less than three hectares. On the other end, 2.1 % of farms had 50 hectares or more of total land having almost 39 % of the land under farms. This problem of poor land distribution can be seen more clearly analyzing the Lorenz's curve or the Gini's index. There was a small improvement in the land distribution between 1978 and 1991 since the 1991 Lorenz's curve moved toward the equal distribution 45 degree line or the Gini's index decreased from 0.85 to 0.77. The index of Gini for the equal distribution is 0.5 (see figure 7.1). There is not information on 1968 agricultural census on land distribution by size of farms to compare with 1978 and 1991 data. But similar analysis ca be made at province level in 1978 and 1991.

FIGURE 7.1
LORENZ'S CURVES AND GINI'S COEFFICIENT IN 1978 AND 1991 AGRICULTURAL CENSUSES



YEAR	COEFFICIENT OF GINI
1978	0.85
1991	0.77

7.6 ACTUAL LAND USE

The 39.0 % (230,881 Has.) of total land under farms was classified as cultivated land (area under temporary, permanent crops and fallow of one year or less), 29.4 % was pastures and grazing areas (173,406 Has); remaining 31.6 % of the area (187,120 Has) was classified as other, which included fallow of more than one year (20,398 Has), natural forest (104,338 Has), planted forest (8,359 Has) and non-agricultural areas (54,025 Has). See table 7.5. It is important to point out that, 28,300 Has were under coconuts mixed with pastures used to graze livestock specially cattle.

It was very difficult to compare 1991 NAC data with 1968 and 1978 results. For example, the 1978 agricultural census did not collect information on pastures; in 1968 census only 36,604 Has were estimated under pastures to feed 140,447 cattle heads. The cultivated area decreased from 144,700 hectares in 1968 to 116,800 hectares in 1978 and there is not any explanation in 1978 publication on this problem.

7.5 LAND USE IN 1991, 1978 AND 1968 AGRICULTURAL CENSUSES

CENSUS	LAND UNDER FARMS (000 HAS)							
YEAR	TOTAL	%	CULTIVATED	%	PASTURES	%	OTHER	%
1991	591	100.0	231	39.0	173	29.4	187	31.6
1978	320	100.0	117	36.6	-	-	203	63.4
1968	242	100.0	145	59.9	37	15.3	60	24.8

7.7 LAND TENURE

The 36.7 % (216,874 Has) of total land under farms were leased from N.L.T.B, 32.2 % (190,380 Has) had Mataqali Ownership land tenure, 15.8 % (93,365 Has) of the land was under Free Hold, 11.2 % (66,528 Has) was leased from the Crown and remaining 4.1 % (24,260 Has) had other land tenure, such as share crop (0.4 %), other type of leases (1.6 %). See table 7.6.

Comparing with 1978 the percentages remained similar for N.L.T.B. Lease and Crown Lease, but it increased from 26.8 % in 1978 to 32.2 % in 1991 for Mataqali Ownership land tenure. The relative participation of Free Holds decreased from 26.0 % in 1978 to 15.8 % in 1991 NAC (see table 7.6). The 1968 agricultural census did not collect information on land tenure.

TABLE 7.6 PERCENTAGES OF LAND TENURE OF FIJI IN 1991 AND 1978 AGRICULTURAL CENSUSES

CENSUS YEAR	TOTAL	LAND TENURE (%)				
		FREE HOLD	CROWN LEASE	N.L.T.B. LEASE	MATAQALI OWNERSHIP	OTHER
1991	100.0	15.8	11.2	36.7	32.2	4.1
1978	100.0	26.0	11.2	36.7	26.8	-
1968	INFORMATION ON LAND TENURE WAS NOT COLLECTED					

7.8 MAIN CROPS

7.8.1 Sugar Cane

Sugar cane is the most dominant agriculture Industry in terms of foreign exchange earnings and the number of people employed in the industry. Cane farming in Fiji is based around small holders and the industry is managed by the Fiji Sugar Cooperation, which vertically controls all the aspects of the Industry. The company provides extension, research, transportation, milling and the marketing of raw sugar.

According with the 1991 NAC there were 29,411 farmers involved in cane farming with 112,192 hectares under sugar cane (the average of sugar cane area per farm was 3.8 Has). The major sugar producing provinces were Ba with 53,097 Has (47.3 %), Macuata with 31,542 Has (28.1 %), Nadroga/Navosa with 15,366 Has (13.7 %). Ra had 11,545 Has (10.3 %) under sugar cane and Cakaudrove 642 Has (0.6 %).

7.8.2 Coconuts

Copra is the second major traditional export earner and the economic base of the Eastern Islands and much of the Northern Division. The Industry is based around the estates of Cakaudrove which had 35,433 Has planted with coconuts (54.4 % of the total planted area in Fiji) and small holders in the Eastern Provinces which had 15,086 Has under coconuts (23.1 %). Together Cakaudrove and Eastern Division represented the 77.5 % of the total area under coconuts (65,114 Has) in the entire country. Lau had the largest area under coconuts (10,070 Has or the 66.8 %) within Eastern Division; Lomaiviti had 2,936 Has (19.5 %) under coconuts. Other important provinces were Macuata with 4,957 Has and Bua with 4,850 Has under coconuts (see table 7.7).

It is important to point out that from the total area of the country under coconuts (65,114 Has) the 44.5 % was in "Pure

Stand" (28,986 Has), the 42.2 % (27,444 Has) mixed with pastures and the remaining 13.3 % (8,684 Has) of the total area was mixed, interplanted or associated with other permanent crops and/or temporary crops (see last two lines of table 7.7).

TABLE 7.7 AREA PLANTED UNDER COCONUTS IN "PURE, MIXED, INTERPLANTED AND ASSOCIATED STANDS" ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	TOTAL (Has)	PURE STAND (Has)	MIXED, INTERPLANTED AND ASSOCIATE WITH		
			TOTAL (Has)	PASTURES (Has)	OTHER CROPS (Has)
CENTRAL	2227	1800	427	297	130
NAITASIRI	166	115	51	22	29
NAMOSI	82	3	79	18	61
REWA	589	571	18	1	17
SERUA	85	5	80	80	0
TAILEVU	1305	1106	199	176	33
WESTERN	2561	1458	1103	1103	0
BA	1544	623	921	921	0
N & N	372	326	46	46	0
RA	645	509	136	136	0
NORTHERN	45240	14313	30927	22939	7988
BUA	4850	2101	2749	2377	372
CAKAUDROVE	35433	9361	26072	18741	7331
MACUATA	4957	2851	2106	1821	285
EASTERN	15086	11415	3671	3105	566
KADAVU	714	421	293	289	4
LAU	10070	8082	1988	1458	530
LOMAIVITI	2936	2200	736	724	12
ROTUMA	1366	712	654	634	20
					*
TOTAL	65114	28986	36128	27444	8684
PERCENTAGE	100.0	44.5	55.5	42.2	13.3

Total areas under coconuts were similar in 1991 (65,114 Has) and 1978 (66,630 Has); but both years had lower area under coconuts than 1968 census (72,249 Has). Nevertheless, the area distribution between "Pure Stand" and "Mixed Stand" are different

since 1978 and 1968 did not collect information on coconuts mixed with pastures. In fact, the percentage of coconuts mixed with other crops in 1991 (13.3 % in last line of table 7.7) is similar to that one in 1968 (14.3 % in last line of table 7.8).

TABLE 7.8 AREA UNDER COCONUTS IN 1991, 1978 AND 1968 AGRICULTURAL CENSUSES AT NATIONAL LEVEL

CENSUS YEAR	TOTAL		PURE STAND		MIXED STAND	
	Has	%	Has	%	Has	%
1991	65114	100.0	28986	44.5	36128	55.5
1978	66630	100.0	64679	97.1	1951	2.9
1968	72249	100.0	61912	85.7	10337	14.3

7.8.3 Rice

Domestic rice production has not been spectacular in spite of Government high priority in increasing self sufficiency through research of new varieties and the development of irrigation schemes.

Rice cultivation in Fiji is concentrated in the Northern Division which had 7,217 Has planted (61.8 %) and Central Division provinces with 3,082 Has planted (26.4 %). Together Northern and Central Divisions accounted for the 88.2 % (10,299 Has) of the 11,676 Has cultivated with rice in Fiji.

The main provinces cultivating rice according the 1991 NAC were Macuata (5,608 Has), Bua (1,432 Has), Serua (1,196 Has) and Tailevu (1,193 Has).

Rice cultivation is divided into two seasons. The main season rice is planted from December to January during the rainfall season, while the off season is planted from July to August.

7.8.4 Cassava

Cassava is grown throughout the year in Fiji and it takes nine to twelve months for it to be mature. It is the most common staple food in the diet of ethnic Fijians since it is inexpensive and readily available. The crop is also high in carbohydrate and other minerals such as calcium.

It is mainly grown by small holder farmers who then sells it to middlemen in the markets of the urban centers. Frozen cassava

have also found markets in Australia and New Zealand where a large Pacific Community exists.

A total of 17,800 Has were planted with cassava in Fiji; the 93.2 % was in "Pure Stand" (16,600 Has) and 6.8 % in "Mixed or Interplanted Stand". Only 6,446 (36.2 %) Has were harvested from July, 1990 to June, 1991 out of the 17,800 Has planted with cassava at national level.

The main producing cassava provinces were Naitasiri 3,825 Has, Nadroga/Navosa 2,600 hectares and Ba with 2,311 Has.

7.8.5 Dalo

Dalo or taro is a commonly grown root crops for both domestic consumption and for export. It is a staple food, high in carbohydrates and are a good source of calcium. The main crop of dalo is usually planted from September to November while the off-season is planted from March to June. However planting throughout the year is possible in the wet zone. It takes eight to twelve months to mature. There has been a significant increase in dalo exported overseas over the years due to the increasing demand by the Pacific Communities overseas.

Approximately 5,550 Has were under dalo planted in "Pure Stand"; but other 7,266 Has were mixed or interplanted with other temporary crops, such as 5,895 Has with yaqona and 1,017 Has under the mixture "yaqona/cassava/dalo". Besides, dalo was associated with "coconuts and cassava" approximately in 1,950 Has. The harvested area of dalo from July, 1990 to June, 1991 accounted for 1,810 Has in "Pure Stand" (32.6 % of 5,550 Has planted) and around 1,200 Has in "Mixed Stand" with temporary crops.

The major Divisions cultivating dalo in "Pure Stand" were Central with 3,378 Has, Eastern with 917 Has and Western with 877 Has. Cakaudrove was the major province growing dalo mixed with yaqona (3,539 Has out of 5,895 Has planted) and also producing dalo mixed with cassava under coconuts trees (1,196 Has out of 1,713 Has).

7.8.6 Yaqona

Yaqona is an important cash crop for the rural developers. It has an important place in the cultural and traditional life of the Fijian people. Yaqona is used as a traditional drink by Fijians and is widely common by other races as a social drink. Consequently, there is a considerable local demand for the product.

It is grown as a cash crop at semi and subsistence level and it takes 4-5 years before it is harvested. It can be grown on a wide range of soils and is often intercropped with dalo, cassava and vegetables. It is also grown under coconuts.

There were 3,745 Has planted of yaqona in "Pure Stand" in Fiji with Cakaudrove being the highest producing province with 664 Has. The other major yaqona producing areas in "Pure Stand" were Lomaiviti 638 Has, Bua 359 Has and Naitasiri with 504 Has.

As was mentioned above, yaqona was mixed or interplanted with cassava and dalo in 6,912 Has. Also yaqona was cultivated under coconuts in 3,704 Has, Cakaudrove being the major province with 3,490 Has.

7.8.7 Maize

Maize is mainly used for poultry and animal feed and is grown to lessen the quantity of imported animal feed. It is grown from November to March and is best grown on well drained alluvial soil.

Maize is currently grown in Fiji at subsistence and semi-subsistence level. Planting is concentrated in Nadroga/Navosa with 1,563 Has in "Pure Stand" (64.2 % of 2,436 Has planted in Fiji) , Ba 365 Has (15 %) and Serua 351 Has (14.4 %). Also there were 144 Has mixed or interplanted with beans.

7.9 LIVESTOCK

7.9.1 Total Cattle

The total cattle herd were 280,221 heads with 42,789 farms involved in cattle farming and with an average of 6.5 heads per reporting farm. It is important to indicate that 4,613 farms defined in the 1991 NAC as "FARMS WITHOUT LAND" had 15,474 cattle heads. Out of the 280,221 cattle, 32,152 heads were not distributed by age and sex due farmers and/or informants did not know that information. Analyzing the distribution by sex and age, working bullocks represented an 18.1 % of the total cattle herd or the 49.8 % of male cattle. There was an average of 1.2 working bullocks per cattle reporting farm.

Western Division is the major cattle grower with Ba having 68,869 heads (24.6 %), Nadroga/Navosa 55,286 heads (19.7 %) and Ra with 31,084 heads (11.1 %). Other important provinces were the dairy producing, such as Tailevu 33,699 heads (12.0 %) and Naitasiri with 29,311 heads (10.5 %).

7.9.2 Dairy Cattle

The dairy industry is concentrated in the Central Division where most farms supply milk to the Rewa Cooperative Dairy Company. In the other parts of the country, farmers deliver milk directly to consumers.

There were 2,041 farms involved in commercial dairy farming with a total dairy cattle population of 36,805 which represented the 13.1 % of the total cattle herd (280,221 heads). The major

dairy producing provinces were Tailevu which had 16,563 heads, Naitasiri 12,644 heads and Serua with 2,548 heads. In Western division Ba had 2,091 heads and Nadroga/Navosa 1,157 heads.

7.9.3 Beef Cattle

The Beef Industry is made up of small holders and the large scale intensive projects such as Yaqara, Uluisaivou and Yalavou. The industry has not been performing well with cattle numbers showing little growth.

The total Beef herd was 55,633 (19.9 % of the 280,221 total cattle herd) with 1,825 farms involved in commercial Beef farming and an average of 30.5 heads per farm. The major beef producing provinces were Nadroga/Navosa 15,861 cattle, Ra 8,996 cattle, Ba 6,779 cattle and Naitasiri with 6,228 cattle.

7.9.4 Non-dairy and Non-beef Cattle

All other cattle that, were not classified as commercial dairy and beef cattle by the 1991 NAC, were included in this category. The 67.0 % (187,782 heads) of the total cattle herd of Fiji was classified in this group with 39,344 farms involved in this activity and an average of 4.8 heads per reporting farm.

Most of this type of cattle were concentrated in Western Division representing the 64.1 % (120,335 heads) of the 187,782 heads, Northern Division 18.4 % (34,636 heads) and Central Division with the 14.4 % (27,033 heads).

7.9.5 Goats

The local goat industry has lately consolidate its production as the main supplier of goat meat to the local market. This attributes to the strong growth in the local goat production and has resulted in the absolute decrease in the volume of imported goat meat. The industry has potential to achieve self sufficiency within the next five years if farmers are willing to practice improved goat husbandry.

There were 24,027 farms involved in commercial and non-commercial goat production. Goat farming was concentrated in Western and Northern Divisions which had 14,703 (61.1 %) and 6,871 (28.6 %) goat farms respectively out of the 24,027 farms existing in Fiji on the census day.

The total goat population was 187,235 with 7.8 heads per reporting farm in average. Ba had the highest number of goats with 59,764, followed by Macuata 36,080 and Nadroga/Navosa 28,832.

7.9.6 Non-commercial Pigs

Pig meat production has continued to increase over the years with self sufficiency remaining very high. The total number of

non-commercial farms involved in pig farming was 14,609 with the total population of 90,850 pigs and an average of 6.2 heads per farm.

The major pig producers were Lau which had 24.7 % (22,476 heads) of the total pig population and Cakaudrove which accounted for 14.6 % (13,298 heads) of the national total.

7.9.7 Non-commercial Poultry

Approximately 64,787 farms (67.9 % of the 95,400 farms existing in Fiji on the census day) were involved in non-commercial chicken production most of them for home consumption. The total number of chicken counted during the census was 781,173 with an average of 12.1 chicken per reporting farm. Ba remained the largest producer of chicken with 34.1 % of the total chicken population.

Also 17,784 farms reported to have 135,935 ducks with an average of 7.6 per farm. The major production was concentrated in Western Division (68,521 ducks), Northern Division (34,641 ducks) and Central Division (30,137 ducks).

