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AGRICULTURAL SYSTEMS OF PAPUA NEW GUINEA

Working Paper No. 20

BOUGAINVILLE PROVINCE

TEXT SUMMARIES, MAPS, CODE LISTS AND VILLAGE IDENTIFICATION

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UNIVERSITY OF PAPUA NEW GUINEA

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Cover Photograph:
The late Gore Gabriel clearing undergrowth from a pandanus nut grove in the Sinasina area, Simbu Province (R.L. Hide).

PREFACE

Acknowledgements

The following organisations have contributed financial support to this project: The Research School of Pacific and Asian Studies, The Australian National University; The Australian Agency for International Development; the Papua New Guinea-Australia Colloquium through the International Development Program of Australian Universities and Colleges and the Papua New Guinea National Research Institute; the Papua New Guinea Department of Agriculture and Livestock; the University of Papua New Guinea; and the National Geographic Society, Washington DC.

Technical advice and encouragement have been provided throughout the project by John McAlpine, Gael Keig and Sue Cuddy, Australian Commonwealth Scientific and Industrial Research Organization.

Support and advice have been received from Geoff Humphreys and Harold Brookfield of the Land Management Project, and Gerard Ward (formerly Director), Research School of Pacific and Asian Studies, The Australian National University. Brookfield's (1971) study of Melanesian agricultural systems has been particularly influential.

The Papua New Guinea Agricultural Systems Project was developed from two previous studies. Michael Bourke began mapping Papua New Guinea agricultural systems in the 1970s while a Senior Horticulturalist with the PNG Department of Primary Industry (Bourke 1976). Robin Hide created an annotated bibliography of information on Papua New Guinea agricultural systems while working with the CSIRO PNGRIS group (Hide and Cuddy 1988).

Participants

The following persons participated in the production of this paper:

Papua New Guinea Department of Agriculture and Livestock: Moses Woruba, Bill Humphrey (field mapping)

Papua New Guinea National Research Institute: Tony Regan (information on Care Centres)

North Solomons Province Administration: John Siau (formerly Provincial Secretary)

Australian National University: Bryant Allen, Michael Bourke (conceptualisation, field mapping, data preparation, writing); Robin Grau (GIS management, ARC/INFO, map preparation); Matthew Allen, Patricia Hobsbawn (literature review); Janine Conway (research assistance).

Field survey and interviews

Only a small part of the information reported here was gathered during fieldwork. Because of the Bougainville crisis, it was not possible to conduct fieldwork in central and southern Bougainville and no fieldwork was done as part of the Mapping Agricultural Systems of Papua New Guinea project by the ANU team. Instead, 23 persons were interviewed.

Some preliminary mapping was done briefly in the Kieta, Wakunai, Togarau and Panguna areas in December 1980. In September 1992, Moses Woruba and Bill Humphrey of LAES Keravat spent three days surveying agriculture on Nissan and Pinipel Islands. Moses Woruba briefly visited the

Nuguria group of coral atolls at this time. He also conducted extensive interviews with islanders from all atoll groups when a group were at Keravat on a training course.

Information for Buka and Bougainville came mainly from interviews conducted with 23 persons between June and December 1996. The persons interviewed described agriculture in their home areas or places where they had worked. Several people provided information on more than one location. The interviews were conducted in the Kokopo, East New Britain area (13); Keravat, East New Britain, area (5); Port Moresby (3) and Canberra (2). Thirteen men and ten women were interviewed. Their most recent visit ranged from eight years to three weeks prior to the interview. Sixteen of the interviewees had either resided or had had extended visits to the province in the early-mid 1990s (1992-1996). The other seven had been home for only short term visits or had not lived in the province since 1988.

The occupations of the persons interviewed were agriculturalist (5), teacher (5), administration/clerical (4), villager (3), housewife (2), Aid Post Orderly (1), medical doctor (1), policeman (1) and post-graduate student (1).

Each interview took one to three hours. All were conducted separately, except for two persons from Siwai who were interviewed together and the three informants from the Kanua area. Thus the information presented here comes from separate interviews of two to four persons for each agricultural system, except for the Kanua area where all three informants were together. The quality of the information obtained was remarkably good, although not as useful as fieldwork. Information was surprisingly consistent for each location. Several aspects of the database are likely to be less reliable than if fieldwork has been conducted. These are:

1. System boundaries. The system boundaries tend to coincide with cultural or administrative ones. Fieldwork may have suggested different boundaries. For example, fieldwork may have indicated that locations on Bougainville above 300 m altitude should be classed as a single agricultural system with longer fallow periods, shorter cropping periods, taro an important crop and sweet potato not planted in mounds.
2. Fallow periods. These were determined from informants' descriptions of fallow vegetation as well as the stated periods, as the latter are often underestimated in reality in Papua New Guinea.
3. Cropping periods. Information from informants was reasonably consistent, but not as accurate as would have been gained from numerous garden visits.

Nine agricultural systems have been identified for the province. Agriculture on Nissan and Pinipel Islands (System 2001), the smaller atolls (System 2002) and the small islands off the west coast of Buka Island (2004) is quite distinctive for each system. However, the systems for Buka Island (System 2003), the Tinputz-Wakunai area (System 2005), northwest Bougainville (System 2006) and southwest Bougainville (System 2008) are very similar. Only minor differences in sub-dominant staples, the number of plantings before fallow and cash cropping separate these four systems. Given the source of information, the differences may not be real (except for cash cropping where information appears reliable and consistent). The system in southeast Bougainville (System 2007) and south Bougainville (Buin area, System 2009) are similar to each other, but differ from the other four systems on Buka-Bougainville in that only one planting is made before land is fallowed in southeast and south Bougainville.

The civil war (known as the Bougainville crisis in PNG) has caused considerable disruption to the villagers in parts of the province, especially in central, south and southwest Bougainville. In early 1997, PNG government sources indicate that some 45,000 people in Bougainville Province were

living in Care Centres. The largest concentration was in the Buin area where about 17,000 people were still in Care Centres.

During the worst years of the crisis, in the early-mid 1990s, the PNG government was providing rice to many villagers in Care Centres throughout the province. The supply of rice was reported to be irregular and people still depended on food gardens to a greater or lesser degree. Most people who were still in Care Centres were growing most of their own food in their own gardens. However, some people were still mainly dependent on rice supplied by the government in early 1997. These people were located mainly in the Buin area (about 13,000 people) and in the Arawa area (about 4000 people).

Much material relevant to agricultural development is summarised in the North Solomons Provincial Development Study, particularly Section A of Volume 2 (Economic Consultants 1982). While the information on cash supply is now dated, it still provides a useful overview for the province.

Persons interviewed

The following were interviewed at Kokopo, Keravat, Port Moresby and Canberra: Evelyn Boxall, Katherine Billy, Ben Hulo, Cyril Imako, Mary Jal, Lugakei Joe, Linda Kamang, Louise Kurika, Michael Lugabai, Eris Memora, Ambrose Mopei, Murray Nahiana, Rachael Rake, Sam Rangai, Salome Silovo, Jerry Sipana, Joyce Sipana, Ruth Spriggs, Samual Tapets, Heather Timate, Daniel Tokapip, Thomasina Umue and Moses Woruba. Their assistance is greatly appreciated.

Revised and reprinted version

The Mapping Agricultural Systems Project database was revised in late 1998 (see Introduction to Working Paper Number 1). This working paper was reprinted in 2002. Karen Lummis, Tess McCarthy, Natalie Stuckings, Laura Vallee, Amber Pares and Veerle Vlassak were responsible for the production of the revised paper.

CONTENTS

1. INTRODUCTION

The major purpose of the Papua New Guinea Agricultural Systems Project is to produce information on small holder (subsistence) agriculture at provincial and national levels. Information is collected by field observation, interviews with villagers and reference to published and unpublished documents. The information is entered into a computer database (dBase IV), from where it is transferred to a mapping program (ARC/INFO). Methods are described by Bourke et al. (1993). This paper contains a written summary of the information on the Agricultural Systems in this Province, maps of selected agricultural features, a complete listing of all information in the database in coded form, and lists of villages with National Population Census codes, indexed by Agricultural Systems. This information will eventually be available on disk as a map-linked database suitable for use on a personal computer.

Identification of agricultural systems and subsystems

An Agricultural System is identified when a set of similar agricultural crops and practices occur within a defined area. Six criteria are used to distinguish one system from another:

1. Fallow type (the vegetation which is cleared from a garden site before cultivation).

2. Fallow period (the length of time a garden site is left unused between cultivations).

3. Cultivation intensity (the number of consecutive crops planted before fallow).

4. The staple, or most important, crops.

5. Garden and crop segregation (the extent to which crops are planted in separate gardens; in separate areas within a garden; or are planted sequentially).

6. Soil fertility maintenance techniques (other than natural regrowth fallows).

Where one or more of these factors differs significantly and the differences can be mapped, then a separate system is distinguished.

Where variation occurs, but is not able to be mapped at 1:500 000 scale because the areas in which the variation occurs are too small or are widely dispersed within the larger system, a subsystem is identified. Subsystems within an Agricultural System are allocated a separate record in the database, identified by the Agricultural System number and a subsystem number.

Sago is a widespread staple food in lowland Papua New Guinea. Sago is produced from palms which are not grown in gardens. Most of the criteria above cannot be applied. In this case, systems are differentiated on the basis of the staple crops only.

Relationship to PNGRIS

The Papua New Guinea Resource Information System (PNGRIS) contains information on the natural resources of PNG (Bellamy 1986). However PNGRIS contains no information on agricultural practices, other than an assessment of land use intensity based on air photograph interpretation by Saunders (1993), and ECOPHYS which is concerned with predicted crop performance in a specific environment (Hackett 1988). The Agricultural Systems Project is designed to provide detailed information on agricultural practices and cropping patterns as part of an upgraded PNGRIS geographical information system. For this reason the Agricultural Systems database contains almost no information on the environmental settings of the systems, except for altitude and slope. The layout of the text descriptions, the database code files and the village lists are modelled on PNGRIS formats (Cuddy 1987).

The mapping of Agricultural Systems has been carried out on the same map base and scale as PNGRIS (Tactical Pilotage Charts, 1:500 000). It is also done within the areas of agricultural land use established by Saunders (1993) from aerial photography. Except where specifically noted, Agricultural Systems boundaries have been mapped without reference to PNGRIS Resource Mapping Unit (RMU) boundaries. Agricultural Systems are defined at the level of the Province (following PNGRIS) but their wider distribution is recognised in the database by cross-referencing systems which cross provincial borders.

A preliminary view of the relationships between RMUs and the Agricultural Systems in this Province can be obtained from the listing of villages by Agricultural System, where RMU numbers are appended (Section 6.3).

Note for reprinted edition

Most of the fieldwork for this project was conducted over a six year period (late 1990 to late 1996). Over this period, a number of minor inconsistencies arose in data classification and presentation. As well, some changes occurred in conventions for the text fields and in the definitions of data fields, for example, for seasonality, fencing and burning. These changes were noted in the Preface of the Provincial Working Papers (first editions) as they occurred. One of the more important changes was that the cutoff points for the classification of cash earning activities were applied more consistently. Because of these inconsistencies and changes in definitions, it was necessary to revise the database so that it was consistent for all 19 provinces and to incorporate changes in agriculture systems since the original papers were produced.

Most changes, as distinct from definitional changes, relate to cash income. The revisions were done in late 1998. The largest number of changes occurred in the first four provincial working papers: East Sepik, West Sepik, Western and Gulf Provinces. Papers for the five Island Region provinces required the least number of changes. Agricultural systems that cross provincial boundaries have been adjusted so that the information is identical on both sides of the boundary, apart from some minor differences in some of the text fields. However the notes have not been updated to incorporate new publications since the Working Papers were completed.

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Saunders, J.C. 1993 *Agricultural Land Use of Papua New Guinea* [map with explanatory notes]. Scale 1:1 000 000. PNGRIS Publication No. 1. CSIRO, Brisbane.

Smith, T., G. Keig, J. Marks and R. Grau 1992 Summary Results by Environmental Zone from the 1982-3 National Nutrition Survey of Papua New Guinea: Implications for Future Survey Design. Papua New Guinea Institute of Medical Research, Goroka.

2. DATABASE STRUCTURE, DEFINITIONS AND CODES

Information on agricultural systems is stored in a database, one record per agricultural system (or subsystem where identified) and 108 fields per record. This section lists the field ***names*** and their database abbreviations **[NAMES]**. Summary descriptions, explanatory notes and variable codes are given for each field.

LOCATION AND IDENTIFICATION

1. Provincial Identification **[PROVINCE]:** A two digit National Population Census code. Eg. code 14 = East Sepik Province. Provincial codes are listed in Appendix A.1.

2. System Identification **[SYSTIDNO]:** A two digit number identifying the agricultural system within this province. Eg. code 01 = System 01. Numbers are not assigned to systems within a province in any particular order.

3. Agricultural System **[AGSYST]:** Systems are also identified by a unique Papua New Guinea-wide four digit number. The first two digits are the National Population Census provincial code and the second two digits are the system identification number. Eg. 1401 = System 01 in the East Sepik Province.

4. Agricultural Subsystem **[SUBSYSIDNO]:** Subsystems are identified by a single digit. When referred to in the text they are preceded by the agricultural system number and a hyphen. Eg. 1418-1 is Subsystem 1 of System 1418.

5. Number of Subsystems **[NUMSUBSYS]:** A single digit specifying the number of subsystems that occur within this System.