CHAPTER 8. TABLES

TABLE 1 : NUMBER AND TOTAL LAND UNDER FARMS EXISTING ON THE CENSUS DAY, BY ACTUAL LAND USE AND BY SIZE OF FARMS AT NATIONAL LEVEL

SIZE OF FARMS (Has)	NUMBER OF FARMS	%	TOTAL LAND (Has)	%	ACTUAL LAND USE AREA (Has)								
					TEMPORARY CROPS & FORAGES	FALLOW ONE YEAR & LESS	FALLOW MORE THAN ONE YEAR	PERMANENT CROPS (NO PASTURES)	COCONUTS WITH PASTURES	PASTURES (INCLUDE GRAZING)	NATURAL FOREST	PLANTED FOREST	NON-AGRICULTURE LAND
0.0	13068	13.7	0	0	0	0	0	0	0	0	0	0	0
0.1 - 0.9	28252	29.6	11358	1.9	7330	547	406	1134	80	178	92	21	1570
1.0 - 2.9	17638	18.5	32000	5.4	8537	2271	2086	11673	1204	2463	721	75	2970
3.0 - 4.9	12276	12.9	49321	8.4	5488	2415	2585	26624	1363	4358	1415	147	4926
5.0 - 9.9	12703	13.3	87283	14.8	5253	3921	3998	46890	2104	12790	4407	307	7613
10.0 - 19.9	6332	6.6	85334	14.4	3263	2543	4261	31857	3484	18692	13039	636	7559
20.0 - 49.9	3173	3.3	98141	16.6	2231	1312	3830	20094	6036	26326	22753	1948	13611
50.0 - 99.9	1407	1.5	95471	16.1	629	354	1821	9167	4303	35067	33879	1094	9157
100 and More	551	0.6	132499	22.4	448	217	1411	9239	8870	73532	28032	4131	6619
TOTAL	95400	100.0	591407	100.0	33179	13580	20398	156678	27444	173406	104338	8359	54025

TABLE 2: NUMBER AND TOTAL LAND UNDER FARMS EXISTING ON THE CENSUS DAY, BY ACTUAL LAND USE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL LAND (Has)	%	ACTUAL LAND USE AREA (Has)								
					TEMPORARY CROPS & FORAGES	FALLOW ONE YEAR & LESS	FALLOW MORE THAN ONE YEAR	PERMANENT CROPS (NO PASTURES)	COCONUTS WITH PASTURES	PASTURES (INCLUDE GRAZING)	NATURAL FOREST	PLANTED FOREST	NON-AGRICULTURE LAND
CENTRAL	19062	20.0	76719	13.0	9540	2489	3480	3818	297	29989	21389	532	5185
NAITASIRI	7386	7.7	30502	5.2	5419	691	1674	1193	22	8746	10510	141	2106
NAMOSI	1101	1.2	3510	0.6	664	41	74	109	18	1717	549	0	338
REWA	2739	2.9	5588	0.9	962	33	433	631	1	1313	1637	7	571
SERUA	1470	1.5	7567	1.3	889	695	351	48	80	3059	2018	9	418
TAILEVU	6366	6.7	29552	5.0	1606	1029	948	1837	176	15154	6675	375	1752
WESTERN	43401	45.5	269743	45.6	10900	5540	9130	82403	1103	111765	15355	2125	31422
BA	26340	27.6	121697	20.6	4038	2285	3737	54114	921	29167	12006	501	14928
NADROGA/NAVOSA	10783	11.3	101817	17.2	5130	2398	3953	15828	46	58384	1412	540	14126
RA	6278	6.6	46229	7.8	1732	857	1440	12461	136	24214	1937	1084	2368
NORTHERN	22402	23.5	190039	32.1	7514	5150	5401	58038	22939	29545	48422	3913	9117
BUA	3086	3.2	34170	5.8	936	1490	1361	3079	2377	14420	8005	1839	663
CAKAUDROVE	7926	8.3	69467	11.7	3782	156	862	18758	18741	1543	23553	88	1984
MACUATA	11390	12.0	86402	14.6	2796	3504	3178	36201	1821	13582	16864	1986	6470
EASTERN	10535	11.0	54906	9.3	5225	401	2387	12419	3105	2107	19172	1789	8301
KADAVU	2518	2.6	6125	1.0	1347	41	68	426	289	729	2183	167	875
LAU	2864	3.0	29492	5.0	2020	21	1417	8924	1458	579	10754	1195	3124
LOMAIVITI	4501	4.7	15209	2.6	1591	201	464	2266	724	793	4662	419	4089
ROTUMA	652	0.7	4080	0.7	267	138	438	803	634	6	1573	8	213
TOTAL	95400	100.0	591407	100.0	33179	13580	20398	156678	27444	173406	104338	8359	54025

TABLE 3 : NUMBER AND TOTAL LAND UNDER FARMS EXISTING ON THE CENSUS DAY, BY LAND TENURE AND BY SIZE OF FARMS AT NATIONAL LEVEL

SIZE OF FARMS (Has)	NUMBERS OF FARMS	%	TOTAL LAND (Has)	%	LAND TENURE AREA (Has)						
					FREE-HOLD	CROWN-LEASE	N.L.T.B LEASE	OTHER LEASE	SHARE CROPPING	MATAQALI OWNERSHIP	OTHER
0.0	13068	13.7	0	0.0	0	0	0	0	0	0	0
0.1 - 0.9	28252	29.6	11358	1.9	415	345	961	204	133	8883	417
1.0 - 2.9	17638	18.5	32000	5.4	1847	5305	7334	918	355	15305	936
3.0 - 4.9	12276	12.9	49321	8.4	4886	12332	17694	2026	393	11534	456
5.0 - 9.9	12703	13.3	87283	14.8	9321	22367	33991	2483	605	17250	1266
10.0 - 19.9	6332	6.6	85334	14.4	7784	10121	44946	1134	646	18540	2163
20.0 - 49.9	3173	3.3	98141	16.6	14352	6415	39596	1182	10	35120	1466
50.0 - 99.9	1407	1.5	95471	16.1	13582	3143	25983	558	0	47375	4830
100 and More	551	0.6	132499	22.4	41178	6500	46369	923	0	36373	1156
TOTAL	95400	100.0	591407	100.0	93365	66528	216874	9428	2142	190380	12690

TABLE 4: NUMBER AND TOTAL LAND UNDER FARMS EXISTING ON THE CENSUS DAY, BY LAND TENURE AND BY PROVINCE AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBERS OF FARMS	%	TOTAL LAND (Has)	%	LAND TENURE AREA (Has)						
					FREE-HOLD	CROWN-LEASE	N.L.T.B LEASE	OTHER LEASE	SHARE CROPPING	MATAQALI OWNERSHIP	OTHER
CENTRAL	19062	20.0	76719	13.0	12995	7431	25507	3109	77	26612	988
NAITASIRI	7386	7.7	30502	5.2	3594	4817	8440	1057	28	11911	655
NAMOSI	1101	1.2	3510	0.6	15	0	1215	0	0	2253	27
REWA	2739	2.9	5588	0.9	943	1466	566	275	0	2305	33
SERUA	1470	1.5	7567	1.3	3921	129	1099	698	31	1653	36
TAILEVU	6366	6.7	29552	5.0	4522	1019	14187	1079	18	8490	237
WESTERN	43401	45.5	269743	45.6	23404	46613	117857	3870	1328	70840	5831
BA	26340	27.6	121697	20.6	10590	31471	52060	1585	1184	21919	2888
NADROGA/NAVOSA	10783	11.3	101817	17.2	3385	8589	45533	208	144	42007	1951
RA	6278	6.6	46229	7.8	9429	6553	20264	2077	0	6914	992
NORTHERN	22402	23.5	190039	32.1	51184	11455	71973	1766	695	49327	3639
BUA	3086	3.2	34170	5.8	10679	436	11965	270	289	10283	248
CAKAUDROVE	7926	8.3	69467	11.7	30692	888	5781	375	197	28994	2540
MACUATA	11390	12.0	86402	14.6	9813	10131	54227	1121	209	10050	851
EASTERN	10535	11.0	54906	9.3	5782	1029	1537	683	42	43601	2232
KADAVU	2518	2.6	6125	1.0	1695	265	191	0	1	3451	522
LAU	2864	3.0	29492	5.0	1737	0	3	629	0	25844	1279
LOMAIVITI	4501	4.7	15209	2.6	2217	764	1343	54	0	10406	425
ROTUMA	652	0.7	4080	0.7	133	0	0	0	41	3900	6
TOTAL	95400	100.0	591407	100.0	93365	66528	216874	9428	2142	190380	12690

TABLE 5 : AREA UNDER TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	CABBAGE (Has)		CASSAVA (Has)		CEREALS FOR GRAINS (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	182	75	6490	2624	9	7
NAITASIRI	136	58	3813	1577	8	7
NAMOSI	0	0	294	106	0	0
REWA	10	4	829	330	0	0
SERUA	1	0	272	87	0	0
TAILEVU	35	13	1282	524	1	0
WESTERN	627	376	6199	2179	297	259
BA	109	109	2290	610	2	2
NADROGA/NAVOSA	514	266	2600	1035	285	257
RA	4	1	1309	534	10	0
NORTHERN	43	18	1858	784	11	11
BUA	16	6	230	67	0	0
CAKAUDROVE	21	11	673	250	0	0
MACUATA	6	1	955	467	11	11
EASTERN	2	0	2040	633	1	1
KADAVU	0	0	760	250	1	1
LAU	0	0	789	169	0	0
LOMAIVITI	2	0	427	185	0	0
ROTUMA	0	0	64	29	0	0
TOTAL	854	469	16587	6220	318	278

TABLE 5 : AREA UNDER TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	COW PEAS (Has)		CUCUMBER (Has)		DALO (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	6	2	87	59	3378	1280
NAITASIRI	5	2	55.0	27	2376	993
NAMOSI	0	0	0.0	0	237	44
REWA	0	0	3.0	2	254	60
SERUA	0	0	1.0	0	134	53
TAILEVU	1	0	28.0	30	377	130
WESTERN	139	54	70.0	35.0	877	193
BA	81	23	9.0	6	258	34
NADROGA/NAVOSA	38	16	60.0	29	289	68
RA	20	15	1.0	0	330	91
NORTHERN	20	15	0.0	0.0	373	123
BUA	0	0	0.0	0	59	11
CAKAUDROVE	0	0	0.0	0	151	38
MACUATA	20	15	0.0	0	163	74
EASTERN	0	0	0.0	0	917	214
KADAVU	0	0	0.0	0	78	13
LAU	0	0	0.0	0	401	67
LONAIVITI	0	0	0.0	0	293	76
ROTUMA	0	0	0.0	0	145	58
TOTAL	165	71	157	94	5545	1810

TABLE 5 : AREA UNDER TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	EGGPLANT (Has)		GINGER (Has)		KAWAI (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	113	64	271	116	8	1
NAITASIRI	94	60	266	114	0	0
NAMOSI	0	0	0	0	0	0
REWA	6	3	0	0	1	1
SERUA	2	0	0	0	0	0
TAILEVU	11	1	5	2	7	0
WESTERN	258	183	0	0	133	21
BA	32	16	0	0	121	18
NADROGA/NAVOSA	220	166	0	0	7	3
RA	6	1	0	0	5	0
NORTHERN	7	0	0	0	63	32
BUA	3	0	0	0	1	1
CAKAUDROVE	0	0	0	0	0	0
MACUATA	4	0	0	0	62	31
EASTERN	0	0	0	0	19	10
KADAVU	0	0	0	0	10	8
LAU	0	0	0	0	9	2
LOMAIVITI	0	0	0	0	0	0
ROTUMA	0	0	0	0	0	0
TOTAL	378	247	271	116	223	64

TABLE 5 : AREA UNDER TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	MAIZE (Has)		OKRA (Has)		PEANUTS (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	426	266	183	105	28	15
NAITASIRI	43	10	131	70	2	0
NAMOSI	0	0	0	0	22	11
REWA	22	16	11	8	4	4
SERUA	351	238	0	0	0	0
TAILEVU	10	2	41	27	0	0
WESTERN	1979	1200	292	208	487	242
BA	365	176	84	71	107	47
NADROGA/NAVOSA	1563	1007	207	136	331	163
RA	51	17	1	1	49	32
NORTHERN	30	17	3	0	155	57
BUA	3	3	3	0	34	6
CAKAUDROVE	0	0	0	0	0	0
MACUATA	27	14	0	0	121	51
EASTERN	1	0	0	0	5	0
KADAVU	0	0	0	0	0	0
LAU	0	0	0	0	5	0
LOMAIVITI	1	0	0	0	0	0
ROTUMA	0	0	0	0	0	0
TOTAL	2436	1483	478	313	675	314

TABLE 5 : AREA UNDER TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	PIGEON PEA (Has)		PUMPKIN (Has)		RICE (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	5	1	103	36	3082	2622
NAITASIRI	0	0	85	26	523	421
NAMOSI	0	0	0	0	3	3
REWA	0	0	3	2	167	87
SERUA	0	0	4	2	1196	1040
TAILEVU	5	1	11	6	1193	1071
WESTERN	597	282	301	119	1377	1151
BA	503	223	17	8	385	357
NADROGA/NAVOSA	30	11	283	111	694	534
RA	64	48	1	0	298	260
NORTHERN	127	124	0	0	7217	5869
BUA	114	112	0	0	1432	1346
CAKAUDROVE	0	0	0	0	177	160
MACUATA	13	12	0	0	5608	4363
EASTERN	0	0	2	0	0	0
KADAVU	0	0	0	0	0	0
LAU	0	0	2	0	0	0
LOMAIVITI	0	0	0	0	0	0
ROTUMA	0	0	0	0	0	0
TOTAL	729	407	406	155	11676	9642

TABLE 5 : AREA UNDER TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	SWEET POTATOES (Has)		TOBACCO (Has)		TOMATOES (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	726	289	0	0	137	87
NAITASIRI	589	230	0	0	47	21
NANDI	10	4	0	0	0	0
REWA	61	38	0	0	39	36
SERUA	35	10	0	0	8	8
TAILEVU	31	7	0	0	43	22
WESTERN	1130	549	739	175	753	362
BA	89	12	33	6	87	36
NADROGA/NAVOSA	1029	532	706	169	642	317
RA	12	5	0	0	24	9
NORTHERN	69	37	17	2	3	0
BUA	47	32	1	0	0	
CAKAUDROVE	3	0	0	0	2	0
MACUATA	19	5	16	2	1	0
EASTERN	282	94	0	0	0	0
KADAVU	91	69	0	0	0	0
LAU	186	24	0	0	0	0
LOMAIVITI	4	0	0	0	0	0
ROTUMA	1	1	0	0	0	0
TOTAL	2207	969	756	177	893	449

TABLE 5 : AREA UNDER TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	URD (Has)		WATER MELON (Has)		YAQONA (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	12	11	259	118	914	56
NAITASIRI	0	0	36	15	504	14
NAMOSI	0	0	0	0	119	19
REWA	0	0	3	0	39	0
SERUA	0	0	99	48	63	13
TAILEVU	12	11	121	55	189	10
WESTERN	155	72	454	166	600	24
BA	137	63	28	18	132	0
NADROGA/NAVOSA	7	2	394	137	218	23
RA	11	7	32	11	250	1
NORTHERN	16	16	51	36	1298	107
BUA	1	1	31	27	359	32
CAKAUDROVE	0	0	0	0	664	41
MACUATA	15	15	20	9	275	34
EASTERN	3	0	1	0	933	71
KADAVU	0	0	0	0	143	2
LAU	0	0	1	0	150	9
LOMAIVITI	0	0	0	0	638	60
ROTUMA	3	0	0	0	2	0
TOTAL	186	99	765	320	3745	258

TABLE 5 : AREA UNDER TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	YAM (Has)		OTHER CROPS (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	104	19	336	189
NAITASIRI	35	4	241	134
NAMOSI	9	2	4	1
REWA	6	4	6	1
SERUA	2	2	29	21
TAILEVU	52	7	56	32
WESTERN	383	79	238	75
BA	259	37	119	29
NADROGA/N	56	22	90	31
RA	68	20	29	15
NORTHERN	349	206	20	2
BUA	31	11	8	2
CAKAUDROVE	63	17	0	0
MACUATA	255	178	12	0
EASTERN	265	70	30	0
KADAVU	22	15	10	0
LAU	187	36	5	0
LOMAIVITI	41	12	0	0
ROTUMA	15	7	15	0
TOTAL	1101	374	624	266

TABLE 6 : AREA UNDER TEMPORARY CROPS IN "MIXED AND INTERPLANTED STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	CASSAVA/DALO (Has)		CASSAVA/DALO/YAGONA (Has)		DALO/YAGONA (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	12	6	53	9	1021	428
NAITASIRI	0	0	12	0	707	326
NANDSI	5	3	11	6	161	57
REWA	5	2	0	0	67	21
SERUA	2	1	30	3	62	19
TAILEVU	0	0	0	0	24	5
WESTERN	21	16	1	1	172	32
BA	21	16	0	0	72	27
NADROGA/NAVOSA	0	0	0	0	23	1
RA	0	0	1	1	77	4
NORTHERN	63	25	522	63	3700	203
BUA	0	0	9	1	156	10
CAKAUDROVE	63	25	488	61	3539	193
MACUATA	0	0	25	1	5	0
EASTERN	97	22	441	84	1002	309
KADAVU	0	0	145	71	538	279
LAU	11	0	143	1	233	3
LOMAIVITI	0	0	151	12	225	26
ROTUMA	86	22	2	0	6	1
TOTAL	193	69	1017	157	5895	972

TABLE 6 : AREA UNDER TEMPORARY CROPS IN "MIXED AND INTERPLANTED STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	DALO/YAMS (Has)		MAIZE/BEANS (Has)		OTHER MIXED CROPS (Has)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	4	0	28	3	69	18
NAITASIRI	1	0	27	2	27	2
NAMOSI	0	0	0	0	8	4
REWA	0	0	0	0	3	1
SERUA	0	0	1	1	29	11
TAILEVU	3	0	0	0	2	0
WESTERN	9	3	110	35	136	81
BA	6	3	108	35	104	66
NADROGA/NAVOSA	2	0	2	0	26	14
RA	1	0	0	0	6	1
NORTHERN	104	70	6	1	171	41
BUA	1	1	1	1	6	2
CAKAUDROVE	47	20	5	0	126	30
MACUATA	56	49	0	0	39	9
EASTERN	44	8	0	0	81	12
KADAVU	4	4	0	0	6	4
LAU	40	4	0	0	51	6
LOMAIVITI	0	0	0	0	22	2
ROTUMA	0	0	0	0	2	0
TOTAL	161	81	144	39	457	152

TABLE 6 : AREA UNDER TEMPORARY CROPS IN "MIXED AND INTERPLANTED STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	OTHER VEGETABLES IN MIXED (Has)		ROOT CROPS/VEGETABLES (Has)		YAQONA/ROOT CROP/VEGETABLES (Hns)	
	PLANTED	HARVESTED	PLANTED	HARVESTED	PLANTED	HARVESTED
CENTRAL	36	14	74	8	4	0
NAITASIRI	10	5	50	5	0	0
NAMOSI	0	0	10	1	3	0
REWA	10	0	0	0	0	0
SERUA	4	1	9	0	1	0
TAILEVU	12	8	5	2	0	0
WESTERN	700	326	74	29	2	0
BA	685	318	72	29	2	0
NADROGA/NAVOSA	11	4	0	0	0	0
RA	4	4	2	0	0	0
NORTHERN	324	66	18	14	86	0
BUA	8	2	0	0	0	0
CAKAUDROVE	16	9	18	14	76	0
MACUATA	300	55	0	0	10	0
EASTERN	17	2	14	0	12	0
KADAVU	0	0	0	0	0	0
LAU	17	2	14	0	12	0
LOMAIVITI	0	0	0	0	0	0
ROTUMA	0	0	0	0	0	0
TOTAL	1077	408	180	51	104	0

TABLE 7 : AREA UNDER PERMANENT CROPS IN "PURE STAND" ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	BANANA (Has)		BELE (Has)		CITRUS FRUIT (Has)	
	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE
CENTRAL	404	116	26	5	30	2
NAITASIRI	374	94	20	3	27	0
NANDSI	0	0	0	0	2	2
REWA	6	3	0	0	1	0
SERUA	0	0	0	0	0	0
TAILEVU	24	19	6	2	0	0
WESTERN	200	39	15	1	41	41
BA	138	5	12	0	36	36
NADROGA/NAVOSA	29	21	2	1	5	5
RA	33	13	1	0	0	0
NORTHERN	275	275	36	33	3	1
BUA	2	2	2	0	2	0
CAKAUDROVE	252	252	33	33	0	0
MACUATA	21	21	1	0	1	1
EASTERN	22	2	0	0	1	1
KADAVU	0	0	0	0	0	0
LAU	11	2	0	0	0	0
LOMAIVITI	2	0	0	0	0	0
ROTUMA	9	0	0	0	1	1
TOTAL	901	432	77	39	75	45