6. District **[DISTRICT]:** The 1990 National Population Census code for the District within which the System is located. More than one District may be listed. District codes are listed in Appendix A.2.

7. Census Divisions **[CENSUSDIV]:** The 1980 National Population Census code for the Census Divisions that occur within the System. Census Division codes for this Province are listed in Appendix A.2.

ENVIRONMENTAL

8. Lowest Altitude **[ALTLOW]:** The lowest altitude, in metres (rounded), to which the System extends.

9. Highest Altitude **[ALTHIGH]:** The highest altitude, in metres (rounded), to which the System extends.

10. Garden Slope **[SLOPE]:** The average slope of gardens in the System.

1	Flat	(<2^{o})
2	Gentle	(2-10^{o})
3	Steep	(10-25^{o})
4	Very steep	(>25^{o})
5	Multiple classes	

***11. Survey Description* [SURVDESC]:** A text description of the areas visited or not visited within the system, the length of time spent in different areas, traverses undertaken, the mode of transport used, the month and year of the survey, and the sources of any documentary information used.

***12. Summary Description* [SYSSUMM]:** A concise text description of the agricultural system, and subsystems (if any), focussed on the occurrence of the major distinguishing criteria.

***13. System Boundary Definitions* [BOUNDDEF]:** A brief description of how the boundaries between systems were identified and mapped. The boundaries between agricultural and non-agricultural land use were taken from Saunders (1993).

***14. Systems Crossing Provincial Borders* [OTHPROV]:** A logical field (yes/no) which indicates whether the System crosses a provincial border.

***15. Same System in Adjacent Province* [PROVSYS]:** A listing of AGSYST numbers (see Field 3 above) of up to two systems in adjacent provinces which are identical to this system, for systems which cross provincial borders.

***16. Subsystem Extent* [SUBSYSEXT]:** An estimate of the proportion of the area of the total system occupied by a subsystem. In the case of there being no subsystems this field is listed as 100 per cent.

1	25 per cent
2	50 per cent
3	75 per cent
4	100 per cent

***17. Type of Fallow Vegetation Cleared* [FALLTYPE]:** The predominant type of vegetation cleared from garden sites at the beginning of a new period of cultivation. Where short fallows are used (see Field 18 below), fallow type refers to the vegetation cleared after a long fallow.

1	Short grass (*eg. kunai < 1.5 m tall*)
2	Tall grass (*eg. Miscanthus or Saccharum > 1.5 m tall*)
3	Grass and woody regrowth *(dense short or tall grass and short woody regrowth*)
4	Short woody regrowth (*shrubs/trees < 10 m tall*)
5	Tall woody regrowth (*trees > 10 m tall*)
6	Forest (*no indication of previous use*)
7	No long fallow
8	Savanna *(Scattered woody growth with grass ground cover)*

***18. Use of Short Fallows* [SHORTFALL]:** A presence and significance measure which indicates whether short fallows are used. Short fallows are brief periods of less than 12 months between plantings during which land is left fallow.

***19. The Long Fallow Period* [FALLPER]:** An estimate of the length of time (greater than 12 months) land is left to revert to regrowth, before it is cultivated again. Class 0 refers to situations where very long cropping intervals (40 plantings or more) make long fallows not significant.

0	Not significant
1	1 to 4 years
2	5 to 15 years
3	Greater than 15 years

20. Cropping Intensity **[**CROPINT**]:** The number of times staple crops are planted in the main gardens before those gardens are returned to a long fallow. Short fallows of less than 12 months (see Field 18 above) are excluded for this purpose: they may occur between plantings without affecting the classification. The class 'More than 40 plantings', refers to situations where land has been planted continuously without a long fallow since the Pacific War (1942-45) or longer. In such cases Field 19, Long Fallow Period, is classed as 'Long fallow period not significant'.

1	1 planting only
2	2 plantings
3	3 to 5 plantings
4	6 to 14 plantings
5	15 to 40 plantings
6	More than 40 plantings

CROP COMPONENTS

21. The Dominant Staple Crops **[DOMSTAP]:** The most important staple food crops grown in the subsystem. A major staple is defined as a crop estimated to cover more than one-third of staple garden area, and therefore no more than 3 dominant staples may be identified for a system. An important exception occurs when sago is the staple. Sago is extracted from palms which are not cultivated in gardens. In the text accounts (System Summaries and Notes), dominant staples are described as the '*most important crops*'.

22. The Subdominant Staple Crops **[SUBSTAP]:** Staple food crops of lesser importance grown in the subsystem. A subdominant staple is defined as a crop estimated to cover more than 10 per cent of a staple garden area; up to six crops may be listed. An important exception occurs when sago is the staple. Sago is extracted from palms which are not cultivated in gardens. In the text accounts (System Summaries and Notes), subdominant staples are described as '*important crops*'.

23. All Staple Crops **[ALLSTAP]:** A list of up to 10 staple crops including crops classed as dominant and subdominant, as well as other staple crops which occur commonly. In the text accounts (System Summaries and Notes), staple crops which are classified as neither dominant nor subdominant are described as '*other crops*'.

01	Mixed staple (no dominant staple: a mix of some or all of: banana, taro, sweet potato Chinese taro, yam, cassava and corn)		
02	Banana *(Musa* cvs*)*	13	Taro *(Colocasia esculenta*)
03	Breadfruit *(Artocarpus altilis)*	14	Yam *(Dioscorea alata*)
04	Cassava *(Manihot esculenta)*	15	Yam *(Dioscorea esculenta*)
05	Chinese taro *(Xanthosoma sagittifolium)*	16	Yam *(Dioscorea pentaphylla*)
06	Coconut *(Cocos nucifera)*	17	Other
07	Corn *(Zea mays)*	18	Queensland arrowroot (*Canna edulis)*
08	Potato *(Solanum tuberosum)*		
09	Sago *(Metroxylon sagu)*	19	Taro (Amorphophallus) *(Amorphophallus paeoniifolius)*
10	Swamp taro *(Cyrtosperma chamissonis)*	20	Yam *(Dioscorea bulbifera)*
11	Sweet potato *(Ipomoea batatas)*	21	Yam *(Dioscorea nummularia)*
12	Taro *(Alocasia macrorrhiza*)		

***24. Other Vegetable Crops* [VEG]:** A list of up to 10 important vegetable crops:

01 Aibika *(Abelmoschus manihot)*
02 Amaranthus *(Amaranthus* spp.*)*
03 Bean, common *(Phaseolus vulgaris)*
04 Bean, lablab *(Lablab purpureus)*
05 Bean, winged *(Psophocarpus tetragonolobus)*
06 Cabbage *(Brassica oleracea var. capitata)*
07 Chinese cabbage *(Brassica chinensis)*
08 Choko tips *(Sechium edule)*
09 Corn *(Zea mays)*
10 Cucumber *(Cucumis sativus)*
11 Ferns
12 Ginger *(Zingiber officinale)*
13 Highland pitpit *(Setaria palmifolia)*
14 Kangkong *(Ipomoea aquatica)*
15 Kumu musong *(Ficus copiosa)*
16 Lowland pitpit *(Saccharum edule)*
17 Nasturtium *(Nasturtium* spp.*)*
18 Oenanthe *(Oenanthe javanica)*
19 Peanuts *(Arachis hypogaea)*
20 Pumpkin fruit *(Cucurbita moschata)*
21 Pumpkin tips *(Cucurbita moschata)*
22 Rungia *(Rungia klossii)*
23 Tulip *(Gnetum gnemon)*
24 Valangur *(Polyscias* spp.*)*
25 Balbal *(Erythrina variegata)*
26 Bamboo shoots
27 Bean, snake *(Vigna unguiculata)*
28 Spring onion *(Allium cepa var. cepa)*
29 Sweet potato leaves *(Ipomoea batatas)*
30 Taro leaves *(Colocasia esculenta)*
31 Watercress *(Nasturtium officinale)*
32 Other
33 Bean, lima *(Phaseolus lunatus)*
34 Bottle gourd *(Lagenaria siceraria)*
35 Dicliptera *(Dicliptera papuana)*
36 Kalava *(Ormocarpum orientale)*
37 Karakap *(Solanum nodiflorum)*
38 Basil *(Ocimum basilicum)*
39 Bean leaves *(Phaseolus* spp.)
40 Cassava leaves *(Manihot esculenta)*
41 Chilli leaves *(Capsicum frutescens)*
42 Eggplant *(Solanum melongena)*
43 Pigeon pea *(Cajanus cajan)*
44 Tomato *(Lycopersicon esculentum)*

***25. Fruit Crops* [FRUIT]:** A list of up to 8 important fruits grown:

01 Avocado (*Persea americana)*
02 Banana *(Musa* cvs*)*
03 Bukabuk (*Burckella obovata)*
04 Coastal pandanus *(Pandanus tectorius)*
05 Malay apple *(Syzygium malaccense)*
06 Mandarin *(Citrus reticulata)*
07 Mango *(Mangifera indica)*
08 Marita pandanus *(Pandanus conoideus)*
09 Orange (*Citrus sinensis)*
10 Passionfruit, banana *(Passiflora mollissima)*
11 Passionfruit, other *(Passiflora* spp.*)*
12 Pawpaw *(Carica papaya)*
13 Pineapple *(Ananas comosus)*
14 Rambutan *(Nephelium lappaceum)*
15 Sugar *(Saccharum officinarum)*
16 Ton *(Pometia pinnata)*
17 Watermelon *(Citrullus lanatus)*
18 Other
19 Custard apple *(Annona squamosa)*
20 Golden apple *(Spondias cytherea)*
21 Granadilla (*Passiflora quadrangularis)*
22 Grapefruit (*Citrus paradisi)*
23 Guava (*Psidium guajava)*
24 Lemon (*Citrus limon)*
25 Lime *(Citrus aurantifolia)*
26 Parartocarpus *(Parartocarpus venenosa)*
27 Pomelo *(Citrus maxima)*
28 Pouteria *(Pouteria maclayana)*
29 Raspberry *(Rubus* spp.)
30 Soursop *(Annona muricata)*
31 Tree tomato *(Cyphomandra betacea)*
32 Watery rose apple *(Syzygium aqueum)*
33 Governor's plum *(Flacourtia indica)*
34 Lovi-lovi *(Flacourtia inermis)*
35 Mon *(Dracontomelon dao)*
36 Rukam *(Flacourtia rukam)*
37 Ficus *(Ficus* spp.)

***26. Nut Crops* [NUT]:** A list of up to 5 important nuts grown or collected:

01	Breadfruit *(Artocarpus altilis)*	09	Karuka, wild *(Pandanus brosimos)*
02	Candle nut *(Aleurites moluccana)*	10	Okari *(T. kaernbachii/ T. impediens*)
03	Castanopsis *(Castanopsis acuminatissima)*	11	Sis *(Pangium edule)*
		12	Pao *(Barringtonia* spp.)
04	Coconut *(Cocos nucifera)*	13	Tulip *(Gnetum gnemon)*
05	Finschia *(Finschia chloroxantha)*	14	Other
06	Galip *(Canarium indicum*)	15	Polynesian chestnut *(Inocarpus fagifer)*
07	Java almond *(Terminalia catappa*)		
08	Karuka, planted *(Pandanus julianettii)*	16	Cycad *(Cycas* spp.)
		17	Entada *(Entada scandens)*
		18	Dausia *(Terminalia megalocarpa)*

***27. Narcotic Crops* [NARC]:** A list of up to 5 important narcotics grown:

1	Betel nut, highland *(Areca macrocalyx)*
2	Betel nut, lowland *(Areca catechu)*
3	Betel pepper, highland (*Piper gibbilimbum*)
4	Betel pepper, lowland *(Piper betle)*
5	Tobacco *(Nicotiana tabacum)*
6	Kava *(Piper methysticum)*

FORMS OF GARDEN AND CROP SEGREGATION

***28. Garden Segregation* [GARDSEG]:** A presence and significance measure of whether individual staple food crops are planted in different gardens. A garden is a contiguous area of land planted with crops under the management of a social unit such as a family or a household. If some gardens are sited in different vegetation zones, and have different fallow periods, cultivation periods or other agronomic characteristics, then they are assigned to a separate subsystem.

All presence and significance measures are coded as follows:

0	None
1	Minor or insignificant
2	Significant
3	Very significant

***29. Crop Segregation* [CROPSEG]:** A presence and significance measure of whether individual staple food crops are planted separately in different parts of the same garden.

***30. Crop Sequences* [CROPSEQU]**: A presence and significance measure of whether the harvesting of one crop species is usually followed by the planting of another, eg. yams followed by sweet potato, or sweet potato followed by peanuts followed by sweet potato (see also Field 33 below).

***31. Mixed Vegetable Gardens* [MIXGARD]:** A presence and significance measure of whether mixed gardens are used. A mixed garden is typically a garden which is subsidiary to that containing the main staple(s). It is planted with a wide range of either subdominant staples and/or other vegetables. It may or may not be distinguished from the main garden types by different fallow and agronomic techniques.

***32. Household Gardens* [HOUSGARD]:** A presence and significance measure of whether house gardens are used. A house garden is typically a garden that is small relative to the main gardens, is located near houses, and which contains a variety of crops. Also known as door yard or kitchen gardens.

SOIL FERTILITY MAINTENANCE TECHNIQUES

33. Legume Rotation **[LEGUMROT]:** A presence and significance measure of whether a leguminous crop (eg. peanuts or winged bean) is grown between plantings of main food crops.