TABLE 7 : AREA UNDER PERMANENT CROPS IN "PURE STAND" ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	COCOA (Has)		COCONUT (Has)		COFFEE (Has)	
	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE
CENTRAL	882	440	1800	1686	0	0
NAITASIRI	335	30	115	71	0	0
NAMOSI	0	0	3	3	0	0
REWA	0	0	571	545	0	0
SERUA	1	0	5	5	0	0
TAILEVU	546	410	1106	1062	0	0
WESTERN	321	244	1458	636	0	0
BA	0	0	623	287	0	0
NADROGA/NAVOSA	0	0	326	8	0	0
RA	321	244	509	341	0	0
NORTHERN	2092	962	14313	12954	216	140
BUA	575	419	2101	1926	0	0
CAKAUDROVE	407	275	9361	8649	216	140
MACUATA	1110	268	2851	2379	0	0
EASTERN	40	24	11415	6314	0	0
KADAVU	0	0	421	360	0	0
LAU	4	4	8082	4650	0	0
LOMAIVITI	4	0	2200	812	0	0
ROTUMA	32	20	712	492	0	0
TOTAL	3335	1670	28986	21590	216	140

TABLE 7 : AREA UNDER PERMANENT CROPS IN "PURE STAND" ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	DURUKA (Has)		ORANGE (Has)		PAWPAW (Has)	
	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE
CENTRAL	218	121	3	1	3	1
NAITASIRI	103	38	3	1	1	1
NAMOSI	44	44	0	0	0	0
REWA	24	4	0	0	1	0
SERUA	8	4	0	0	1	0
TAILEVU	39	31	0	0		
WESTERN	30	17	0	0	51	38
BA	4	0	0	0	5	0
NADROGA/NAVOSA	19	12	0	0	43	35
RA	7	5	0	0	3	3
NORTHERN	6	6	364	364	0	0
BUA	0	0	0	0	0	0
CAKAUDROVE	0	0	0	0	0	0
MACUATA	6	6	364	364	0	0
EASTERN	1	1	6	6	0	0
KADAVU	0	0	0	0	0	0
LAU	1	1	0	0	0	0
LOMAIVITI	0	0	0	0	0	0
ROTUMA	0	0	6	6		
TOTAL	255	145	373	371	54	39

TABLE 7 : AREA UNDER PERMANENT CROPS IN "PURE STAND" ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	PINEAPPLE (Has)		OTHER CROPS (Has)	
	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE
CENTRAL	211	55	44	27
NAITASIRI	161	16	10	8
NAMOSI	0	0	0	0
REWA	3	0	4	4
SERUA	0	0	15	7
TAILEVU	47	39	15	8
WESTERN	138	89	55	43
BA	134	85	28	18
NADROGA/NAVOSA	3	3	8	7
RA	1	1	19	18
NORTHERN	27	18	137	86
BUA	3	1	2	1
CAKAUDROVE	9	9	100	65
MACUATA	15	8	35	20
EASTERN	16	2	44	20
KADAVU	1	1		
LAU	4	0	35	15
LOMAIVITI	0	0	3	2
ROTUMA	11	1	6	3
TOTAL	392	164	280	176

TABLE 8 : AREA UNDER PERMANENT CROPS IN "MIXED, INTERPLANTED AND ASSOCIATED STAND" ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	COCONUTS/CASSAVA (Has)		COCONUTS/COCOA (Has)		COCONUT/DALO (Has)	
	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE
CENTRAL	15	8	49	15	16	15
NAITASIRI	0	0	29	0	0	0
NAMOSI	15	8	0	0	0	0
REWA	0	0	0	0	13	12
SERUA	0	0	0	0	0	0
TAILEVU	0	0	20	15	3	3
WESTERN	0	0	0	0	0	0
BA	0	0	0	0	0	0
NADROGA/NAVOSA	0	0	0	0	0	0
RA	0	0	0	0	0	0
NORTHERN	916	770	1896	1410	216	215
BUA	12	2	209	202	5	5
CAKAUDROVE	634	519	1677	1198	207	206
MACUATA	270	249	10	10	4	4
EASTERN	17	3	10	3	0	0
KADAVU	0	0	0	0	0	0
LAU	17	3	0	0	0	0
LOMAIVITI	0	0	0	0	0	0
ROTUMA	0	0	10	3	0	0
TOTAL	948	781	1955	1428	232	230

TABLE 8 : AREA UNDER PERMANENT CROPS IN "MIXED, INTERPLANTED AND ASSOCIATED STAND" ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	COCONUT/DALO/CASSAVA (Has)		COCONUTS/PASTURES (Has)		COCONUT/YAQONA (Has)	
	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE
CENTRAL	4	4	297	166	46	0
NAITASIRI	0	0	22	0	0	0
NAMOSI	0	0	18	0	46	0
REWA	4	4	1	0	0	0
SERUA	0	0	80	50	0	0
TAILEVU	0	0	176	116	0	0
WESTERN	0	0	1103	800	0	0
BA	0	0	921	632	0	0
NADROGA/NAVOSA	0	0	46	46	0	0
RA	0	0	136	122	0	0
NORTHERN	1196	1027	22939	18792	3636	3028
BUA	0	0	2377	1927	146	146
CAKAUDROVE	1196	1027	18741	15387	3490	2882
MACUATA	0	0	1821	1478	0	0
EASTERN	513	0	3105	1367	22	16
KADAVU	0	0	289	289	4	4
LAU	513	0	1458	317	0	0
LOMAIVITI	0	0	724	328	12	12
ROTUMA	0	0	634	433	6	0
TOTAL	1713	1031	27444	21125	3704	3044

TABLE 8 : AREA UNDER PERMANENT CROPS IN "MIXED, INTERPLANTED AND ASSOCIATED STAND" ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	COCONUT/YAM (Has)		VUDI/BELE (Has)		OTHER MIXED CROPS	
	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE
CENTRAL	0	0	0	0	72	41

TABLE 8 : AREA UNDER PERMANENT CROPS IN "MIXED, INTERPLANTED AND ASSOCIATED STAND" ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	COCONUT/YAM (Has)		VUDI/BELE (Has)		OTHER MIXED CROPS	
	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE	PLANTED	PRODUCTIVE AGE
CENTRAL	0	0	0	0	72	41
NAITASIRI	0	0	0	0	15	7
NAMOSI	0	0	0	0	4	3
REWA	0	0	0	0	5	1
SERUA	0	0	0	0	18	9
TAILEVU	0	0	0	0	30	21
WESTERN	0	0	35	16	51	37
BA	0	0	30	14	7	7
NADROGA/N	0	0	5	2	22	20
RA	0	0	0	0	22	10
NORTHERN	128	123	395	309	53	31
BUA	0	0	19	19	1	0
CAKAUDROVE	127	122	364	279	43	23
MACUATA	1	1	12	11	9	8
EASTERN	4	0	250	206	23	12
KADAVU	0	0	0	0	0	0
LAU	0	0	242	205	15	6
LOMAIVITI	0	0	8	1	2	1
ROTUMA	4	0	0	0	6	5
TOTAL	132	123	680	531	199	121

TABLE 9 : NUMBER OF SUGARCANE FARMS AND PLANTED AREA IN "PURE STAND, MIXED, INTERPLANTED AND ASSOCIATED STANDS" ON THE CENSUS DAY BY RATOONS AND BY SIZE OF FARMS AT NATIONAL LEVEL

SIZE OF FARMS (Has)	NUMBER OF FARMS	%	TOTAL SUGARCANE (Has)	%	PLANTED AREA OF SUGARCANE (Has)						
					PLANTED NOT TO BE HARVESTED IN 1991	PLANTED TO BE HARVESTED IN 1991	FIRST RATOON	SECOND RATOON	THIRD RATOON	FOURTH RATOON	OTHER RATOONS
0.0	0	0.0	0	0.0	0	0	0	0	0	0	0
0.1 - 0.9	708	2.4	382	0.3	0	47	52	44	134	61	44
1.0 - 2.9	6038	20.5	8371	7.5	320	903	1365	1828	1850	897	1208
3.0 - 4.9	7906	26.9	22465	20.0	1291	2656	3029	4219	4675	2853	3742
5.0 - 9.9	9074	30.9	39188	34.9	2308	4825	5670	7501	7204	5024	6656
10.0 - 19.9	4239	14.4	26020	23.2	1478	3878	3398	4247	4265	2731	6023
20.0 - 49.9	1167	4.0	10871	9.7	701	1519	1288	1881	2106	1229	2147
50.0 - 99.9	249	0.8	2696	2.4	126	439	470	610	518	243	290
100 and More	30	0.1	2199	2.0	300	461	192	64	75	63	1044
TOTAL	29411	100.0	112192	100.0	6524	14728	15464	20394	20827	13101	21154

TABLE 10: NUMBER OF SUGARCANE FARMS AND PLANTED AREA IN "PURE, MIXED, INTERPLANTED AND ASSOCIATED STANDS" ON THE CENSUS DAY BY RATOONS AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL SUGARCANE (Has)	%	PLANTED AREA OF SUGARCANE (Has)						
					PLANTED NOT TO BE HARVESTED IN 1991	PLANTED TO BE HARVESTED IN 1991	FIRST RATOON	SECOND RATOON	THIRD RATOON	FOURTH RATOON	OTHER RATOONS
CENTRAL	0	0.0	0	0.0	0	0	0	0	0	0	0
NAITASIRI	0	0.0	0	0.0	0	0	0	0	0	0	0
NAMOSI	0	0.0	0	0.0	0	0	0	0	0	0	0
REWA	0	0.0	0	0.0	0	0	0	0	0	0	0
SERUA	0	0.0	0	0.0	0	0	0	0	0	0	0
TAILEVU	0	0.0	0	0.0	0	0	0	0	0	0	0
WESTERN	23188	78.8	80008	71.3	4888	10390	11918	16346	16428	9873	10165
BA	15710	53.4	53097	47.3	3073	6396	6943	10526	11372	6804	7983
NADROGA/NAVOSA	4008	13.6	15366	13.7	940	2036	2310	3242	3187	2237	1414
RA	3470	11.8	11545	10.3	875	1958	2665	2578	1869	832	768
NORTHERN	6223	21.2	32184	28.7	1636	4338	3546	4048	4399	3228	10989
BUA	0	0.0	0	0.0	0	0	0	0	0	0	0
CAKAUDROVE	154	0.5	642	0.6	56	154	75	151	54	53	99
MACUATA	6069	20.7	31542	28.1	1580	4184	3471	3897	4345	3175	10890
EASTERN	0	0.0	0	0.0	0	0	0	0	0	0	0
KADAVU	0	0.0	0	0.0	0	0	0	0	0	0	0
LAU	0	0.0	0	0.0	0	0	0	0	0	0	0
LOMAIVITI	0	0.0	0	0.0	0	0	0	0	0	0	0
ROTUMA	0	0.0	0	0.0	0	0	0	0	0	0	0
TOTAL	29411	100.0	112192	100.0	6524	14728	15464	20394	20827	13101	21154

TABLE 11 : NUMBER OF SCATTERED PLANTS AND TREES AND VINES FOR CROPS ON THE CENSUS DAY BY TYPE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF PLANTS AND TREES									
	AVACADO		BANANA		BREADFRUIT		CHILLI		CITRUS FRUIT	
	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING
CENTRAL	1958	1331	207765	142107	49437	38771	3455	3282	31166	25541
NAITASIRI	11	11	72924	60358	13434	12385	1	1	14341	12230
NAMOSI	1353	808	23188	7208	9792	1566	0	0	4477	3794
REWA	118	97	20191	11242	9174	8804	0	0	3137	2371
SERUA	15	15	8263	4079	1698	1422	0	0	5141	3869
TAILEVU	461	400	83199	59220	15339	14594	3454	3281	4070	3277
WESTERN	1240	1027	298735	174005	60876	54220	8388	7482	115248	95844
BA	550	497	133423	73363	36098	32994	7676	6906	77259	63089
NADROGA/NAVOSA	151	134	43051	33997	9076	7737	624	488	12846	11596
RA	539	396	122261	66645	15702	13489	88	88	25143	21159
NORTHERN	930	833	348539	255589	70808	65517	1963	1466	9059	6365
BUA	12	12	50036	21918	8596	5620	1842	1345	5838	3470
CAKAUDROVE	66	66	161083	153754	31829	31228	25	25	5	5
MACUATA	852	755	137420	79917	30383	28669	96	96	3216	2890
EASTERN	81	81	88125	63539	26365	24115	410	410	8631	7343
KADAVU	37	37	11205	9052	6095	5962	343	0	4117	3279
LAU	3	3	51863	33474	11880	10090	67	343	824	577
LOMAIVITI	13	13	21762	19047	5713	5465	0	67	3627	3424
ROTUMA	28	28	3295	1966	2677	2598	0	0	63	63
TOTAL	4209	3272	943164	635240	207486	182623	14216	12640	164104	135093

TABLE 11 : NUMBER OF SCATTERED PLANTS AND TREES AND VINES FOR CROPS ON THE CENSUS DAY BY TYPE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF PLANTS AND TREES									
	COCOA		COCONUT		CUSTARD APPLE		DURUKA		EGGPLANT	
	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING
CENTRAL	3234	3071	126266	101149	1774	1641	14338	14314	61	61
NAITASIRI	2826	2702	32303	23840	566	539	3970	3970	0	0
NANDSI	0	0	6209	4317	65	65	1318	1318	0	0
REWA	118	79	21060	19138	497	497	599	575	0	0
SERUA	0	0	13556	9230	449	343	1695	1695	16	16
TAILEVU	290	290	53138	44624	197	197	6756	6756	45	45
WESTERN	346	346	214198	143030	5225	1987	11878	11794	15751	13002
BA	0	0	122092	75431	5060	1880	5445	5445	14185	11462
NADROGA/NAVOSA	0	0	41213	32693	67	54	2058	1974	1566	1540
RA	346	346	50893	34906	98	53	4375	4375	0	0
NORTHERN	3548	3427	189495	145328	1978	1723	867	867	4020	3319
BUA	1395	1274	11546	9051	16	16	0	0	2422	1721
CAKAUDROVE	1048	1048	2259	2259	869	869	0	0	272	272
MACUATA	1105	1105	175690	134018	1093	838	867	867	1326	1326
EASTERN	447	447	92193	71560	275	134	2490	2490	2687	2555
KADAVU	0	0	25304	17395	219	78	0	0	86	86
LAU	8	8	42906	31629	10	10	488	488	2306	2174
LOMAIVITI	227	227	18970	17913	0	0	2002	2002	267	267
ROTUMA	212	212	5013	4623	46	46	0	0	28	28
TOTAL	7575	7291	622152	461067	9252	5485	29573	29465	22519	18937

TABLE 11 : NUMBER OF SCATTERED PLANTS AND TREES AND VINES FOR CROPS ON THE CENSUS DAY BY TYPE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF PLANTS AND TREES									
	GRAPE FRUIT		GUAVA		LEMON		MANDARINE & TANGARINE		MANGO	
	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING
CENTRAL	1892	1892	4120	3960	9877	8507	13516	11710	14837	12969
NAITASIRI	12	12	1635	1577	4554	3657	884	884	2519	1486
NAMOSI	0	0	0	0	70	70	883	874	38	38
REWA	1880	1880	888	855	1840	1663	204	164	4471	4224
SERUA	0	0	137	130	75	75	0	0	680	342
TAILEVU	0	0	1460	1398	3338	3042	11545	9788	7209	6879
WESTERN	302	302	4485	4185	8824	6696	6605	5845	106177	93204
BA	0	0	4210	3948	2647	1859	1553	1409	81697	71446
NADROGA/NAVOSA	61	61	127	123	3576	2684	2935	2569	13846	12071
RA	241	241	148	114	2601	2153	2117	1867	10634	9687
NORTHERN	183	183	2905	2255	12741	12000	9486	8218	31215	29347
BUA	0	0	53	32	0	0	0	0	853	700
CAKAUDROVE	0	0	1910	1910	5254	5173	965	965	6177	6043
MACUATA	183	183	942	313	7487	6827	8521	7253	24185	22604
EASTERN	3	3	3086	3086	3936	3920	503	446	12204	11225
KADAVU	0	0	0	0	0	0	50	50	2659	2521
LAU	0	0	2979	2979	3496	3486	223	166	6246	5521
LOMAIVITI	0	0	98	98	240	240	230	230	3125	3015
ROTUMA	3	3	9	9	200	194	0	0	174	168
TOTAL	2380	2380	14596	13486	35378	31123	30110	26219	164433	146745

TABLE 11 : NUMBER OF SCATTERED PLANTS AND TREES AND VINES FOR CROPS ON THE CENSUS DAY BY TYPE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF PLANTS AND TREES									
	ORANGES		OTHER CULTIVATED FRUITS		PAWPAW		PINEAPPLE		SOURLIME	
	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING	PLANTED	BEARING
CENTRAL	3573	3405	15914	15109	12942	11410	9716	7721	1220	1153
NAITASIRI	195	153	5496	5073	3896	3347	2386	1994	0	0
NAMOSI	0	0	231	231	223	104	1626	1623	0	0
REWA	1037	0	4365	4285	2165	2046	2127	748	45	45
SERUA	0	1011	330	299	970	685	166	127	0	0
TAILEVU	2341	2241	5492	5221	5688	5228	3411	3229	1175	1108
WESTERN	12897	10216	43518	40849	58028	50255	15154	13007	533	513
BA	1533	1106	39259	37039	40442	35636	4503	3524	171	171
NADROGA/NAVOSA	10604	8517	1359	1308	5803	4713	2305	2068	101	101
RA	760	593	2900	2502	11783	9906	8346	7415	261	241
NORTHERN	21374	20656	17385	17016	50410	41941	56946	47616	1750	1731
BUA	0	0	217	193	12038	8501	23490	19859	0	0
CAKAUDROVE	11551	11534	8273	8248	11512	11460	4867	4864	40	40
MACUATA	9823	9122	8895	8575	26860	21980	28589	22893	1710	1691
EASTERN	8941	8251	6875	6854	23131	21834	6572	6229	290	223
KADAVU	55	55	1135	1135	1980	1929	0	0	0	0
LAU	8433	7759	4884	4866	16587	15514	6469	6131	11	11
LOMAIVITI	53	53	681	681	3463	3393	14	9	167	100
ROTUMA	400	384	175	172	1101	998	89	89	112	112
TOTAL	46785	42528	83692	79828	144511	125440	88388	74573	3793	3620

TABLE 12: NUMBER OF FARMS AND AREA UNDER PASTURES ON THE CENSUS DAY BY TYPE AND PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL PASTURES (Has)	%	TYPE AND AREA (Has)		
					IMPROVED EXOTIC	IMPROVED NATIVE	UNIMPROVED NATIVE
CENTRAL	4310	18.3	29989	17.3	4399	15763	9827
NAITASIRI	2348	9.9	8746	5.0	973	5097	2676
NAMOSI	91	0.4	1717	1.0	157	920	640
REWA	304	1.3	1313	0.8	0	315	998
SERUA	327	1.4	3059	1.8	126	2476	457
TAILEVU	1240	5.3	15154	8.7	3143	6955	5056
WESTERN	13227	56.0	111765	64.5	772	24602	86391
BA	7994	33.9	29167	16.8	11	671	28485
NADROGA/NAVOSA	2359	10.0	58384	33.7	761	14117	43506
RA	2874	12.2	24214	14.0	0	9814	14400
NORTHERN	5897	25.0	29545	17.0	895	1516	27134
BUA	1084	4.6	14420	8.3	258	732	13430
CAKAUDROVE	210	0.9	1543	0.9	254	590	699
MACUATA	4603	19.5	13582	7.8	383	194	13005
EASTERN	173	0.7	2107	1.2	62	872	1173
KADAVU	72	0.3	729	0.4	0	92	637
LAU	45	0.2	579	0.3	62	40	477
LOMAIVITI	53	0.2	793	0.5	0	734	59
ROTUMA	3	0.0	6	0.0	0	6	0
TOTAL	23607	100.0	173406	100.0	6128	42753	124525