34. Planted Tree Fallow **[TREEFALL]:** A presence and significance measure of whether tree species (eg. *Casuarina oligodon* or *Parasponia* spp.) are planted into gardens or fallows for the stated purpose of improving soil quality during subsequent cultivations. This measure excludes the practice of planting fruit tree species into gardens and fallows, but does not exclude the planted trees being used for timber or firewood.

35. The Use of Compost **[COMPOST]:** A presence and significance measure of whether organic matter is placed beneath the surface of the soil.

36. The Use of Animal Manure **[MANURE]:** A presence and significance measure of whether animal manure is placed on or in the soil. The measure does not include the deposition of manure by the animals themselves, eg. pigs tethered in gardens.

37. The Use of Island Beds: **[ISLBED]:** A presence and significance measure of whether island beds are used. Island beds are beds of soil on which crops are planted and which are raised above the level of a surrounding area of standing or slowly moving water.

38. The Contribution of Silt from Flooding **[SILT]:** A presence and significance measure of whether silt from floods is deposited either regularly or sporadically on the soil surface in gardens. It is assumed the flooding is of natural causes, but the measure does not exclude deliberate manipulation of stream channels in order to enhance the delivery of silt or for the partial control of flood waters.

39. The Use of Inorganic Fertiliser **[FERT]:** A presence and significance measure of whether inorganic fertiliser is applied to gardens. This measure excludes the use of inorganic fertiliser on cash crops, such as coffee or vegetables.

OTHER AGRICULTURAL PRACTICES

40. The Placing of Pigs in Gardens **[PIGSIN]:** A presence and significance measure of whether pigs are placed in gardens between plantings. Pigs may be placed in gardens between plantings for a number of stated reasons, eg. to eat earthworms, to eat unharvested crops, or to till the soil. This measure excludes the deliberate breaking of fences to allow pigs to forage after the cropping phase.

41. Burning **[BURN]:** A presence and significance measure of whether fallow vegetation cleared and cut in a new garden site is burnt before the planting of the staple crops. The measure includes the burning of material which has been heaped. Significance takes into account the frequency of burning relative to the cropping intensity. So, for example, if the majority of the fallow material cleared from the site is burnt at the initial clearing of a garden, and only one or two plantings are made before fallowing, burning is Very Significant. If the same thing occurs at clearing, but a large number of plantings are made before the next long fallow, with little or no burning between plantings, burning is Minor.

***42. Soil Tillage* [TILL]:** A presence and significance measure of whether soil in the staple food gardens is tilled before planting. Tillage includes the breaking up, or turning over, of the whole or the major part of the soil on the garden surface. The measure includes tillage in either the first planting and/or subsequent plantings. The formation of soil mounds and beds (see Fields 53-58 below) involves working the soil into a tilth, but in order to distinguish clearly between these processes, mounds and beds are not automatically classified as soil tillage.

***43. The Use of Deep Holing* [HOLE]:** A presence and significance measure of whether deep holing is used. Deep holing is sometimes used in yam cultivation in order to influence the dimensions and shape of the tubers. Deep (> 50 cm) holes are dug, the soil is broken into a fine tilth and the hole re-filled before planting. The use of this technique is usually restricted to the cultivation of *Dioscorea alata.*

***44. Cutting Fallow Vegetation Onto the Crops* [FALLCUT]:** A presence and significance measure of whether crops are planted beneath standing fallow vegetation, and the vegetation is later cut down onto the growing crops.

***45. The Use of Fences* [FENCE]:** A presence and significance measure of whether gardens are fenced. Fences are linear barriers made of wood, bamboo, cane grass or stones, and may incorporate a ditch or a bank. The measure excludes low ridges which form between fields when stones are thrown to the perimeter during cultivation. In the assessment of the significance of fences, the occurrence of fences around every individual garden is given greater significance than one fence around a large number of gardens.

***46. The Use of Irrigation* [IRRIG]:** A presence and significance measure of whether water is applied to crops by the use of channels or aqueducts.

***47. The Use of Mulch* [MULCH]:** A presence and significance measure of whether a mulch is used to cultivate the staple crops. A mulch is organic material which is applied to the soil surface. If the material is placed beneath the soil surface it is defined as a compost (see Field 35 above).

***48. The Seasonality of Main Crops* [SEASMAJ]:** A presence and significance measure of whether the dominant staples (most important food crops) and the subdominant staples (important food crops) are planted at about the same time each year.

***49. The Seasonality of Other Crops* [SEASMIN]:** A presence and significance measure of whether other staple crops and vegetable crops are planted at about the same time each year.

***50. The Use of Drains* [DRAIN]:** A presence and significance measure of whether ditches are used in and around gardens to remove surface water or to lower the groundwater table.

***51. The Use of Soil Retention Barriers* [SOILRET]:** A presence and significance measure of whether structures (pegged logs, fences or hurdles, stone walls) are constructed along the contour or below individual plants, in order to prevent or reduce the down slope movement of soil.

***52. The Use of Staking* [STAKE]:** A presence and significance measure of whether crops are trained or tied up stakes, trellises or standing dead trees to lift them off the soil surface. The practice is usually applied to yams (*Dioscorea* spp.), beans, sugarcane, and sometimes gourds, cucumber and choko.

MOUNDING TECHNIQUES

In many parts of Papua New Guinea the soil is formed into circular mounds of varying dimensions and crops are planted on them. Mounding should not be confused with composting (see Field 35 above). Mounds may or may not contain compost and composting may take place in the absence of mounds. Mounds are usually re-formed at each new planting. Mound formation usually involves extensive soil disturbance. The effect can be similar to complete soil tillage (see Field 42 above).

The following fields contain presence and significance measures of whether mounds of the specified dimensions are used in the system.

53. Very Small Mounds **[VSMMOUND]:** Mounds up to 10 cm high.

54. Small Mounds **[SMMOUND]:** Mounds 10 to 40 cm high.

55. Medium Sized Mounds **[MOUND]:** Mounds 40-70 cm high and between 1 m and 2.5 m in diameter.

56. Large Mounds **[LRGEMOUND]:** Mounds > 70 cm high and > 2.5 m in diameter.

GARDEN BED TECHNIQUES

In some locations the soil is also raised into beds and crops planted on them. Bed formation usually involves extensive soil disturbance. The effect can be similar to complete soil tillage (see Field 42 above). Two shapes of beds are distinguishable:

57. Square Beds **[BEDSQ]:** Square beds are constructed by digging shallow ditches typically 2 to 4 metres apart on a grid layout, and throwing the soil removed onto the surface to form a bed. The outcome is a characteristic chequerboard or gridiron pattern in gardens.

58. Long Beds **[BEDLONG]:** Long beds are constructed by digging shallow ditches down slope typically 2 to 4 metres apart and over 10 metres in length, and throwing the soil removed to the centre to form a bed.

59. Mechanical Soil Tillage **[MECHAN]:** The use of tractors or hand-held cultivators in the preparation of a garden site for food crops. The measure includes the use of machinery in the cultivation of crops for sale.

CASH EARNING ACTIVITIES

A presence and significance measure of the importance of the following common rural cash income sources. The list includes sources related to agricultural or land based production from the farmers' own resources.

60. Animal Products **[ANSKIN]:** The sale of animal skins, furs and bird plumes, but not fresh meat.

61. Betel Nut **[BETEL]:** The sale of betel nuts (*Areca catechu* or *A. macrocalyx)* and associated items like pepper and lime.

62. Cardamom **[CARDAM]:** The sale of cardamom (*Elettaria cardamomum).*

63. Cattle **[CATTLE]:** The sale of cattle as live beasts or as fresh meat.

***64. Chillies* [CHILLIE]:** The sale of dried chillies (*Capsicum frutescens).*

***65. Cocoa* [COCOA]:** The sale of cocoa (*Theobroma cacao)* beans.

***66. Copra* [CNUT]:** The sale of copra and nuts from coconut palms (*Cocos nucifera).*

***67. Arabica Coffee* [COFFARAB]:** The sale of Arabica coffee (*Coffea arabica*).

***68. Robusta Coffee* [COFFROB]:** The sale of Robusta coffee (*Coffea canephora*).

***69. Crocodile Products* [CROC]:** The sale of freshwater and saltwater crocodile (*Crocodylus* spp.) skins or meat, from managed and wild animals.

***70. Firewood* [FIREWOOD]:** The sale of firewood.

***71. Fish* [FISH]:** The sale of fresh or smoked freshwater or saltwater fish, shellfish or crustacea.

***72. Fresh Food:* [FOOD]:** The sale of fresh vegetables, fruits, nuts and fresh or smoked meat from domesticated or wild animals.

***73. Oil Palm* [OILPALM]:** The sale of palm oil fruit (*Elaeis guineensis).*

***74. Potato* [POTATO]:** The sale of Irish potatoes (*Solanum tuberosum).*

***75. Pyrethrum* [PYRETH]:** The sale of dried pyrethrum flowers (*Chrysanthemum cinerariaefolium).*

***76. Rice* [RICE]:** The sale of rice (*Oryza sativa).*

***77. Rubber* [RUBB]**: The sale of latex from rubber trees (*Hevea brasiliensis).*

***78. Sheep and Wool* [SHEEP]:** The sale of sheep as live animals, or meat and the sale of wool.

***79. Tea* [TEA]:** The sale of unprocessed tea (*Camellia sinensis).*

***80. Tobacco* [TOBACCO]:** The sale of the dried tobacco leaf (*Nicotiana tabacum).*

***81-82. Other* [OTHER1] [OTHER2]:** Other unlisted sources of cash include the sale of copal gum (*Agathis* sp.), massoi bark (*Massoia aromatica*), tigasso oil (*Campnosperma* sp.), salt extracted from plants or natural springs and deposits, mineral oil, bêche-de-mer, insects and butterflies, live birds, marsupials, pigs and horses, house building materials including thatching and sheets of woven cane, canoe hulls, clothing, weapons, string bags, carvings and artefacts. This category excludes other sources of cash income such as wages and salaries, logging or mining royalties, gold mining, banditry, gambling and remittances. These are mentioned in Notes (Field 83) if they are important.

***83. Further Notes* [NOTES]:** Additional notes on particularly outstanding features of the system and further information drawn from published and unpublished documents.

SURVEY DETAILS

Fields ***84-101*** contain details of dates when observations were made of the system for the purposes of this project and the names of the persons who made the observations. Up to three survey visits can be accommodated. The field names are:

Month of a short visit [**SVDATMON**]: Eg. 01 = January.
Year of a short visit [**SVDATYR**]: Eg. 1992.
Period of a longer term study [**SVPERYRA**]: Eg. 1971-72.
Person making the visit [**SURVNAME**]: Initials of person(s). Full names are given in a Key on the relevant page in Section 5.

The type of survey [**SURVTYPE**]

1	Very brief visit to one place (less than an hour), or interviews
2	Short visit to a few places (less than 1 day)
3	Visits to several places (1 to 3 days)
4	Multiple visits to many places (4 to 15 days)
5	Multiple visits to many locations over several years (more than 15 days)

102. Information From the National Nutrition Survey 1982-83 **[NNS]:** The National Nutrition Survey 1982/83, selected families in villages across most of the country from a sampling frame based on environments drawn from PNGRIS classifications. Amongst other questions, people were asked what foods they had eaten during the previous day (NNS 1982/3). For systems in which more than 10 families were interviewed, responses for particular foods are presented as percentages of the total number of families interviewed. Results are presented only for staple foods, fresh fish and purchased rice. The entry includes the number of families and number of villages surveyed, and the month and year of survey.

This information is more than 10 years old and is independent of the information collected by the Agricultural Systems Project. It should be used carefully (Smith et al. 1992). In some Systems the sample size is small and villages sampled may be restricted to one part of the System. It is possible that Chinese taro (*Xanthosoma sagittifolium*) has been included in the general term 'taro', increasing the importance of taro (*Colocasia esculenta*) and decreasing the importance of Chinese taro. Where diets change seasonally, the results may also be unrepresentative.

103. Main References **[REF]:** References to published and unpublished documents that contain substantial information on agriculture in the System.

104. Other References **[REF2]:** References to published and unpublished documents that contain additional information directly relevant to the Agricultural System.

105. The Area of the System **[AREA]**: The area, in square kilometres, occupied by the System. The figure is calculated by the mapping program ARC/INFO.

106. Total Resident Population 1980 **[TOTPOP]:** The total population resident within the area covered by the System at the time of the 1980 National Population Census. The 1990 National Population Census figures are not used because of questions over their reliability, but the 1990 National Population Census maps are used to locate most Census Units.

***107. The Number of People Living Outside the System* [ABSPOPPER]:** An estimate of the proportion of the population absent from villages in the system in 1978-79, expressed as a percentage of the total population. The figure is the difference between the 'total' population and the 'resident' population listed in the 1978-79 Provincial Data System (PDS) Rural Community Register for the Province. The 'total' population is the total number of persons listed in the Village Book and the 'resident' population the number living in the village, or who have been absent for less than 6 months at the time of the census. In some cases 'total' and 'resident' populations in the PDS are the same.

***108. The Population Density* [POPDEN]:** The number of persons per square kilometre in 1980, calculated by dividing Field 106 (total population) by Field 105 (area). There are two situations where adjusted figures are given (indicated by "*"). In some systems sago is the staple food and there is little or no agriculture or subsistence is based completely on non-agricultural activities (eg. fishing or trading) and no agricultural land use can be identified. For these systems the area has been adjusted to include a 5 kilometre buffer strip around the system boundary, or centred on settlements where no land use is identified. The 5 kilometre buffer zone is assumed to be the area of non-agricultural land, usually forest, in which wild plants and animals are exploited. In the latter case, settlements are identified with point symbols. The second kind of adjustment occurs where the populations of two adjoining systems, both of which use both systems, are unequally distributed in the two system areas due to the locations of the census units. In such cases, adjusted population density figures are shown (for example, Milne Bay Province Systems 0501 and 0502), with explanations in Notes (Field 83).