TABLE 13 : NUMBER OF CATTLE FARMS AND NUMBER OF CATTLE EXISTING ON THE CENSUS DAY BY SEX, AGE AND SIZE OF FARMS AT NATIONAL LEVEL

SIZE OF FARMS (Has)	NUMBER OF FARMS	%	TOTAL CATTLE	%	FEMALES				MALES						SEX & AGE DISTRIBUTION UNKNOWN
					TOTAL	CALVES LESS 1 YEAR	HEIFERS 1 - 3 YEARS	COWS MORE 3 YEARS	TOTAL	CALVES LESS 1 YEAR	STEERS 1 - 3 YEARS	STEERS MORE 3 YEARS	BULLS	WORK-ING-BULLOCKS	
0.0	4613	10.8	15475	5.5	10040	2192	2074	5774	5173	1161	672	468	834	2038	262
0.1 - 0.9	6336	14.8	23332	8.3	15058	2874	3598	8586	7315	1191	1306	749	1644	2425	959
1.0 - 2.9	8198	19.2	33664	12.0	19398	3929	3849	11620	13239	1634	1670	919	1322	7694	1027
3.0 - 4.9	7316	17.1	32901	11.7	15382	3481	2758	9143	15327	1932	1119	508	767	11001	2192
5.0 - 9.9	8750	20.4	46243	16.5	22672	5445	3994	13233	21145	3149	1838	829	1199	14130	2426
10.0 - 19.9	4545	10.6	33039	11.8	15765	3491	3014	9260	13544	1937	1423	937	924	8323	3730
20.0 - 49.9	1924	4.5	29187	10.4	12645	2488	2629	7528	9121	1855	1684	1135	982	3465	7421
50.0 - 99.9	772	1.8	24818	8.9	12277	2177	3339	6761	7184	1964	1860	1308	768	1284	5357
100 and More	335	0.8	41562	14.8	22848	2823	6161	13864	9936	2339	3121	3283	798	395	8778
TOTAL	42789	100.0	280221	100.0	146085	28900	31416	85769	101984	17162	14693	10136	9238	50755	32152

TABLE 14 : NUMBER OF CATTLE FARMS AND NUMBER OF CATTLE EXISTING ON THE CENSUS DAY BY SEX, AGE, AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL CATTLE	%	FEMALES				MALES						SEX & AGE DISTRIBUTION UNKNOWN
					TOTAL	CALVES LESS 1 YEAR	HEIFERS 1 - 3 YEARS	COWS MORE 3 YEARS	TOTAL	CALVES LESS 1 YEAR	STEERS 1 - 3 YEARS	STEERS MORE 3 YEARS	BULLS	WORKING-BULLOCKS	
CENTRAL	7679	17.9	75254	26.9	45794	7937	11163	26694	21295	6239	5963	1935	3044	4114	8165
NAITASIRI	3249	7.6	29311	10.5	17017	3716	3573	9728	9330	2796	2581	968	1202	1783	2964
NANDSI	344	0.8	3057	1.1	1451	243	490	718	439	77	85	98	93	86	1167
REWA	304	0.7	2504	0.9	1770	182	398	1190	734	181	166	76	201	110	0
SERUA	690	1.6	6883	2.4	2639	447	681	1511	1788	507	517	36	208	520	2256
TAILEVU	3092	7.2	33699	12.0	22917	3349	6021	13547	9004	2678	2614	757	1340	1615	1778
WESTERN	25894	60.4	155239	55.4	79074	16765	16273	46036	58891	7905	6285	5908	4293	34500	17274
BA	14492	33.8	68869	24.6	34066	7795	6308	19963	25562	3730	2199	1125	1602	16906	9241
NADROGA/NAVOSA	6999	16.4	55286	19.7	27638	6425	5104	16109	20604	2617	2543	2386	1758	11300	7044
RA	4403	10.3	31084	11.1	17370	2545	4861	9964	12725	1558	1543	2397	933	6294	989
NORTHERN	8177	19.1	42787	15.3	16957	3453	2702	10802	19322	2427	1862	1716	1259	12058	6508
BUA	1149	2.7	8604	3.1	3554	701	705	2148	3043	504	333	228	347	1631	2007
CAKAUDROVE	1423	3.3	14756	5.3	5677	804	988	3885	4710	751	1309	1278	480	892	4369
MACUATA	5605	13.1	19427	6.9	7726	1948	1009	4769	11569	1172	220	210	432	9535	132
EASTERN	1039	2.5	6941	2.5	4260	745	1278	2237	2476	591	583	577	642	83	205
KADAVU	187	0.4	610	0.2	472	3	130	339	138	0	0	18	120	0	0
LAU	365	0.9	4265	1.5	2228	581	798	849	1961	524	533	551	284	69	76
LOMAIVITI	250	0.6	1253	0.4	907	112	257	538	217	52	36	8	113	8	129
ROTUMA	237	0.6	813	0.3	653	49	93	511	160	15	14	0	125	6	0
TOTAL	42789	100.0	280221	100.0	146085	28900	31416	85769	101984	17162	14693	10136	9238	50755	32152

TABLE 15: NUMBER OF DAIRY FARMS AND NUMBER OF DAIRY CATTLE EXISTING ON THE CENSUS DAY BY SEX, AGE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL DAIRY CATTLE	%	DAIRY FEMALE				DAIRY MALE						SEX & AGE DISTR-IBUTION UNKNOWN
					TOTAL	CALVES LESS 1 YEAR	HEIFERS 1 - 3 YEARS	COWS MORE 3 YEARS	TOTAL	CALVES LESS 1 YEAR	STEERS 1 - 3 YEARS	STEERS MORE 3 YEARS	BULLS	WORK-ING-BULLOCKS	
CENTRAL	1601	78.4	33178	90.1	24220	3596	5196	15428	7343	2276	2356	782	1206	723	1615
NAITASIRI	961	47.1	12644	34.4	7657	1564	1296	4797	3372	1012	884	457	612	407	1615
NAMOSI	91	4.5	354	1.0	292	59	97	136	62	29	10	10	0	13	0
REWA	78	3.8	1069	2.9	935	51	78	806	134	49	45	14	26	0	0
SERUA	262	12.8	2548	6.9	1675	330	401	944	873	160	330	21	92	270	0
TAILEVU	209	10.2	16563	45.0	13661	1592	3324	8745	2902	1026	1087	280	476	33	0
WESTERN	333	16.4	3269	8.9	1311	306	326	679	1444	155	296	583	77	333	514
BA	56	2.8	2091	5.7	940	208	326	406	653	155	147	30	65	256	498
NADROGA/NAVOSA	266	13.0	1157	3.1	371	98	0	273	770	0	149	553	12	56	16
RA	11	0.5	21	0.1	0	0	0	0	21	0	0	0	0	21	0
NORTHERN	94	4.7	318	0.9	242	26	27	189	76	13	0	0	0	63	0
BUA	2	0.1	5	0.0	5	0	5	0	0	0	0	0	0	0	0
CAKAUDROVE	80	4.0	260	0.7	207	12	22	173	53	12	0	0	0	41	0
MACUATA	12	0.6	53	0.1	30	14	0	16	23	1	0	0	0	22	0
EASTERN	13	0.6	40	0.1	40	0	27	13	0	0	0	0	0	0	0
KADAVU	0	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
LAU	0	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
LOMAIVITI	13	0.6	40	0.1	40	0	27	13	0	0	0	0	0	0	0
ROTUMA	0	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2041	100.0	36805	100.0	25813	3928	5576	16309	8863	2444	2652	1365	1283	1119	2129

TABLE 16: NUMBER OF BEEF FARMS AND NUMBER OF BEEF CATTLE EXISTING ON THE CENSUS DAY BY SEX, AGE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL BEEF CATTLE	%	FEMALE BEEF				MALE BEEF						SEX & AGE DISTRIBUTION UNKNOWN
					TOTAL	CALVES LESS 1 YEAR	HEIFERS 1 - 3 YEARS	COWS MORE 3 YEARS	TOTAL	CALVES LESS 1 YEAR	STEERS 1 - 3 YEARS	STEERS MORE 3 YEARS	BULLS	WORK-ING-BULLOCKS	
CENTRAL	724	39.7	15043	27.0	6308	1263	1903	3142	4599	1370	1523	647	550	509	4136
NAITASIRI	298	16.3	6228	11.2	2810	753	551	1506	2265	789	791	248	189	248	1153
NAMOSI	55	3.0	1451	2.6	583	39	204	340	280	23	47	73	64	73	588
REWA	226	12.4	1346	2.4	764	113	320	331	582	114	121	62	175	110	0
SERUA	51	2.8	1984	3.6	201	41	37	123	212	107	71	0	16	18	1571
TAILEVU	94	5.2	4034	7.3	1950	317	791	842	1260	337	493	264	106	60	824
WESTERN	760	41.6	31635	56.9	16316	2122	4821	9373	7117	1389	1656	2679	809	584	8202
BA	148	8.1	6779	12.2	1338	250	166	922	623	198	53	198	40	134	4818
NADROGA/NAVOSA	509	27.9	15860	28.5	8842	1612	2236	4994	3634	882	1350	658	455	289	3384
RA	103	5.6	8996	16.2	6136	260	2419	3457	2860	309	253	1823	314	161	0
NORTHERN	179	9.8	7833	14.1	2644	331	429	1884	2425	470	958	879	85	33	2764
BUA	20	1.1	1454	2.6	0	0	0	0	0	0	0	0	0	0	1454
CAKAUDROVE	132	7.2	6058	10.9	2502	264	371	1867	2290	390	958	843	66	33	1266
MACUATA	27	1.5	321	0.6	142	67	58	17	135	80	0	36	19	0	44
EASTERN	162	8.9	1123	2.0	914	152	205	557	209	53	51	20	79	6	0
KADAVU	0	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
LAU	3	0.2	224	0.4	184	34	31	119	40	11	15	12	2	0	0
LOMAIVITI	146	8.0	852	1.5	686	112	152	422	166	39	36	8	77	6	0
ROTUMA	13	0.7	47	0.1	44	6	22	16	3	3	0	0	0	0	0
TOTAL	1825	100.0	55634	100.0	26182	3868	7358	14956	14350	3282	4188	4225	1523	1132	15102

TABLE 17: NUMBER OF NON-DAIRY AND NON-BEEF FARMS AND NUMBER OF NON-DAIRY AND NON-BEEF CATTLE EXISTING ON THE CENSUS DAY BY SEX, AGE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL NON-DAIRY & NON-BEEF CATTLE	%	FEMALE NON DAIRY AND BEEF CATTLES				MALE NON DAIRY AND BEEF CATTLES						SEX & AGE DISTR-IBUTION UNKNOWN
					TOTAL	CALVES LESS 1 YEAR	HEIFERS 1 - 3 YEARS	COWS MORE 3 YEARS	TOTAL	CALVES LESS 1 YEAR	STEERS 1 - 3 YEARS	STEERS MORE 3 YEARS	BULLS	WORK-ING-BULLOCKS	
CENTRAL	5435	13.8	27033	14.4	15266	3078	4064	8124	9353	2593	2084	506	1288	2882	2414
NAITASIRI	2028	5.2	10439	5.6	6550	1399	1726	3425	3693	995	906	263	401	1128	196
NAMOSI	205	0.5	1252	0.7	576	145	189	242	97	25	28	15	29	0	579
REWA	18	0.0	89	0.0	71	18	0	53	18	18	0	0	0	0	0
SERUA	387	1.0	2151	1.1	763	76	243	444	703	240	116	15	100	232	685
TAILEVU	2797	7.1	13102	7.0	7306	1440	1906	3960	4842	1315	1034	213	758	1522	954
WESTERN	25085	63.8	120335	64.1	61447	14337	11126	35984	50330	6361	4333	2646	3407	33583	8558
BA	14361	36.5	59999	32.0	31788	7337	5816	18635	24286	3377	1999	897	1497	16516	3925
NADROGA/NAVOSA	6424	16.4	38269	20.4	18425	4715	2868	10842	16200	1735	1044	1175	1291	10955	3644
RA	4300	10.9	22067	11.8	11234	2285	2442	6507	9844	1249	1290	574	619	6112	989
NORTHERN	7960	20.2	34636	18.4	14071	3096	2246	8729	16821	1944	904	837	1174	11962	3744
BUA	1136	2.9	7145	3.8	3549	701	700	2148	3043	504	333	228	347	1631	553
CAKAUDROVE	1235	3.1	8438	4.5	2968	528	595	1845	2367	349	351	435	414	818	3103
MACUATA	5589	14.2	19053	10.1	7554	1867	951	4736	11411	1091	220	174	413	9513	88
EASTERN	864	2.2	5778	3.1	3306	593	1046	1667	2267	538	532	557	563	77	205
KADAVU	187	0.5	610	0.3	472	3	130	339	138	0	0	18	120	0	0
LAU	362	0.9	4041	2.2	2044	547	767	730	1921	513	518	539	282	69	76
LOMAIVITI	90	0.2	361	0.2	181	0	78	103	51	13	0	0	36	2	129
ROTUMA	225	0.6	766	0.4	609	43	71	495	157	12	14	0	125	6	0
TOTAL	39344	100.0	187782	100.0	94090	21104	18482	54504	78771	11436	7853	4546	6432	48504	14921

TABLE 18 : NUMBER OF GOAT FARMS AND NUMBER OF GOATS EXISTING ON THE CENSUS DAY BY SEX, AGE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL GOATS	%	GOATS LESS THAN 6 MONTHS			GOATS 6 MONTHS AND OVER		
					TOTAL	FEMALES	MALES	TOTAL	FEMALES	MALES
CENTRAL	1255	5.2	8718	4.7	3175	1996	1179	5543	3788	1755
NAITASIRI	454	1.9	2316	1.2	1028	560	468	1288	768	520
NAMOSI	5	0.0	10	0.0	0	0	0	10	5	5
REWA	109	0.5	860	0.5	207	121	86	653	392	261
SERUA	136	0.6	1437	0.8	829	666	163	608	441	167
TAILEVU	551	2.2	4095	2.2	1111	649	462	2984	2182	802
WESTERN	14703	61.2	106387	56.8	39406	20106	19300	66981	46937	20044
BA	8947	37.2	59764	31.9	21792	11801	9991	37972	26721	11251
NADROGA/NAVOSA	3120	13.0	28832	15.4	10528	4158	6370	18304	12756	5548
RA	2636	11.0	17791	9.5	7086	4147	2939	10705	7460	3245
NORTHERN	6871	28.6	58890	31.5	17456	9867	7589	41434	31420	10014
BUA	806	3.4	17275	9.2	5966	3904	2062	11309	9268	2041
CAKAUDROVE	942	3.9	5535	3.0	1921	952	969	3614	2338	1276
MACUATA	5123	21.3	36080	19.3	9569	5011	4558	26511	19814	6697
EASTERN	1198	5.0	13240	7.1	4484	2441	2043	8756	5747	3009
KADAVU	189	0.8	1659	0.9	320	162	158	1339	758	581
LAU	589	2.4	8893	4.7	3474	1861	1613	5419	3565	1854
LOMAIVITI	88	0.4	905	0.5	390	211	179	515	346	169
ROTUMA	332	1.4	1783	1.0	300	207	93	1483	1078	405
TOTAL	24027	100.0	187235	100.0	64521	34410	30111	122714	87892	34822

TABLE 19: NUMBER OF PIG FARMS AND NUMBER OF PIGS EXISTING ON THE CENSUS DAY BY SEX, AGE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL PIGS	%	PIGS LESS THAN 6 MONTHS			PIGS 6 MONTHS/OVER		
					TOTAL	FEMALES	MALES	TOTAL	FEMALES	MALES
CENTRAL	2385	16.3	18518	19.4	9307	4850	4457	9211	4813	4398
NAITASIRI	1101	7.5	7843	8.6	3641	1699	1942	4202	2226	1976
NAMOSI	70	0.5	179	0.2	81	27	54	98	53	45
REWA	150	1.0	3445	3.8	1400	808	592	2045	571	1474
SERUA	171	1.2	604	0.7	427	224	203	177	127	50
TAILEVU	893	6.1	6447	6.1	3758	2092	1666	2689	1836	853
WESTERN	3122	21.5	11748	12.9	5820	3140	2680	5928	3652	2276
BA	1742	11.9	6168	6.8	2864	1648	1216	3304	1869	1435
NADROGA/NAVOSA	774	5.4	3454	3.8	1858	927	931	1596	1028	568
RA	606	4.1	2126	2.3	1098	565	533	1028	755	273
NORTHERN	4933	33.8	21879	24.1	11612	6645	4967	10267	6996	3271
BUA	866	5.9	3349	3.7	1583	973	610	1766	1352	414
CAKAUDROVE	2802	19.2	13298	14.6	7245	4036	3209	6053	3886	2167
MACUATA	1265	8.7	5232	5.8	2784	1636	1148	2448	1758	690
EASTERN	4169	28.5	38705	42.6	21768	12976	8792	16937	10932	6005
KADAVU	1395	9.5	7441	8.2	2431	1305	1126	5010	2647	2363
LAU	1755	12.0	22476	24.7	14738	8699	6039	7738	5124	2614
LOMAIVITI	564	3.9	3606	4.0	2122	1231	891	1484	1178	306
ROTUMA	455	3.1	5182	5.7	2477	1741	736	2705	1983	722
TOTAL	14609	100.0	90850	100.0	48507	27611	20896	42343	26393	15950

NOTE: THIS TABLE DOES NOT PRESENT INFORMATION ON COMMERCIAL PIGGERIES, SINCE THEY WERE NOT INCLUDED IN THE 1991 HAC

TABLE 20 : NUMBER OF HORSE FARMS AND NUMBER OF HORSES EXISTING ON THE CENSUS DAY BY SEX, AGE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL HORSES	%	SEX	
					FEMALES	MALES
CENTRAL	1932	10.3	3680	9.8	1658	2022
NAITASIRI	1037	5.5	1764	4.8	730	1034
NANOSI	118	0.6	309	0.8	92	217
REWA	155	0.8	307	0.8	120	187
SERUA	154	0.8	288	0.8	142	146
TAILEVU	468	2.5	1012	2.5	574	438
WESTERN	12241	65.2	24426	66.8	9952	14474
BA	5287	28.2	8938	24.4	3534	5404
NADROGA/NAVOSA	4640	24.7	11245	30.7	4581	6664
RA	2314	12.3	4243	11.6	1837	2406
NORTHERN	3322	17.8	5907	16.4	2459	3448
BUA	1153	6.2	2169	6.2	969	1200
CAKAUDROVE	1094	5.8	2336	6.4	1110	1226
MACUATA	1075	5.7	1402	3.8	380	1022
EASTERN	1271	6.8	2557	6.1	1297	1260
KADAVU	3	0.0	20	0.1	13	7
LAU	755	4.1	1832	4.1	979	853
LOMAIVITI	305	1.6	429	1.2	141	288
ROTUMA	208	1.1	276	0.8	164	112
TOTAL	18766	100.0	36570	100.0	15366	21204

TABLE 21: NUMBER OF POULTRY FARMS AND NUMBER OF CHICKENS AND DUCKS EXISTING ON THE CENSUS DAY BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	CHICKENS				DUCKS			
	NUMBER OF FARMS	%	TOTAL CHICKEN	%	NUMBER OF FARMS	%	TOTAL DUCKS	%
CENTRAL	10287	15.8	108382	14.0	2728	15.3	30137	22.2
NAITASIRI	4190	6.4	44772	5.7	1066	6.0	8518	6.3
NAMOSI	368	0.6	2529	0.4	23	0.1	159	0.1
REWA	884	1.4	7223	0.9	102	0.6	1167	0.9
SERUA	841	1.3	8903	1.1	383	2.2	6289	4.6
TAILEVU	4004	6.2	44955	5.8	1154	6.4	14004	10.3
WESTERN	32407	50.0	393747	50.4	9679	54.4	68521	50.4
BA	20159	31.1	266713	34.1	7020	39.5	47772	35.1
NADROGA/NAVOSA	7830	12.0	81858	10.5	1859	10.5	14772	10.9
RA	4448	6.9	45176	5.8	800	4.5	5977	4.4
NORTHERN	16380	25.3	191647	24.5	4962	27.9	34641	25.5
BUA	1964	3.0	21249	2.7	309	1.7	1500	1.1
CAKAUDROVE	5057	7.8	55914	7.2	707	4.0	4307	3.2
MACUATA	9359	14.5	114484	14.6	3946	22.2	28834	21.2
EASTERN	5714	8.8	87397	11.1	415	2.4	2636	1.9
KADAVU	1864	2.9	17630	2.3	208	1.2	1060	0.8
LAU	1945	3.0	44315	5.6	37	0.2	647	0.5
LOMAIVITI	1323	2.0	11612	1.5	170	1.0	929	0.7
ROTUMA	582	0.9	13840	1.8	0	0.0	0	0.0
TOTAL	64788	100.0	781173	100.0	17784	100.0	135935	100.0

NOTE: THIS TABLE DOES NOT PRESENT INFORMATION ON COMMERCIAL (INDUSTRIAL) POULTRY FARMS, SINCE THEY WERE NOT INCLUDED IN 1991 MAC

TABLE 22 : NUMBER OF FARMS EXISTING ON THE CENSUS DAY BY LEGAL STATUS AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	TOTAL NUMBER	%	LEGAL STATUS								
			[NDI-VIDUAL	HOUSE-HOLD	JOINT HOUSEHOLD	CORP-ORATION	COOP-ERATIVE	PRIVATE OTHER	GOVER-NMENT	MATAQALI	NOT STATED
CENTRAL	19062	20.0	18280	47	98	11	90	202	5	269	60
NAITASIRI	7386	7.7	7103	0	13	0	8	58	2	142	60
NAMOSI	1101	1.2	1062	0	0	0	13	13	0	13	0
REWA	2739	2.9	2617	6	27	11	16	10	3	49	0
SERUA	1470	1.5	1403	0	20	0	22	18	0	7	0
TAILEVU	6366	6.7	6095	41	38	0	31	103	0	58	0
WESTERN	43401	45.5	38077	1958	551	1	60	97	1	435	2221
BA	26340	27.6	23468	262	372	0	24	24	0	136	2054
NADROGA/NAVOSA	10783	11.3	8894	1232	117	0	2	73	1	297	167
RA	6278	6.6	5715	464	62	1	34	0	0	2	8
NORTHERN	22402	23.5	21447	55	210	62	30	115	33	203	247
BUA	3086	3.2	3000	0	1	0	14	12	0	36	23
CAKAUDROVE	7926	8.3	7486	0	12	12	12	22	32	126	224
MACUATA	11390	11.9	10961	55	197	50	4	81	1	41	0
EASTERN	10535	11.0	9597	267	1	12	11	153	13	473	8
KADAVU	2518	2.6	2457	0	0	12	0	17	0	32	0
LAU	2864	3.0	2202	266	1	0	10	72	0	313	0
LOMAIVITI	4501	4.7	4295	1	0	0	0	64	13	128	0
ROTUMA	652	0.7	643	0	0	0	1	0	0	0	8
TOTAL	95400	100.0	87401	2327	860	86	191	567	52	1380	2536

TABLE 23 : NUMBER OF INDIVIDUAL FARMERS EXISTING ON THE CENSUS DAY BY SEX AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMERS	%	SEX AND PERCENTAGE (%) FEMALES	%	MALES	%
CENTRAL	18600	100.0	669	3.6	17931	96.4
NAITASIRI	7193	100.0	231	3.2	6962	96.8
NAMOSI	1062	100.0	24	2.3	1038	97.7
REWA	2650	100.0	134	5.1	2516	94.9
SERUA	1423	100.0	97	6.8	1326	93.2
TAILEVU	6272	100.0	183	2.9	6089	97.1
WESTERN	42750	100.0	2763	6.5	39987	93.5
BA	26137	100.0	1981	7.6	24156	92.4
NADROGA/NAVOSA	10352	100.0	421	4.1	9931	95.9
RA	6261	100.0	361	5.8	5900	94.2
NORTHERN	22032	100.0	1335	6.1	20697	93.9
BUA	3026	100.0	98	3.2	2928	96.8
CAKAUDROVE	7726	100.0	213	2.8	7513	97.2
MACUATA	11280	100.0	1024	9.1	10256	90.9
EASTERN	9906	100.0	90	0.9	9816	99.1
KADAVU	2457	100.0	21	0.9	2436	99.1
LAU	2481	100.0	39	1.6	2442	98.4
LOMAIVITI	4319	100.0	22	0.5	4297	99.5
ROTUMA	649	100.0	8	1.2	641	98.8
TOTAL	93288	100.0	4857	5.2	88431	94.8

TABLE 24 : NUMBER OF INDIVIDUAL FARMERS EXISTING ON THE CENSUS DAY BY AGE GROUPS AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMERS	%	AGE AND PERCENTAGE (%)							
			10 - 19	%	20 - 39	%	40 - 59	%	60 AND MORE	%
CENTRAL	18600	100.0	110	0.6	7038	37.8	8446	45.4	3006	16.2
NAITASIRI	7193	100.0	0	0.0	3040	42.3	3237	45.0	916	12.7
NAMOSI	1062	100.0	23	2.2	533	50.2	392	36.9	114	10.7
REWA	2650	100.1	49	1.8	884	33.4	1374	51.9	343	12.9
SERUA	1423	100.0	3	0.2	474	33.3	679	47.7	267	18.8
TAILEVU	6272	99.9	35	0.6	2107	33.5	2764	44.1	1366	21.8
WESTERN	42750	100.0	250	0.6	13370	31.3	21730	50.8	7400	17.3
BA	26137	100.0	124	0.5	7789	29.8	13487	51.6	4737	18.1
NADROGA/NAVOSA	10352	99.9	90	0.9	3394	32.8	5298	51.1	1570	15.2
RA	6261	100.0	36	0.6	2187	34.9	2945	47.0	1093	17.5
NORTHERN	22032	100.0	155	0.7	8154	37.0	9949	45.2	3774	17.1
BUA	3026	100.0	48	1.6	1353	44.7	1178	38.9	447	14.8
CAKAUDROVE	7726	100.0	58	0.8	2524	32.7	3727	48.2	1417	18.3
MACUATA	11280	100.1	49	0.4	4277	37.9	5044	44.8	1910	16.9
EASTERN	9906	100.0	313	3.2	4342	43.8	3830	38.7	1421	14.3
KADAVU	2457	99.9	90	3.7	1084	44.1	896	36.4	387	15.8
LAU	2481	100.0	30	1.2	917	37.0	1126	45.4	408	16.4
LOMAIVITI	4319	100.0	187	4.3	2150	49.8	1530	35.4	452	10.5
ROTUMA	649	100.1	6	0.9	191	29.4	278	42.9	174	26.8
TOTAL	93288	100.0	828	0.9	32904	35.3	43955	47.1	15601	16.7

TABLE 25 : NUMBER OF INDIVIDUAL FARMERS EXISTING ON THE CENSUS DAY BY RACE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMERS	%	RACE AND PERCENTAGE (%) FIJIAN	%	INDIAN	%	OTHER	%
CENTRAL	18600	100.0	13206	71.0	4464	24.0	930	5.0
NAITASIRI	7193	100.0	5117	71.1	2000	27.8	76	1.1
NAMOSI	1062	100.0	1062	100.0	0	0.0	0	0.0
REWA	2650	100.0	1648	62.2	260	9.8	742	28.0
SERUA	1423	100.0	831	58.4	529	37.2	63	4.4
TAILEVU	6272	100.0	4548	72.5	1675	26.7	49	0.8
WESTERN	42750	100.0	17360	40.6	25169	58.9	221	0.5
BA	26137	100.0	7550	28.9	18454	70.6	133	0.5
NADROGA/NAVOSA	10352	100.0	5968	57.7	4329	41.8	55	0.5
RA	6261	100.0	3842	61.4	2386	38.1	33	0.5
NORTHERN	22032	100.0	11784	53.5	9344	42.4	904	4.1
BUA	3026	99.9	2229	73.6	701	23.2	96	3.2
CAKAUDROVE	7726	100.1	6245	80.9	775	10.0	706	9.1
MACUATA	11280	100.0	3310	29.3	7868	69.8	102	0.9
EASTERN	9906	100.1	9144	92.4	54	0.5	708	7.1
KADAVU	2457	100.0	2430	98.9	0	0.0	27	1.1
LAU	2481	100.0	2441	98.4	33	1.3	7	0.3
LOMAIVITI	4319	100.0	4271	98.9	21	0.5	27	0.6
ROTUMA	649	100.0	2	0.3	0	0.0	647	99.7
TOTAL	93288	100.0	51494	55.2	39031	41.8	2763	3.0

TABLE 26 : NUMBER OF INDIVIDUAL FARMERS EXISTING ON THE CENSUS DAY BY EDUCATION LEVEL AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMERS	%	EDUCATION LEVEL AND PERCENTAGE (%)											
			NO SCHOOL	%	PRIMARY	%	JUNIOR SECON-DARY	%	SENIOR SECON-DARY	%	TERTIARY	%	NOT STATED	%
CENTRAL	18600	100.0	359	1.9	7733	41.6	8460	45.5	1377	7.4	418	2.2	253	1.4
NAITASIRI	7193	99.9	127	1.8	2853	39.7	3313	46.0	641	8.9	188	2.6	71	1.0
NAMOSI	1062	99.9	0	0.0	516	48.5	470	44.3	69	6.5	0	0.0	7	0.7
REWA	2650	100.0	20	0.8	1130	42.6	1365	51.5	64	2.4	64	2.4	7	0.3
SERUA	1423	100.0	112	7.9	650	45.7	478	33.6	72	5.1	70	4.9	41	2.9
TAILEVU	6272	100.0	100	1.6	2584	41.2	2834	45.2	531	8.5	96	1.5	127	2.0
WESTERN	42750	100.0	3258	7.6	21794	51.0	15230	35.6	1362	3.2	240	0.6	866	2.0
BA	26137	100.1	2335	8.9	12254	47.0	9785	37.4	933	3.6	166	0.6	664	2.5
NADROGA/NAVOSA	10352	100.0	518	5.0	5784	55.9	3564	34.4	283	2.7	52	0.5	151	1.5
RA	6261	100.0	405	6.5	3756	60.0	1881	30.0	146	2.3	22	0.4	51	0.8
NORTHERN	22032	100.0	2640	12.0	10799	49.0	6220	28.2	1281	5.8	432	2.0	660	3.0
BUA	3026	100.0	86	2.8	2057	68.0	609	20.1	147	4.9	74	2.4	53	1.8
CAKAUDROVE	7726	100.1	310	4.0	3724	48.3	2946	38.1	343	4.4	201	2.6	202	2.6
MACUATA	11280	100.0	2244	19.9	5018	44.5	2665	23.6	791	7.0	157	1.4	405	3.6
EASTERN	9906	100.0	0	0.0	3715	37.5	5559	56.1	488	4.9	99	1.0	45	0.5
KADAVU	2457	100.0	0	0.0	958	39.0	1380	56.2	119	4.8	0	0.0	0	0.0
LAU	2481	100.0	0	0.0	1425	57.4	852	34.3	129	5.2	46	1.9	29	1.2
LOMAIVITI	4319	100.1	0	0.0	990	23.0	3068	71.0	204	4.7	44	1.0	13	0.3
ROTUMA	649	100.0	0	0.0	342	52.7	259	39.9	36	5.5	9	1.4	3	0.5
TOTAL	93288	100.0	6257	6.7	44041	47.2	35469	38.0	4508	4.8	1189	1.3	1824	2.0

TABLE 27 : NUMBER OF INDIVIDUAL FARMERS EXISTING ON THE CENSUS DAY BY TYPE OF OCCUPATION AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMERS	%	OCCUPATION TYPE											
			PROF TECHNICAL & RELATED WORKERS	ADMIN & MANAGERIAL WORKERS	CLERICAL & RELATED WORKERS	SERVICE WORKERS	FARM MANAGERS & SUPERVISORS	FARMERS	AGRICULTURAL & ANIMAL HUSBANDARY WORKERS	FORESTRY WORKERS	FISHERMEN HUNTERS & RELATED WORKERS	PRODUCTION & RELATED WORKERS, TRANSPORT	WORKERS NOT CLASSIFIED BY OCCUPATION	OCCUPATION NOT STATED
CENTRAL	18600	19.9	515	33	496	140	277	13063	144	102	300	2231	485	814
NAITASIRI	7193	7.7	191	1	302	31	202	5354	72	33	16	678	210	103
NAMOSI	1062	1.1	17	0	4	0	0	854	0	45	20	80	38	4
REWA	2650	2.8	43	18	86	6	0	1917	9	0	146	250	54	121
SERUA	1423	1.5	54	5	21	14	12	935	16	15	56	129	97	69
TAILEVU	6272	6.7	210	9	83	89	63	4003	47	9	62	1094	86	517
WESTERN	42750	45.8	864	154	653	1082	247	25407	74	162	867	6682	2584	3974
BA	26137	28.0	624	133	297	824	156	13350	13	73	550	5101	1511	3505
NADROGA/NAVOSA	10352	11.1	195	10	276	178	79	7414	37	89	259	1110	489	216
RA	6261	6.7	45	11	80	80	12	4643	24	0	58	471	584	253
NORTHERN	22032	23.6	439	154	500	146	371	11689	30	138	415	4396	1318	2436
BUA	3026	3.2	98	36	50	146	71	2084	12	0	53	322	42	112
CAKAUDROVE	7726	8.3	154	58	160	0	55	5682	2	84	51	723	397	360
MACUATA	11280	12.1	187	60	290	0	245	3923	16	54	311	3351	879	1964
EASTERN	9906	10.6	241	53	39	51	134	8210	14	0	30	682	168	284
KADAVU	2457	2.6	25	27	9	0	94	2093	0	0	9	105	49	46
LAU	2481	2.7	115	26	0	0	10	2098	4	0	10	67	34	117
LOMAIVITI	4319	4.6	93	0	27	40	27	3498	4	0	0	451	76	103
ROTUMA	649	0.7	8	0	3	11	3	521	6	0	11	59	9	18
TOTAL	93288	100.0	2059	394	1688	1419	1029	58369	262	402	1612	13991	4555	7508

TABLE 28 : NUMBER OF REPORTING FARMS AND NUMBER OF WORKERS IN THE FARM DURING LAST WEEK (MONDAY THROUGH SUNDAY) ON THE CENSUS DAY BY TYPE, SEX AND BY PROVINCE, DIVISON AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL WORKERS	%	RELATIVES WITHOUT RENUMERATION			WORKERS WITH RENUMERATION					
								CASH			INKIND		
					TOTAL	FEMALES	MALES	TOTAL	FEMALES	MALES	TOTAL	FEMALES	MALES
CENTRAL	17005	23.9	40437	24.0	34766	9300	25466	3069	285	2784	2602	89	2513
NAITASIRI	6941	9.7	17290	10.2	14104	3566	10538	1858	147	1711	1328	18	1310
NAMOSI	996	1.4	2968	1.8	2584	1047	1537	12	0	12	372	0	372
REWA	2470	3.5	5360	3.2	4816	1004	3812	121	27	94	423	18	405
SERUA	1340	1.9	3591	2.1	3090	1135	1955	319	50	269	182	36	146
TAILEVU	5258	7.4	11228	6.7	10172	2548	7624	759	61	698	297	17	280
WESTERN	32385	45.2	74211	44.0	58892	10283	48609	11090	864	10226	4229	962	3267
BA	17356	24.2	35578	21.1	28501	3142	25359	6360	230	6130	717	86	631
NADROGA/NAVOSA	9411	13.2	27134	16.1	21102	6383	14719	2882	491	2391	3150	729	2421
RA	5618	7.9	11499	6.8	9289	758	8531	1848	143	1705	362	147	215
NORTHERN	13233	18.5	38468	22.8	27803	7691	20112	9352	1041	8311	1313	174	1139
BUA	2138	3.0	6363	3.8	5468	2081	3387	465	163	302	430	0	430
CAKAUDROVE	5516	7.7	12848	7.6	11590	3113	8477	1121	128	993	137	9	128
MACUATA	5579	7.8	19257	11.4	10745	2497	8248	7766	750	7016	746	165	581
EASTERN	8819	12.3	15487	9.2	13766	1440	12326	1150	195	955	571	30	541
KADAVU	2440	3.4	4077	2.4	3644	221	3423	367	83	284	66	0	66
LAU	1890	2.6	3244	1.9	2856	115	2741	353	99	254	35	0	35
LOMAIVITI	3866	5.4	7039	4.2	6196	1027	5169	388	0	388	455	27	428
ROTUMA	623	0.9	1127	0.7	1070	77	993	42	13	29	15	3	12
TOTAL	71442	100.0	169603	100.0	135227	28714	106513	24661	2385	22276	8715	1255	7460

NOTE: THE DIFFERENCE OF NUMBER OF FARMS BETWEEN TABLE 1 AND TABLE 28 IS DUE TO :