***109. The Intensity of Land Use* [RVALUE]:** The R value (Ruthenberg 1980, 15) is an estimate of the intensity of land use, derived from the ratio of the Cropping Period in years to the length of the cultivation cycle in years. Cropping Period is estimated from the number of plantings of the staple crops before a long fallow (see Field 20 above). The cultivation cycle is the sum of the Cropping Period and the Long Fallow Period (see Field 19 above). The R value is thus:

$$\frac{\text{Cropping Period} \times 100}{\text{Cropping Period} + \text{Long Fallow Period}}$$

Because in this survey both the cropping period and the long fallow period are described as classes, conversion of the class ranges to single year values is necessary in order to calculate R values. The following conversions are used for most crops:

Cropping period	Years	Long fallow period	Years
1 planting only	1	Not used	0
2 plantings	2	1-4 years	3
3-5 plantings	4	5-15 years	10
6-14 plantings	10	>15 years	20
>14 plantings	20		

Triploid banana or Chinese taro may produce for several years from a single planting. In systems in which these crops are dominant staples or subdominant staples with significant land use, the cropping period is adjusted upwards. The adjustment is based on estimates of how long these crops produce from a single planting before a long fallow. Where there is evidence of a cropping period without a long fallow of longer than 20 years, the cropping period is adjusted upwards, to a maximum of 50 years.

3. AGRICULTURAL SYSTEMS: TEXT SUMMARIES

Text summaries take two forms: those for the first or only subsystem in an Agricultural System, and those for subsequent subsystems.

1. The headers on text summaries for the first or only subsystem in an Agricultural System are as follows:

PROVINCE 15 West Sepik	**AGRICULTURAL SYSTEM No**. 1	**Subsystem No** 1 **of** 1
Districts 4 Telefomin	**Subsystem Extent** 100%	**Area (sq km)** 1259
Population 8,530	**Population Density** 7 **persons/sq km**	**Population absent** 7%

This header contains information in the top right hand corner on the number of subsystems descriptions which follow.

This header also contains information for the *whole* Agricultural System on Districts, area, population, population density and absenteeism.

2. Headers on text summaries of subsequent subsystems are as follows:

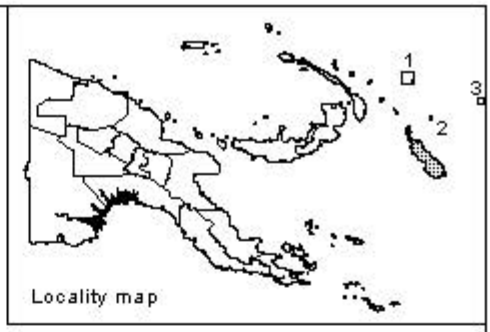
PROVINCE 15 West Sepik	**AGRICULTURAL SYSTEM No**. 3	**Subsystem No** 2 **of** 2
Districts 4 Telefomin	**Subsystem Extent** 25 %	

They contain information on Districts and subsystem extent only.

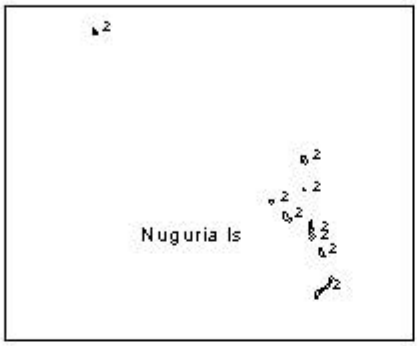
Headers on second and subsequent pages of summaries are as follows:

PROVINCE 15 West Sepik	**AGRICULTURAL SYSTEM No**. 1	**Subsystem No** 1 **of** 1

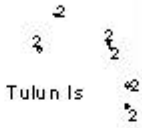
BOUGAINVILLE PROVINCE
Agricultural systems

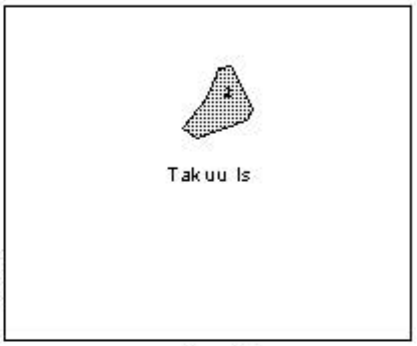



Nissan Is



Inset 1





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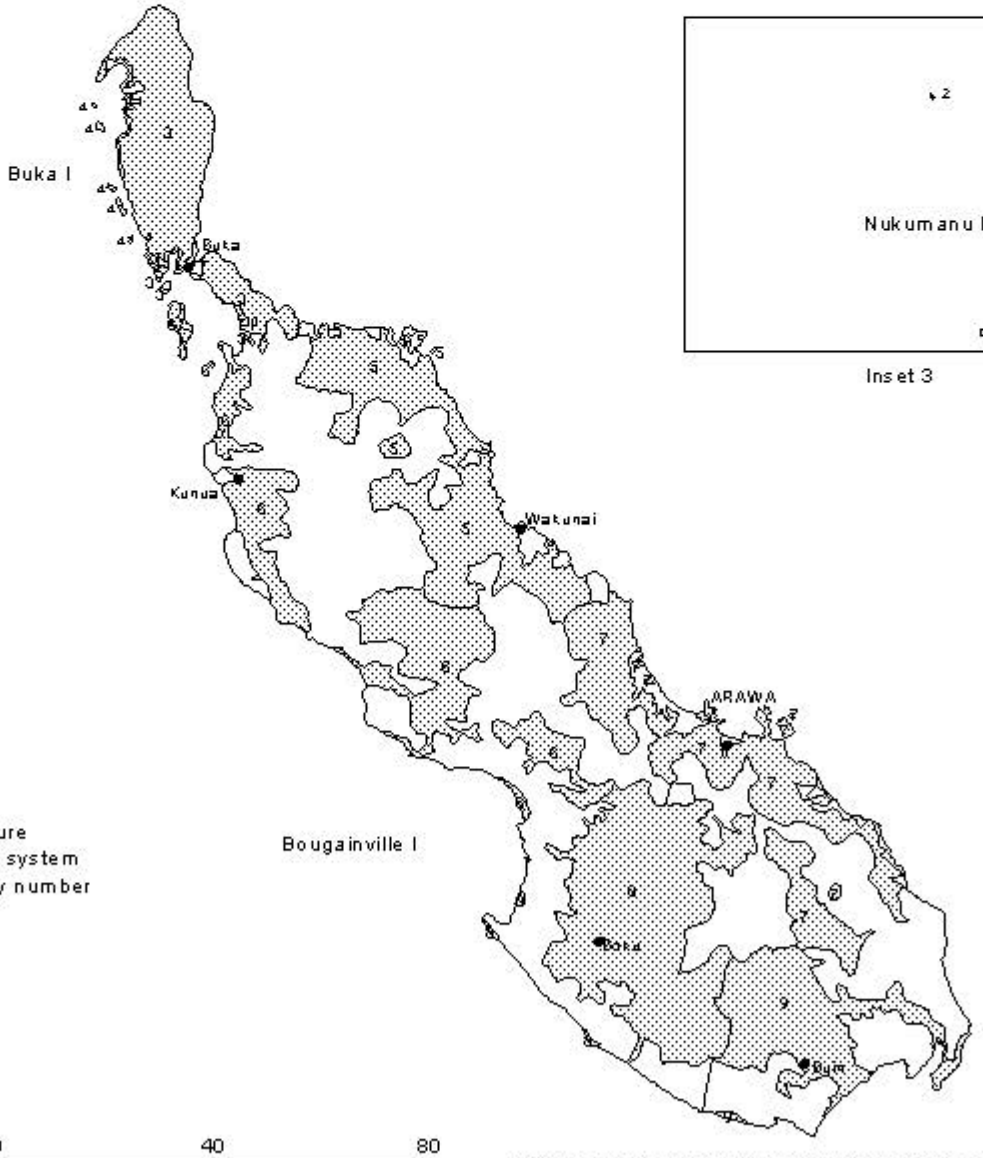