TABLE 29 : NUMBER OF REPORTING FARMS BY MAIN PURPOSE OF PRODUCE FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	MAIN PURPOSE AND PERCENTAGE (%)			
			HOME CONSUMPTION	%	SALE	%
CENTRAL	16930	100.0	10974	64.8	5956	35.2
NAITASIRI	6928	100.0	3955	57.1	2973	42.9
NAMOSI	996	100.0	620	62.2	376	37.8
REWA	2470	100.0	2280	92.3	190	7.7
SERUA	1339	100.0	900	67.2	439	32.8
TAILEVU	5197	100.0	3219	61.9	1978	38.1
WESTERN	32204	100.0	7030	21.8	25174	78.2
BA	17235	100.0	3035	17.6	14200	82.4
NADROGA/NAVOSA	9391	100.0	2766	29.5	6625	70.5
RA	5578	100.0	1229	22.0	4349	78.0
NORTHERN	13220	100.0	5574	42.2	7646	57.8
BUA	2138	100.0	1191	55.7	947	44.3
CAKAUDROVE	5506	100.0	2887	52.4	2619	47.6
MACUATA	5576	100.0	1496	26.8	4080	73.2
EASTERN	8776	100.0	6186	70.5	2590	29.5
KADAVU	2440	100.0	1004	41.1	1436	58.9
LAU	1890	100.0	1706	90.3	184	9.7
LOMAIVITI	3826	100.0	2886	75.4	940	24.6
ROTUMA	620	100.0	590	95.2	30	4.8
TOTAL	71130	100.0	29764	41.8	41366	58.2

NOTE: THE DIFFERENCE OF NUMBER OF FARMS BETWEEN TABLE 1 AND TABLE 29 IS DUE TO THE NON-REPORTING FARMS

TABLE 30 : FARMER'S HOUSEHOLD POPULATION IN THE FARMS DURING LAST WEEK (MONDAY THROUGH SUNDAY) OF CENSUS DAY BY SEX, RACE, WORK ON/OUT OF FARM BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TOTAL POPULATION	%	SEX		RACE			ONLY FOR PERSONS OF 10 YEARS AND OVER							
										WORK ON FARM		WORK OUT FARM		NOT WORK ON/OUT OF FARM			
					FEMALES	MALES	FIJIAN	INDIAN	OTHER	FULL	PART	FULL	PART	NOT WORK LOOK FOR	NOT WORK STUDENT	NOT WORK DOMESTIC	NOT WORK OTHER
CENTRAL	17802	19.8	92021	19.6	42927	49094	63629	25445	2947	16168	14178	6292	594	111	18712	15000	2206
NAITASIRI	7128	7.9	37293	7.9	17261	20032	25743	11417	133	7050	5607	2150	132	6	8245	6151	671
NANOSI	875	1.0	4381	0.9	1963	2418	4381	0	0	1086	1042	75	38	6	838	284	125
REWA	2528	2.8	11907	2.5	5496	6411	8110	1216	2581	1875	1961	1170	246	54	2170	2228	256
SERUA	1389	1.5	7243	1.5	3280	3963	3835	3221	187	984	1854	326	24	0	1290	690	645
TAILEVU	5882	6.5	31197	6.6	14927	16270	21560	9591	46	5173	3714	2571	154	45	6169	5647	509
WESTERN	41575	46.2	233732	49.8	110962	122770	82994	150133	605	37784	20269	20613	2278	2913	49749	50935	12646
BA	25920	28.8	153099	32.6	72827	80272	39215	113465	419	21213	7780	16054	1819	2579	33223	36175	9842
NADROGA/NAVOSA	9872	11.0	50731	10.8	23954	26777	27407	23240	84	11897	8477	3710	228	192	10412	7414	1695
RA	5783	6.4	29902	6.4	14181	15721	16372	13428	102	4674	4012	849	231	142	6114	7346	1109
NORTHERN	21183	23.5	107317	22.8	50642	56675	52969	51152	3196	15688	10594	12005	2380	395	18069	22756	5698
BUA	2924	3.2	15358	3.3	7260	8098	11566	3460	332	2528	2694	828	379	11	2356	1784	668
CAKAUDROVE	7459	8.3	35280	7.5	16324	18956	28272	4337	2671	6817	4205	2924	810	13	4801	6605	946
MACUATA	10800	12.0	56679	12.1	27058	29621	13131	43355	193	6343	3695	8253	1191	371	10912	14367	4084
EASTERN	9468	10.5	36727	7.8	16534	20193	33158	148	3421	8574	4622	1312	194	42	6235	8380	1245
KADAVU	2382	2.6	6741	1.4	2756	3985	6670	0	71	2864	652	48	21	33	709	1845	79
LAU	2278	2.5	10909	2.3	5329	5580	10819	86	4	2253	440	736	70	9	1848	3064	177
LOMAIVITI	4162	4.6	15684	3.3	6810	8874	15531	62	91	2561	3362	366	91	0	3070	2692	920
ROTUMA	646	0.7	3393	0.7	1639	1754	138	0	3255	896	168	162	12	0	608	779	69
TOTAL	90028	100.0	469797	100.0	221065	248732	232750	226878	10169	78214	49663	40222	5446	3461	92765	97071	21795

TABLE 31 : NUMBER OF REPORTING FARMS AND NUMBER OF OWNED MACHINERY AND EQUIPMENT ON THE CENSUS DAY BY TYPE OF MACHINERY AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	AGRICULTURAL MACHINERY AND EQUIPMENT POWER OPERATED AND OTHER MACHINERY													
	HARROWS		MILKING MACHINE (BALE)		MILKING MACHINE (HERRING BONE)		PLOUGHS		ROTARY TILLERS		TRACTORS		OTHER	
	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED
CENTRAL	74	103	20	45	53	53	180	182	199	204	339	343	322	333
NAITASIRI	36	48	8	8	53	53	86	87	111	112	193	195	101	103
NAMOSI	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REWA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SERUA	0	0	0	0	0	0	0	0	12	12	12	12	12	12
TAILEVU	38	55	12	37	0	0	94	95	76	80	134	136	209	218
WESTERN	78	78	0	0	139	193	3299	3351	2591	2684	4740	5265	4967	5182
BA	59	59	0	0	95	137	2708	2746	1891	1956	3256	3694	3430	3606
NADROGA/NAVOSA	19	19	0	0	4	4	331	331	500	526	984	1000	1051	1069
RA	0	0	0	0	40	52	260	274	200	202	500	571	486	507
NORTHERN	9	9	10	10	21	34	951	951	883	889	1312	1316	1532	1666
BUA	0	0	0	0	5	5	0	0	15	15	23	23	23	23
CAKAUDROVE	0	0	2	2	13	26	28	28	32	35	47	49	70	106
MACUATA	9	9	8	8	3	3	923	923	836	839	1242	1244	1439	1537
EASTERN	0	0	0	0	187	572	14	14	3	3	28	28	45	69
KADAVU	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAU	0	0	0	0	0	0	0	0	2	2	0	0	14	25
LOMAIVITI	0	0	0	0	187	572	14	14	1	1	28	28	28	41
ROTUMA	0	0	0	0	0	0	0	0	0	0	0	0	3	3
TOTAL	161	190	30	55	400	852	4444	4498	3676	3780	6419	6952	6866	7250

TABLE 31 : NUMBER OF REPORTING FARMS AND NUMBER OF OWNED MACHINERY AND EQUIPMENT ON THE CENSUS DAY BY TYPE OF MACHINERY AND BY PROVINCE , DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	ANIMAL DRAWN IMPLEMENTS							
	HARROWS		PLOUGH		SCARIFIERS		OTHER	
	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED
CENTRAL	911	933	1508	1538	6	6	1646	1704
NAITASIRI	502	514	538	549	0	0	541	557
NAMOSI	0	0	0	0	0	0	0	0
REWA	0	0	0	0	0	0	0	0
SERUA	21	21	78	78	0	0	91	91
TAILEVU	388	398	892	911	6	6	1014	1056
WESTERN	12872	13356	19250	21269	949	1392	21520	26421
BA	6981	7209	10606	11869	603	898	11869	14844
NADROGA/NAVOSA	4726	4924	5566	5830	325	473	6460	7500
RA	1165	1223	3078	3570	21	21	3191	4077
NORTHERN	1853	1913	6392	6896	41	41	6978	7623
BUA	14	14	647	696	9	9	737	912
CAKAUDROVE	73	73	264	283	0	0	341	385
MACUATA	1766	1826	5481	5917	32	32	5900	6326
EASTERN	13	13	10	10	0	0	23	23
KADAVU	0	0	0	0	0	0	0	0
LAU	0	0	10	10	0	0	10	10
LOMAIVITI	13	13	0	0	0	0	13	13
ROTUMA	0	0	0	0	0	0	0	0
TOTAL	15649	16215	27160	29713	996	1439	30167	35771

TABLE 31 : NUMBER OF REPORTING FARMS AND NUMBER OF OWNED MACHINERY AND EQUIPMENT ON THE CENSUS DAY BY TYPE OF MACHINERY AND BY PROVINCE , DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	FARM TRANSPORT MODES AND EQUIPMENT							
	CARS & VANS		FARM LORRIES		TRAILERS		OTHER	
	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED	NUMBER OF FARMS	NUMBER OWNED
CENTRAL	113	135	43	63	5	5	399	414
NAITASIRI	24	26	2	2	4	4	188	190
NAMOSI	0	0	0	0	0	0	0	0
REWA	0	0	0	0	0	0	0	0
SERUA	0	0	0	0	0	0	27	27
TAILEVU	89	109	41	61	1	1	184	197
WESTERN	1039	1279	1514	1602	21	29	6418	7793
BA	743	889	896	971	3	11	5216	6453
NADROGA/NAVOSA	99	109	433	442	18	18	941	1056
RA	197	281	185	189	0	0	261	284
NORTHERN	383	421	766	801	15	17	2161	2349
BUA	7	7	12	12	1	2	98	102
CAKAUDROVE	80	84	42	65	1	2	138	166
MACUATA	296	330	712	724	13	13	1925	2081
EASTERN	44	50	18	18	0	0	17	31
KADAVU	12	12	0	0	0	0	0	0
LAU	14	15	1	1	0	0	11	22
LOMAIVITI	14	14	14	14	0	0	0	0
ROTUMA	4	9	3	3	0	0	6	9
TOTAL	1579	1885	2341	2484	41	51	8995	10587

TABLE 32 : NUMBER OF REPORTING FARMS THAT HIRED AND/OR BORROWED MACHINERY AND EQUIPMENT FROM JULY, 1990 TO JUNE, 1991 BY TYPE OF MACHINERY AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS THAT HIRED OR BORROWED AGRICULTURAL MACHINERY AND EQUIPMENT POWER OPERATED AND OTHER MACHINERY						
	HARROWS	MIKING MACHINE (BALE)	MILKING MACHINE (HERRING BONE)	PLOUGH	ROTARY TILLERS	TRACTORS	OTHER
CENTRAL	3	3	0	50	43	67	82
NAITASIRI	0	0	0	22	19	32	26
NAMOSI	0	0	0	0	0	0	0
REWA	0	0	0	0	0	0	0
SERUA	0	0	0	0	0	0	0
TAILEVU	3	3	0	28	24	35	56
WESTERN	0	0	0	148	145	318	476
BA	0	0	0	92	67	138	299
NADROGA/NAVOSA	0	0	0	0	9	77	81
RA	0	0	0	56	69	103	96
NORTHERN	0	0	1	2	3	6	53
BUA	0	0	0	0	0	0	0
CAKAUDROVE	0	0	1	0	3	4	25
MACUATA	0	0	0	2	0	2	28
EASTERN	0	0	87	0	0	13	13
KADAVU	0	0	0	0	0	0	0
LAU	0	0	0	0	0	0	0
LOMAIVITI	0	0	87	0	0	13	13
ROTUMA	0	0	0	0	0	0	0
TOTAL	3	3	88	200	191	404	624

TABLE 32 : NUMBER OF REPORTING FARMS THAT HIRED AND/OR BORROWED MACHINERY AND EQUIPMENT FROM JULY, 1990 TO JUNE, 1991 BY TYPE OF MACHINERY AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS THAT HIRED AND/OR BORROWED FARM TRANSPORT MODES AND EQUIPMENT			
	CARS & VANS	FARM LORRIES	TRAILERS	OTHER
CENTRAL	13	9	0	28
NAITASIRI	0	0	0	0
NAMOSI	0	0	0	0
REWA	0	0	0	0
SERUA	0	0	0	0
TAILEVU	13	9	0	28
WESTERN	134	98	2	381
BA	85	21	2	349
NADROGA/NAVOSA	13	0	0	0
RA	36	77	0	32
NORTHERN	29	9	1	81
BUA	0	0	0	44
CAKAUDROVE	23	9	1	10
MACUATA	6	0	0	27
EASTERN	0	0	0	0
KADAVU	0	0	0	0
LAU	0	0	0	0
LOMAIVITI	0	0	0	0
ROTUMA	0	0	0	0
TOTAL	176	116	3	490

TABLE 32 : NUMBER OF REPORTING FARMS THAT HIRED AND/OR BORROWED MACHINERY AND EQUIPMENT FROM JULY, 1990 TO JUNE, 1991 BY TYPE OF MACHINERY AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS THAT HIRED OR BORROWED ANIMAL DRAWN IMPLEMENTS			
	HARROWS	PLOUGH	SCARIFIERS	OTHER
CENTRAL	100	103	6	146
NAITASIRI	66	61	0	66
NAMOSI	0	0	0	0
REWA	0	0	0	0
SERUA	0	0	0	0
TAILEVU	34	42	6	80
WESTERN	136	301	27	538
BA	38	202	0	357
NADROGA/NAVOSA	68	51	6	145
RA	30	48	21	36
NORTHERN	10	80	0	106
BUA	10	43	0	48
CAKAUDROVE	0	13	0	4
MACUATA	0	24	0	54
EASTERN	0	0	0	0
KADAVU	0	0	0	0
LAU	0	0	0	0
LOMAIVITI	0	0	0	0
ROTUMA	0	0	0	0
TOTAL	246	484	33	790

TABLE 33 : NUMBER OF REPORING FARMS USING FERTILIZERS FROM JULY, 1990 TO JUNE, 1991 BY TYPE AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	ORGANIC		INORGANIC		AGRO - CHEMICALS	
			YES	NO	YES	NO	YES	NO
CENTRAL	19062	20.0	2746	16316	3801	15261	5317	13745
NAITASIRI	7386	7.7	1657	5729	1949	5437	2835	4551
NAMOSI	1101	1.2	18	1083	5	1096	40	1061
REWA	2739	2.9	96	2643	214	2525	324	2415
SERUA	1470	1.5	279	1191	470	1000	479	991
TAILEVU	6366	6.7	696	5670	1163	5203	1639	4727
WESTERN	43401	45.5	5299	38102	23162	20239	22834	20567
BA	26340	27.6	3769	22571	15452	10888	15398	10942
NADROGA/NAVOSA	10783	11.3	1314	9469	4483	6300	5144	5639
RA	6278	6.6	216	6062	3227	3051	2292	3986
NORTHERN	22402	23.5	2300	20102	6628	15774	7443	14959
BUA	3086	3.3	258	2828	503	2583	426	2660
CAKAUDROVE	7926	8.3	364	7562	166	7760	995	6931
MACUATA	11390	11.9	1678	9712	5959	5431	6022	5368
EASTERN	10535	11.0	1307	9228	147	10388	363	10172
KADAVU	2518	2.6	0	2518	13	2505	12	2506
LAU	2864	3.0	25	2839	69	2795	66	2798
LOMAIVITI	4501	4.7	1273	3228	54	4447	97	4404
ROTUMA	652	0.7	9	643	11	641	188	464
TOTAL	95400	100.0	11652	83748	33738	61662	35957	59443

TABLE 34: NUMBER OF FARMS CONTACTED BY MPI FROM JULY, 1990 TO JUNE, 1991 BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	NUMBER OF FARMS VISITED BY MPI STAFF	NUMBER OF FARMS VISITED MPI OFFICE	NUMBER OF FARMS ATENDED MPI DEMONSTRATION
CENTRAL	5014	18.3	4369	3446	1751
NAITASIRI	2389	8.7	1900	1570	758
NAMOSI	68	0.2	39	55	17
REWA	499	1.8	473	275	146
SERUA	451	1.7	408	320	220
TAILEVU	1607	5.9	1549	1226	610
WESTERN	8594	31.4	8184	6491	3680
BA	2137	7.8	1926	1827	600
NADROGA/NAVOSA	3949	14.4	3830	2909	2307
RA	2508	9.2	2428	1755	773
NORTHERN	6484	23.7	6213	2818	1006
BUA	1584	5.8	1538	1154	609
CAKAUDROVE	901	3.3	896	355	143
MACUATA	3999	14.6	3779	1309	254
EASTERN	7277	26.6	6754	2106	273
KADAVU	1929	7.0	1821	293	29
LAU	1708	6.2	1502	466	157
LOMAIVITI	3013	11.0	2804	1199	74
ROTUMA	627	2.4	627	148	13
TOTAL	27369	100.0	25520	14861	6710

TABLE 35: NUMBER OF FARMS REPORTING DEVELOPMENT IN FARMING PRACTICE IN PAST 10 YEARS BY TYPE OF DEVELOPMENT AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	TYPE OF DEVELOPMENT					
			NEW ENTERPRISE	NEW VARIETIES	LOAN OBTAINED	LOAN PROBLEMS	ANY ASSISTANCE REQUESTED	ASSISTANCE REQUESTED TO MPI
CENTRAL	3842	18.9	2552	3335	665	366	1902	2212
NAITASIRI	2264	11.1	1673	2000	337	194	1504	1423
NAMOSI	18	0.1	13	5	18	13	13	13
REWA	260	1.3	240	188	49	34	50	128
SERUA	271	1.3	70	261	59	40	76	207
TAILEVU	1029	5.1	556	881	202	85	259	441
WESTERN	13503	66.4	9924	10045	5392	1959	2698	1923
BA	8754	43.0	6577	6470	3079	1121	1319	796
NADROGA/N	2604	12.9	1891	1949	924	236	951	819
RA	2145	10.5	1456	1626	1389	602	428	308
NORTHERN	2383	11.7	648	591	808	265	698	785
BUA	463	2.3	297	228	75	52	168	225
CAKAUDROVE	1077	5.3	193	166	189	41	410	482
MACUATA	843	4.1	158	197	544	172	120	78
EASTERN	620	3.0	248	386	115	73	119	130
KADAVU	205	1.0	92	131	19	16	25	19
LAU	139	0.6	29	88	17	14	13	13
LOMAIVITI	222	1.1	124	134	73	34	65	65
ROTUMA	54	0.3	3	33	6	9	16	33
TOTAL	20348	100.0	13372	14357	6980	2663	5417	5050

TABLE 36: NUMBER OF FARMS REPORTING FISHING ACTIVITIES FROM JULY, 1990 TO JUNE, 1991 BY FISHING METHOD AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	FISHING METHODS				
			GILLNET	HAND LINE	SPEAR	FISH FENCE	HAND COLLECT
CENTRAL	4907	18.0	935	2715	2207	216.0	1249
NAITASIRI	1356	5.0	49	638	817	131	665
NAMOSI	133	0.5	35	23	86	0	0
REWA	776	2.8	352	405	325	18	137
SERUA	416	1.5	164	203	138	0	22
TAILEVU	2226	8.2	335	1446	841	67	425
WESTERN	10724	39.3	2105	7021	5543	969.0	1052
BA	4113	15.1	1048	3113	1897	728	223
NADROGA/NAVOSA	4954	18.1	619	3102	2511	241	745
RA	1657	6.1	438	806	1135	0	84
NORTHERN	7006	25.7	1557	5874	5123	499.0	1118
BUA	1440	5.3	312	918	1131	200	630
CAKAUDROVE	3047	11.2	697	2625	2040	283	228
MACUATA	2519	9.2	548	2331	1952	16	260
EASTERN	4670	17.0	941	3689	3183	309.0	569
KADAVU	1540	5.6	214	1312	1063	9	228
LAU	1656	6.0	138	1109	1054	165	235
LOMAIVITI	934	3.4	238	790	604	117	91
ROTUMA	540	2.0	351	478	462	18	15
TOTAL	27307	100.0	5538	19299	16056	1993	3988

TABLE 37: NUMBER OF FARMS REPORTING FISHING ACTIVITIES FROM JULY, 1990 TO JUNE, 1991 BY DISPOSAL OF CATCH AND BY PROVINCE, DIVISION AND NATIONAL LEVELS

DIVISION AND PROVINCE	NUMBER OF FARMS	%	DISPOSAL OF CATCH		
			FAMILY CONSUMPTION	SALE FOR CASH	BOTH
CENTRAL	4907	18.0	4429	270	208
NAITASIRI	1356	5.0	1342	11	3
NAMOSI	133	0.5	95	38	0
REWA	776	2.8	597	103	76
SERUA	416	1.5	365	39	12
TAILEVU	2226	8.2	2030	79	117
WESTERN	10724	39.3	9007	869	848
BA	4113	15.1	3219	436	458
NADROGA/NAVOSA	4954	18.1	4514	102	338
RA	1657	6.1	1274	331	52
NORTHERN	7006	25.7	6097	396	513
BUA	1440	5.3	1213	58	169
CAKAUDROVE	3047	11.2	2799	75	173
MACUATA	2519	9.2	2085	263	171
EASTERN	4670	17.0	4239	19	412
KADAVU	1540	5.6	1328	0	212
LAU	1656	6.0	1553	0	103
LOMAIVITI	934	3.4	876	7	51
ROTUMA	540	2.0	482	12	46
TOTAL	27307	100.0	23772	1554	1981

QUESTIONNAIRES

REPUBLIC OF FIJI UNDP/FAO

MINISTRY OF PRIMARY INDUSTRIES & CO-OP (MPI & C)

1991 NATIONAL AGRICULTURAL CENSUS (NAC)

S E G M E N T Q U E S T I O N N A I R E

CONFIDENTIAL NAC - 1

PROVINCE	TIKINA	VILLAGE	LOCALITY	STRAT	EA No	SM No	SUB SM

TRACT No ON PHOTO	IN	OUT	FARM/ NON FARM No	NAME OF FARMER OR NONFARMER	TOTAL LAND OF TRACT		REMARKS
					INSIDE SM (HAS)	OUTSIDE SM (HAS)	

1.

TRACT No ON PHOTO	IN	OUT	FARM/ NON FARM NO.	NAME OF FARMER OR NONFARMER	TOTAL LAND OF TRACT		REMARKS
					INSIDE SM (HAS)	OUTSIDE SM (HAS)	
TOTAL LAND INSIDE THE SM (HAS)						/////////	

REPUBLIC OF FIJI — MINISTRY OF PRIMARY INDUSTRIES & COOPERATIVES (MPI & C) — UNDP/FAO

1991 NATIONAL AGRICULTURAL CENSUS (NAC)

CONFIDENTIAL — F A R M Q U E S T I O N N A I R E

NAC - 2

I SEGMENT (SM) AND QUESTIONNAIRE SAMPLING IDENTIFICATION

QUESTION. No	REGISTER	REGION	PROVINCE	TIKINA	STRATUM	EA No	SM No	SUB SM.	FARM No
	0 1								

II FARM AND FARMER IDENTIFICATION ON CENSUS DAY

(1) PROVINCE	(2) TIKINA	(3) VILLAGE	(4) LOCALITY	(5) FARM NAME	(6) FARMER'S NAME

(7) FARMER'S ADDRESS, IF DIFFERENT FROM THE FARM	(8) IS INFORMANT THE FARMER ? YES |1| NO |2|	(9) INFORMANT'S NAME, IF NOT THE FARMER (NO IN 8)	(10) HEAD OF HOUSEHOLD'S NAME

III FARMER INFORMATION ON CENSUS DAY AND LAST WEEK (MONDAY THROUGH SUNDAY)

(11) LEGAL STATUS OF FARMER	(12) SEX	(13) AGE	(14) RACE	(15) EDUCATION	(16) MAIN OCCUPATION LAST WEEK

REMARKS _____

** REGISTER TOTALS (THIS SECTION IS ONLY FOR CODERS, TO BE FILLED IN THE OFFICE)

REGISTER NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
TOTALS	1										1	1	1	1	1	1	1

TOTAL OF ALL REGISTER TOTALS IN THIS QUESTIONNAIRE: _____

QUESTION, No | | | | | | REGISTER | 0 | 2 |

IV TOTAL LAND AND ACTUAL LAND USE TRACT BY TRACT (IN OR OUT THE SM), OPERATED BY THE FARM ON THE CENSUS DAY

(17) LOCAL AREA MEASUREMENT UNIT USED BY THE FARMER

1	2				
HECTARE	ACRE	OTHER: (SPECIFY)	MTS X MTS	M2

(18)	(19)				(20) AREA OF EACH TRACT ACCORDING THE LAND USE									
TRACT No. ON PHOTO	TRACT No. ON FARM	IN	OUT	COD	TEMPORARY CROPS & FORAGES	FALLOW ONE YEAR & LESS	FALLOW MORE THAN ONE YEAR	PERMANENT CROPS (NO PASTURES)	COCONUTS WITH PASTURES	PASTURES (INCLUDE GRAZING)	NATURAL FOREST	PLANTED FOREST	NON AGRICULTURE LAND	TOTAL LAND OF TRACT
	01													
	02													
	03													
	04													
	05													
	06													
	07													
	08													
	09													
	10													
	11													
	12													
	13													
	14													
	15													
TOTAL FARM	00	/////	/////	/////										

REMARKS ______

					0	3

QUESTION. No REGISTER

V LAND TENURE OF THE FARM ON THE CENSUS DAY

(21) LAND TENURE CONDITION OF EACH TRACT ON THE CENSUS DAY

No OF TRACT	FREEHOLD	CROWN LEASE	N.L.T.B. LEASE	OTHER LEASES	SHARE CROPPING	MATAQALI OWNERSHIP	OTHER	TOTAL OF EACH LAND TRACT
0 1								
0 2								
0 3								
0 4								
0 5								
0 6								
0 7								
0 8								
0 9								
1 0								
1 1								
1 2								
1 3								
1 4								
1 5								
TOTAL 0 0								

REMARKS _____

_____

	0 4	
QUESTION. No	REGISTER	TRACT

VI TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991

(22) WHAT ARE THE TEMPORARY CROPS PLANTED IN "PURE STAND" IRRIGATED, HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 IN EACH OF THE FIELDS OF THIS TRACT ? (DO NOT FORGET TO INCLUDE FORAGE PASTURES. WHEN THERE IS DATA FOR FALLOW OF ONE YEAR & LESS IN CHAPTER IV ASK ABOUT CROPS HARVESTED LAST SEASON.)

No OF FIELD	CROP NAME	CROP CODE	PLANTED DATE MONTH & YEAR	HARVESTED DATE MONTH & YEAR	AREA PLANTED	AREA IRRIGATED	AREA HARVESTED	ONLY IF FARMER DO NOT KNOW THE CROP AREA: No OF PLANTS	ONLY IF FARMER DO NOT KNOW THE CROP AREA: SPACING
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									
13									
14									
15									
00	T O T A L								

REMARKS _____

	0 5	
QUESTION. No	REGISTER	TRACT

VII TEMPORARY CROPS IN "MIXED AND INTERPLANTED STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991

23 WHAT ARE THE TEMPORARY CROPS PLANTED IN "MIXED AND INTERPLANTED STAND" IRRIGATED, HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 IN EACH OF THE FIELDS OF THIS TRACT ? (DO NOT FORGET TO INCLUDE FORAGE PASTURES. WHEN THERE IS DATA OF FALLOW 1 YEAR & LESS IN CHAPTER IV ASK ABOUT CROPS HARVETED LAST SEASON.)

No OF FIELD	CROP NAME	CROP CODE	PLANTED DATE MONTH & YEAR	HARVESTED DATE MONTH & YEAR	AREA PLANTED	AREA IRRIGATED	AREA HARVESTED	ONLY IF FARMER DO NOT KNOW THE CROP AREA: No OF PLANTS	ONLY IF FARMER DO NOT KNOW THE CROP AREA: SPACING
0 1									
0 2									
0 3									
0 4									
0 5									
0 6									
0 7									
0 8									
0 9									
1 0									
1 1									
1 2									
1 3									
1 4									
1 5									
0 0	T O T A L								

REMARKS _____

	0 6	
QUESTION. NO	REGISTER	TRACT

VIII PERMANENT CROPS IN "PURE STAND" ON CENSUS DAY

24 WHAT ARE THE PERMANENT CROPS PLANTED IN "PURE STAND" IRRIGATED AND PRODUCTIVE AGE ON CENSUS DAY IN EACH OF THE FIELDS OF THIS TRACT ?

No OF FIELD	CROP NAME	CROP CODE	PLANTED YEAR	No OF TREES			AREA		
				PLANTED	BEARING	DISTANCE	PLANTED	IRRIGATED	PRODUC.AGE
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									
13									
14									
15									
00	T O T A L								

REMARKS _____

_____

		0	7	

QUESTION. No REGISTER TRACT

IX PERMANENT CROPS IN "MIXED, INTERPLANTED AND ASSOCIATED STAND" ON CENSUS DAY

(25) WHAT ARE THE PERMANENT CROPS PLANTED IN "MIXED, INTERPALNTED AND ASSOCIATED STAND" IRRIGATED AND PRODUCTIVE AGE ON CENSUS DAY IN EACH OF THE FIELDS OF THIS TRACT ? (DO NOT FORGET TO INCLUDE PASTURES UNDER COCONUTS. HERE ALSO PERMANENT CROPS ASSOCIATED WITH TEMPORARY CROP AND/OR FORAGES).

No OF FIELD	CROP NAME	CROP CODE	PLAN-TED YEAR	No OF TREES			AREA		
				PLANTED	BEARING	DISTANCE	PLANTED	IRRIGATED	PRODUC.AGE
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									
13									
14									
15									
00	T O T A L								

REMARKS

7a

QUESTION. No | REGISTER 08 | TRACT

X SUGAR CANE IN "PURE, MIXED, INTERPLANTED AND ASSOCIATED STANDS" ON THE CENSUS DAY

(26) WHAT IS THE AREA OF SUGAR CANE PLANTED IN "PURE, MIXED, INTERPALNTED AND ASSOCIATED STANDS" ON CENSUS DAY IN EACH OF THE RATOONS OF THIS TRACT ?

No OF FIELS	CROP NAME	CROP CODE	PLAN-TED YEAR	PLANTED NOT TO BE HARVES/91	PLANTED TO BE HAR VEST./91	FIRST RATOON	SECOND RATOON	THIRD RATOON	FOURTH RATOON	OTHER RATOON	TOTAL AREA OF SUGAR CANE
01	SUGARCANE	134									
02											
03											
04											
05											
06											
07											
08											
09											
10											
11											
12											
13											
14											
15											
00	TOTAL	//////////	//////								

REMARKS ______________________________

					0	9			
QUESTION. No					REGISTER			TRACT	

XI SCATTERED PLANTS, TREES, AND VINES FOR CROPS ON THE CENSUS DAY

(27) WHAT ARE THE NUMBER OF SCATTERED PLANTS, TREES, AND VINES FOR CROPS EXISTING ON THE CENSUS DAY IN THIS TRACT ?

CROP No	CROP CODE	NAME OF THE CROP	NUMBER OF TREES	
			PLANTED	BEARING
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				

					1	0			
QUESTION. No					REGISTER			TRACT	

XII PASTURES ON THE CENSUS DAY

(28) WHAT IS THE AREA UNDER IMPROVED EXOTIC, IMPROVED NATIVE, AND UNIMPROVED NATIVE PASTURES ON THE CENSUS DAY ?

T Y P E O F P A S T U R E	CODE	A R E A
IMPROVED "PLANTED"EXOTIC PASTURES (DO NOT INCLUDE FORAGE PASTURES)	5 0 1	
IMPROVED NATIVE PASTURES (FENCED, AND/OR WEED CONTROL, AND/OR IMPROVED DRAINAGE)	5 0 2	
UNIMPROVED NATIVE PASTURES (DO NOT INCLUDE UNDER COCONUTS, UNDER PINE, FOREST, ETC.)	5 0 3	
T O T A L		

REMARKS _____

	0 4	
QUESTION. No	REGISTER	TRACT

VI TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991

(22) WHAT ARE THE TEMPORARY CROPS PLANTED IN "PURE STAND" IRRIGATED, HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 IN EACH OF THE FIELDS OF THIS TRACT ? (DO NOT FORGET TO INCLUDE FORAGE PASTURES. WHEN THERE IS DATA FOR FALLOW OF ONE YEAR & LESS IN CHAPTER IV ASK ABOUT CROPS HARVESTED LAST SEASON.)

No OF FIELD	CROP NAME	CROP CODE	PLANTED DATE MONTH & YEAR	HARVESTED DATE MONTH & YEAR	AREA PLANTED	AREA IRRIGATED	AREA HARVESTED	ONLY IF FARMER DO NOT KNOW THE CROP AREA: No OF PLANTS	ONLY IF FARMER DO NOT KNOW THE CROP AREA: SPACING
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									
13									
14									
15									
00	T O T A L								

REMARKS _____

QUESTION. No	REGISTER	TRACT
	0 5	

VII TEMPORARY CROPS IN "MIXED AND INTERPLANTED STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991

(23) WHAT ARE THE TEMPORARY CROPS PLANTED IN "MIXED AND INTERPLANTED STAND" IRRIGATED, HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 IN EACH OF THE FIELDS OF THIS TRACT ? (DO NOT FORGET TO INCLUDE FORAGE PASTURES. WHEN THERE IS DATA OF FALLOW 1 YEAR & LESS IN CHAPTER IV ASK ABOUT CROPS HARVETED LAST SEASON.)

No OF FIELD	CROP NAME	CROP CODE	PLANTED DATE MONTH & YEAR	HARVESTED DATE MONTH & YEAR	AREA PLANTED	AREA IRRIGATED	AREA HARVESTED	ONLY IF FARMER DO NOT KNOW THE CROP AREA: No OF PLANTS	SPACING
0 1									
0 2									
0 3									
0 4									
0 5									
0 6									
0 7									
0 8									
0 9									
1 0									
1 1									
1 2									
1 3									
1 4									
1 5									
0 0	T O T A L								

REMARKS ______________________________

5b

	0 6	
QUESTION. NO	REGISTER	TRACT

VIII PERMANENT CROPS IN "PURE STAND" ON CENSUS DAY

(24) WHAT ARE THE PERMANENT CROPS PLANTED IN "PURE STAND" IRRIGATED AND PRODUCTIVE AGE ON CENSUS DAY IN EACH OF THE FIELDS OF THIS TRACT ?

No OF FIELD	CROP NAME	CROP CODE	PLANTED YEAR	No OF TREES			AREA		
				PLANTED	BEARING	DISTANCE	PLANTED	IRRIGATED	PRODUC. AGE
0 1									
0 2									
0 3									
0 4									
0 5									
0 6									
0 7									
0 8									
0 9									
1 0									
1 1									
1 2									
1 3									
1 4									
1 5									
0 0	T O T A L								

REMARKS _____

	0 7	
QUESTION. No	REGISTER	TRACT

IX PERMANENT CROPS IN "MIXED, INTERPLANTED AND ASSOCIATED STAND" ON CENSUS DAY

29 WHAT ARE THE PERMANENT CROPS PLANTED IN "MIXED, INTERPALNTED AND ASSOCIATED STAND" IRRIGATED AND PRODUCTIVE AGE ON CENSUS DAY IN EACH OF THE FIELDS OF THIS TRACT ? (DO NOT FORGET TO INCLUDE PASTURES UNDER COCONUTS. HERE ALSO PERMANENT CROPS ASSOCIATED WITH TEMPORARY CROP AND/OR FORAGES).

No OF FIELD	CROP NAME	CROP CODE	PLANTED YEAR	No OF TREES			AREA		
				PLANTED	BEARING	DISTANCE	PLANTED	IRRIGATED	PRODUC. AGE
0 1									
0 2									
0 3									
0 4									
0 5									
0 6									
0 7									
0 8									
0 9									
1 0									
1 1									
1 2									
1 3									
1 4									
1 5									
0 0	T O T A L								

REMARKS _____

					0	8			

QUESTION. No REGISTER TRACT

X SUGAR CANE IN "PURE, MIXED, INTERPLANTED AND ASSOCIATED STANDS" ON THE CENSUS DAY

(26) WHAT IS THE AREA OF SUGAR CANE PLANTED IN "PURE, MIXED, INTERPALNTED AND ASSOCIATED STANDS" ON CENSUS DAY IN EACH OF THE RATOONS OF THIS TRACT ?

No OF FIELS	CROP NAME	CROP CODE	PLAN-TED YEAR	PLANTED NOT TO BE HARVES/91	PLANTED TO BE HAR VEST./91	FIRST RATOON	SECOND RATOON	THIRD RATOON	FOURTH RATOON	OTHER RATOON	TOTAL AREA OF SUGAR CANE
0 1	SUGARCANE	1 3 4									
0 2											
0 3											
0 4											
0 5											
0 6											
0 7											
0 8											
0 9											
1 0											
1 1											
1 2											
1 3											
1 4											
1 5											
0 0	T O T A L	//////	//////								

REMARKS

					0	9			
QUESTION. No					REGISTER			TRACT	

XI SCATTERED PLANTS, TREES, AND VINES FOR CROPS ON THE CENSUS DAY

(27) WHAT ARE THE NUMBER OF SCATTERED PLANTS, TREES, AND VINES FOR CROPS EXISTING ON THE CENSUS DAY IN THIS TRACT ?

CROP No	CROP CODE	NAME OF THE CROP	NUMBER OF TREES		CROP No	CROP CODE	NAME OF THE CROP	NUMBER OF TREES	
			PLANTED	BEARING				PLANTED	BEARING
01					08				
02					09				
03					10				
04					11				
05					12				
06					13				
07					14				

					1	0			
QUESTION. No					REGISTER			TRACT	

XII PASTURES ON THE CENSUS DAY

(28) WHAT IS THE AREA UNDER IMPROVED EXOTIC, IMPROVED NATIVE, AND UNIMPROVED NATIVE PASTURES ON THE CENSUS DAY ?

T Y P E O F P A S T U R E	CODE	A R E A
IMPROVED "PLANTED"EXOTIC PASTURES (DO NOT INCLUDE FORAGE PASTURES)	5 0 1	
IMPROVED NATIVE PASTURES (FENCED, AND/OR WEED CONTROL, AND/OR IMPROVED DRAINAGE)	5 0 2	
UNIMPROVED NATIVE PASTURES (DO NOT INCLUDE UNDER COCONUTS, UNDER PINE, FOREST, ETC.)	5 0 3	
T O T A L		

REMARKS _____

QUESTION. No	REGISTER	TRACT
	0 4	

VI TEMPORARY CROPS IN "PURE STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991

(22) WHAT ARE THE TEMPORARY CROPS PLANTED IN "PURE STAND" IRRIGATED, HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 IN EACH OF THE FIELDS OF THIS TRACT ? (DO NOT FORGET TO INCLUDE FORAGE PASTURES. WHEN THERE IS DATA FOR FALLOW OF ONE YEAR & LESS IN CHAPTER IV ASK ABOUT CROPS HARVESTED LAST SEASON.)

No OF FIELD	CROP NAME	CROP CODE	PLANTED DATE MONTH & YEAR	HARVESTED DATE MONTH & YEAR	AREA PLANTED	AREA IRRIGATED	AREA HARVESTED	ONLY IF FARMER DO NOT KNOW THE CROP AREA: No OF PLANTS	SPACING
0 1									
0 2									
0 3									
0 4									
0 5									
0 6									
0 7									
0 8									
0 9									
1 0									
1 1									
1 2									
1 3									
1 4									
1 5									
0 0	T O T A L								

REMARKS ______________________________

4C

	0 5	
QUESTION. No	REGISTER	TRACT

VII TEMPORARY CROPS IN "MIXED AND INTERPLANTED STAND" HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991

(21) WHAT ARE THE TEMPORARY CROPS PLANTED IN "MIXED AND INTERPLANTED STAND" IRRIGATED, HARVESTED AND/OR TO BE HARVESTED FROM JULY, 1990 TO JUNE, 1991 IN EACH OF THE FIELDS OF THIS TRACT ? (DO NOT FORGET TO INCLUDE FORAGE PASTURES. WHEN THERE IS DATA OF FALLOW 1 YEAR & LESS IN CHAPTER IV ASK ABOUT CROPS HARVETED LAST SEASON.)

No OF FIELD	CROP NAME	CROP CODE	PLANTED DATE MONTH & YEAR	HARVESTED DATE MONTH & YEAR	AREA PLANTED	AREA IRRIGATED	AREA HARVESTED	ONLY IF FARMER DO NOT KNOW THE CROP AREA: No OF PLANTS	ONLY IF FARMER DO NOT KNOW THE CROP AREA: SPACING
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									
13									
14									
15									
00	T O T A L								

REMARKS _____

	0 6	
QUESTION. NO	REGISTER	TRACT

VIII PERMANENT CROPS IN "PURE STAND" ON CENSUS DAY

(24) WHAT ARE THE PERMANENT CROPS PLANTED IN "PURE STAND" IRRIGATED AND PRODUCTIVE AGE ON CENSUS DAY IN EACH OF THE FIELDS OF THIS TRACT ?

No OF FIELD	CROP NAME	CROP CODE	PLANTED YEAR	No OF TREES			AREA		
				PLANTED	BEARING	DISTANCE	PLANTED	IRRIGATED	PRODUC.AGE
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									
13									
14									
15									
00	T O T A L								

REMARKS _____

160

	0 7	
QUESTION. No	REGISTER	TRACT

IX PERMANENT CROPS IN "MIXED, INTERPLANTED AND ASSOCIATED STAND" ON CENSUS DAY

25 WHAT ARE THE PERMANENT CROPS PLANTED IN "MIXED, INTERPALNTED AND ASSOCIATED STAND" IRRIGATED AND PRODUCTIVE AGE ON CENSUS DAY IN EACH OF THE FIELDS OF THIS TRACT ? (DO NOT FORGET TO INCLUDE PASTURES UNDER COCONUTS. HERE ALSO PERMANENT CROPS ASSOCIATED WITH TEMPORARY CROP AND/OR FORAGES).

No OF FIELD	CROP NAME	CROP CODE	PLANTED YEAR	No OF TREES			AREA		
				PLANTED	BEARING	DISTANCE	PLANTED	IRRIGATED	PRODUC. AGE
0 1									
0 2									
0 3									
0 4									
0 5									
0 6									
0 7									
0 8									
0 9									
1 0									
1 1									
1 2									
1 3									
1 4									
1 5									
0 0	T O T A L								

REMARKS _____

	0 8	
QUESTION. No	REGISTER	TRACT

X SUGAR CANE IN "PURE, MIXED, INTERPLANTED AND ASSOCIATED STANDS" ON THE CENSUS DAY

(26) WHAT IS THE AREA OF SUGAR CANE PLANTED IN "PURE, MIXED, INTERPALNTED AND ASSOCIATED STANDS" ON CENSUS DAY IN EACH OF THE RATOONS OF THIS TRACT ?

No OF FIELS	CROP NAME	CROP CODE	PLANTED YEAR	PLANTED NOT TO BE HARVES/91	PLANTED TO BE HARVEST./91	FIRST RATOON	SECOND RATOON	THIRD RATOON	FOURTH RATOON	OTHER RATOON	TOTAL AREA OF SUGAR CANE
0 1	SUGARCANE	1 3 4									
0 2											
0 3											
0 4											
0 5											
0 6											
0 7											
0 8											
0 9											
1 0											
1 1											
1 2											
1 3											
1 4											
1 5											
0 0	T O T A L										

REMARKS _____

_____

				0	9			

QUESTION. No REGISTER TRACT

XI SCATTERED PLANTS, TREES, AND VINES FOR CROPS ON THE CENSUS DAY

(27) WHAT ARE THE NUMBER OF SCATTERED PLANTS, TREES, AND VINES FOR CROPS EXISTING ON THE CENSUS DAY IN THIS TRACT ?

CROP No	CROP CODE	NAME OF THE CROP	NUMBER OF TREES		CROP No	CROP CODE	NAME OF THE CROP	NUMBER OF TREES	
			PLANTED	BEARING				PLANTED	BEARING
01					08				
02					09				
03					10				
04					11				
05					12				
06					13				
07					14				

				1	0			

QUESTION. No REGISTER TRACT

XII PASTURES ON THE CENSUS DAY

(28) WHAT IS THE AREA UNDER IMPROVED EXOTIC, IMPROVED NATIVE, AND UNIMPROVED NATIVE PASTURES ON THE CENSUS DAY ?

T Y P E O F P A S T U R E	CODE	A R E A
IMPROVED "PLANTED"EXOTIC PASTURES (DO NOT INCLUDE FORAGE PASTURES)	5 0 1	
IMPROVED NATIVE PASTURES (FENCED, AND/OR WEED CONTROL, AND/OR IMPROVED DRAINAGE)	5 0 2	
UNIMPROVED NATIVE PASTURES (DO NOT INCLUDE UNDER COCONUTS, UNDER PINE, FOREST, ETC.)	5 0 3	
T O T A L		

REMARKS _____

QUESTION. No

1	1

REGISTER

XIII LIVESTOCK IN THE TOTAL FARM ON THE CENSUS DAY

(29) WHAT IS THE NUMBER OF "DAIRY" CATTLE BY TYPE (AGE) AND SEX ON THE CENSUS DAY IN THE "TOTAL FARM" ?

F E M A L E S				M A L E S						T O T A L
TOTAL	CALVES LESS 1 YR	HEIFERS 1-3 YEARS	COWS MORE 3 YR	TOTAL	CALVES LESS 1 YR	STEERS 1-3 YEARS	STEERS MORE 3YR	BULLS	WORKING BULLOCKS	(ONLY IF SEX & AGE DISTRIBUTIONS ARE UNKNOWN)

(30) WHAT IS THE NUMBER OF "BEEF" CATTLE BY TYPE (AGE) AND SEX ON THE CENSUS DAY IN THE "TOTAL FARM"

F E M A L E S				M A L E S						T O T A L
TOTAL	CALVES LESS 1 YR	HEIFERS 1-3 YEARS	COWS MORE 3 YR	TOTAL	CALVES LESS 1 YR	STEERS 1-3 YEARS	STEERS MORE 3YR	BULLS	WORKING BULLOCKS	(ONLY IF SEX & AGE DISTRIBUTIONS ARE UNKNOWN)

(31) WHAT IS THE NUMBER OF "NON DAIRY & BEEF FARM" CATTLE BY TYPE (AGE) AND SEX ON THE CENSUS DAY IN THE "TOTAL FARM"

F E M A L E S				M A L E S						T O T A L
TOTAL	CALVES LESS 1 YR	HEIFERS 1-3 YEARS	COWS MORE 3 YR	TOTAL	CALVES LESS 1 YR	STEERS 1-3 YEARS	STEERS MORE 3YR	BULLS	WORKING BULLOCKS	(ONLY IF SEX & AGE DISTRIBUTIONS ARE UNKNOWN)

(32) WHAT IS THE NUMBER OF GOATS AND PIGS EXISTING IN THE "TOTAL FARM" ON THE CENSUS DAY ?

GOATS LESS 6 MONTHS			GOATS 6 MONTHS/OVER			PIGS LESS 6 MONTHS			PIGS 6 MONTHS/OVER		
TOTAL	FEMALE	MALES	TOTAL	FEMALE	MALES	TOTAL	FEMALE	MALES	TOTAL	FEMALE	MALES

REMARKS _____

_____

(33) WHAT IS THE NUMBER OF HORSES, SHEEP, AND POULTRY EXISTING IN THE "TOTAL FARM" ON THE CENSUS DAY ?

HORSES			SHEEP			POULTRY IN FARM (NON INDUSTRIAL)	
TOTAL	FEMALE	MALES	TOTAL	FEMALE	MALES	CHICKEN	DUCKS

						1	2				

QUESTION. No REGISTER

XIV EMPLOYMENT IN THE TOTAL FARM DURING LAST WEEK (MONDAY THROUGH SUNDAY) AND MAIN PURPOSE OF THE PRODUCE

(34) WHAT WAS THE NUMBER OF WORKERS WITH AND WITHOUT REMUNERATION DURING LAST WEEK (MONDAY THROUGH SUNDAY) IN THE "TOTAL FARM" ?

FARMER'S RELATIVES WITHOUT REMUNERATION (INCLUDE FARMER)			WORKERS WITH REMUNERATION					
			CASH AND/OR INKIND			IN KIND		
TOTAL	MALES	FEMALES	TOTAL	MALES	FEMALES	TOTAL	MALES	FEMALES

(35) WHAT DO YOU REGARD AS THE MAIN PURPOSE OF YOUR FARM PRODUCE ?

HOME CONSUMPTION		SALE	

REMARKS _____

_____

_____

				1	3		

QUESTION. No REGISTER

XV FARMER'S HOUSEHOLD POPULATION IN THE "TOTAL FARM" DURING LAST WEEK (MONDAY THROUGH SUNDAY)

(36) WHAT ARE THE PERSONS OF THE FARMER'S HOUSEHOLD DURING LAST WEEK (MONDAY THROUGH SUNDAY) BY AGE, SEX, AND WORK IN THE "TOTAL FARM" ?

No	NAME AND LAST NAME (INCLUDE FARMER)	RELATION TO THE FARMER	AGE	SEX M OR F	RACE	CODE	ONLY FOR PERSONS OF 10 YEARS AND OVER									
							WORK ON FARM		WORK OUT FARM		NOT WORK ON/OUT FARM				CODE	HOURS SPENT ON THE FARM
							FULL	PART	FULL	PART	LOOK FOR	STU-DENT	DOMES-TIC	OTHER		
01		SELF														
02																
03																
04																
05																
06																
07																
08																
09																
10																
11																
12																
13																
14																
15																
	T O T A L															

REMARKS _____

					1	4	

QUESTION. No REGISTER

XVI FARM MACHINERY AND EQUIPMENT IN THE TOTAL FARM ON CENSUS DAY AND FROM JULY, 1990 TO CENSUS DAY

No	TYPE OF MACHINERY	(37) WHAT IS THE NUMBER OF MACHINERY AND EQUIPMENT OWNED BY THE "TOTAL FARM" ON CENSUS DAY ? CODE	NUMBER	(38) DID THE FARM HIRE &/OR BORROW THIS MACHINERY FROM JUL/90 TO PRESENT ? YES	NO
	A ANIMAL DRAWN IMPLEMENTS	/////	//////////		
	Wooden , Iron or Steel PLOUGHS	1 0			
	HARROWS (rotary or disc)	1 1			
	SCARIFIER	1 2			
	OTHER (SPECIFY)				
	B AGRICULTURAL MACHINERY AND EQUIPMENT POWER OPERATED AND OTHER	/////	//////////	//////////	//////////
	TRACTORS (crawler or caterpillar, four & six wheels, power tillers)	2 0			
	PLOUGHS	2 1			
	ROTARY TILLERS	2 2			
	HARROWS (rotary or disc)	2 3			
	MILKING MACHINES (Bale)	2 4			
	MILKING MACHINES (herring Bone)	2 5			
	OTHERS (specify)				
	C FARM TRANSPORT MODES & EQUIPMENT	/////	//////////	//////////	//////////
	Cars ,Van	3 0			
	Farm Lorries	3 1			
	Trailers	3 2			
	Other (specify)				

REMARKS

					1	5

QUESTION. No REGISTER

XVII USE OF FERTILIZERS IN THE TOTAL FARM FROM JULY, 1990 TO CENSUS DAY*

	ORGANIC FERTILIZER		INORGANIC FERTILIZER		AGRO-CHEMICALS	
(39) DID YOU USE IN THE "TOTAL FARM" FROM JULY, 1990 TO CENSUS DAY, THE FOLLOWING INPUTS ?	YES	NO	YES	NO	YES	NO

REMARKS _____

					1	6

QUESTION.No REGISTER

XVIII FARM MANAGEMENT IN THE TOTAL FARM FROM JULY, 1990 TO CENSUS DAY

	YES	NO
(40) DID MPI CONTACT THE FARM FROM JULY, 1990 TO THE CENSUS DAY ? .....>		
IF YES 34.1 DID AN MPI OFFICER VISIT YOU FROM JULY, 1990 TO THE CENSUS DAY ? .....>		
AND/OR 34.2 DID YOU VISIT AN MPI OFFICE ? .....>		
AND/OR 34.3 DID YOU ATTEND MPI DEMONSTRATION FIELD DAYS ? .....>		
(41) WAS THERE DEVELOPMENT IN FARMING PRACTICE IN PAST 10 YEARS ? .....>		
IF YES 35.1 NEW ENTERPRISES ? .....>		
AND/OR 35.2 NEW VARIETIES ? .....>		
(42) DID YOU SEEK LOAN FOR THIS DEVELOPMENT ? .....>		
IF YES 36.1 DID YOU HAVE PROBLEMS WITH LOAN REPAYMENTS ? .....>		
(43) DID YOU SEEK ASSISTANCE FOR THIS DEVELOPMENT ? .....>		
IF YES 37.1 DID YOU SEEK MPI ASSISTANCE ? .....>		

REMARKS _____

					1	7

QUESTION. No REGISTER

XIX EXISTENCE OF FISHERIES ACTIVITIES IN THE TOTAL FARM FROM JULY, 1990 TO THE CENSUS DAY.

		YES	NO
44	DID YOU DO ANY FISHING ACTIVITIES FROM JULY, 1990 TO CENSUS DAY ? .....>		
	IF YES		
45	WHAT FISHING METHOD DID YOU USE ? ..... GILLNET .....>		
	(TICK ONE OR MORE ITEMS) HANDLINE .....>		
	SPEAR .....>		
	FISH FENCE.....>		
	HAND COLLECTION .....>		
46	HOW MANY HOURS PER WEEK DO YOU SPEND FISHING ? .....>		
47	DO ANY OF THE WOMEN IN YOUR FAMILY DO FISHING ? .....>	YES	NO
	IF YES		
48	HOW MANY HOURS PER WEEK DOES SHE SPEND FISHING ? .....>		
49	HOW DO YOU DISPOSE OF YOUR CATCH ? ..... FAMILY CONSUMPTION ...>		
	SALE FOR CASH ...>		

REMARKS _____

_____

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XX SKETCH OF FARM BOUNDARIES (WHEN IT IS NOT POSSIBLE TO DRAW THEM ON THE PHOTO ENLARGEMENT).

XXI RESPONSIBILITIES

ENUMERATORS NAME	DATE

SUPERVISORS NAME	DATE

CODERS NAME	

INPUT CLERKS NAME	DATE

REMARKS _____

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REPUBLIC OF FIJI

MINISTRY OF PRIMARY INDUSTRIES & COOPERATIVES (MPI & C)

UNDP/FAO

1991 NATIONAL AGRICULTURAL CENSUS (NAC)

NONFARM QUESTIONNAIRE

CONFIDENTIAL

I SEGMENT (SM) AND QUESTIONAIRE SAMPLING IDENTIFICATION

NAC - 3

QUESTION. No	REGISTER	REGION	PROVINCE	TIKINA	STRATUM	EA No	SM No	SUB SM.	No OF FARM
	3 1								

II NONFARM AND NONFARMER IDENTIFICATION ON CENSUS DAY

(1) PROVINCE	(2) TIKINA	(3) VILLAGE	(4) LOCALITY	(5) NONFARM NAME	(6) NONFARMER'S NAME

REGISTER 3 2

III TOTAL LAND AND ACTUAL LAND USE TRACT BY TRACT (ONLY INSIDE THE SM). OPERATED BY THE NONFARM ON THE CENSUS DAY

(7) LOCAL AREA MEASUREMENT UNIT USED BY THE NONFARM

HECTARE	ACRE	OTHER: (SPECIFY)	MTS X MTS	M2
1	2			

(8) TRACT No IN PHO	(9) TRACT No OF FARM	IN	OUT	COD	(10) AREA OF EACH TRACT BY LAND USE: NATURAL FOREST	PLANTED FOREST	NON AGRICULTURAL LAND	TOTAL LAND OF TRACT
	01							
	02							
	03							
	04							
	05							
TOTAL FARM	00	/////						

REMARKS _____

ENUMERATOR NAME	DATE

SUPERVISOR NAME	DATE

CODER NAME	DATE

DATA ENTRY NAME	DATE