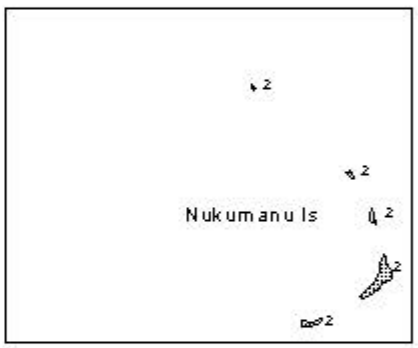

Inset 3

No agriculture
Agricultural system identified by number

40 0 40 80
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 1	**Subsystem No.** 1 **of** 1
Districts 1 Buka	**Subsystem Extent** 100 %	**Area (sq km)** 38
Population 2,991	**Population density** 79 **persons/sq km**	**Population absent** 13 **%**

System Summary

Located on Nissan and Pinipel Islands (Green Islands). The fallow vegetation is short woody regrowth, three years or younger for sweet potato and cassava gardens and a little older for other crops. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; taro, banana and coconut are important crops; other crops are Chinese taro, cassava, yam (D. alata and D. esculenta) and Alocasia taro. Mangrove seeds are an important food on Pinipel Island. Sweet potato is planted in separate gardens or sometimes in a separate section of a garden. Yams, interplanted with taro, are planted in separate sections. Usually only one planting is made before fallowing, but a second planting of sweet potato may be made. Household gardens are common.

Extends across provincial border to System(s) None

Altitude range (m) 0-20 **Slope** Gentle (2-10 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Coconut, Taro (Colocasia)
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Alocasia), Taro (Colocasia), Yam (D. alata), Yam (D. esculenta)
OTHER VEGETABLES	Aibika, Chinese cabbage, Corn, Kumu musong, Pumpkin tips, Valangur, Bean (snake)
FRUITS	Bukabuk, Coastal pandanus, Mango, Pawpaw, Sugarcane, Ton, Guava, Mon
NUTS	Breadfruit, Galip, Java almond, Pao, Polynesian chestnut
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Short woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	1-4 years
CROPPING PERIOD	1 planting
R VALUE	25 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Significant
CROP SEGREGATION	Minor
CROP SEQUENCES	None
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	Significant

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Fish	Significant
2 Coconuts	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	Significant
SMALL MOUNDS	None
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Very significant
STAKING OF CROPS	Minor
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	Minor
SEASONAL SEC'DARY CROPS	Minor

OTHER DOCUMENTATION

Survey description

In September 1992, agricultural systems on Nissan and Pinipel Islands were surveyed (3 days).

Boundary definition

Nissan and Pinipel Islands were allocated to a separate system after visits to these islands and to other atolls.

Notes

This system is distinguished from the atoll system (System 2002) where continuous cultivation of coconut, swamp taro and sweet potato is the main agricultural activity. Land is very limited on Pinipel Island and each family has only small gardens. Family plots are typically 5-10 m wide. Woruba and Humphrey (1993) noted that sweet potato growth appeared to be poor on Pinipel. In contrast, gardens on Nissan Island appeared to produce well and land availability was not a serious problem. Soils are shallow and overlie limestone, and hence food production is vulnerable to drought.

Woruba and Humphrey (1993) reported that the farming systems on both atolls were characterised by the use of stone piles in the gardens which seperated pockets of deeper soil for planting. After the fallow period, vegetation was cut and removed from the site for burning. However there were some important differences between the farming systems of the two islands. On Nissan Island sweet potato was grown with other crops, on a mixed cropping basis, whilst on Pinipel crops were grown in separate sections of the garden. On Pinipel two consecutive sweet potato plantings were made before the garden was left to fallow, and whilst the first crop was usually successful, the second was unreliable. Gardeners on Pinipel felt that the current varieties of sweet potato were inferior to those used in the past. On Pinipel, stone fences are extensively used for keeping pigs out of gardens.

The food crops grown also varied somewhat between the two atolls. Cassava, banana, aibika, sweet potato and taro were grown on both atolls, but corn, yam (both D. alata and D. esculenta), snake bean and pawpaw were grown only on Nissan. Moreover, on Pinipel, fruit trees, including breadfruit and mangroves, were planted near the gardens. Mangroves (Burguiera eriopetala) were eaten daily on Pinipel and were a major staple, together with sweet potato and banana. There are three stages of preparation of mangrove fruit prior to consumption. Fruit and nut trees are very important on both atolls, particularly galip and pao nuts. Some sago (M. salomense) is eaten. Golden apple is another fruit that is eaten.

Yams are planted seasonally in July-August. Taro is planted between yam plants some months later at the beginning of the wet season. Sweet potato and vegetables tend to be planted at the start of the wetter months (October-December). Yams are grown on stakes. Sweet potato and yams are planted in very small mounds.

Archaeological evidence from Nissan indicates that humans have been exploiting coconuts and galip nuts since the Takaroi phase (c. 4850 BP) (Spriggs 1991, 230). These nuts were found to still be important on Nissan (note that pao nut had also become important). However, on Pinipel, coconut trees were in short supply due to space limitations (Woruba and Humphrey 1993). Sale of fish and copra are the main income sources. Other income comes from the sale of betel nut, cocoa and fresh food.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

Woruba, M. and W. Humphrey 1993 A survey report of cropping practices on atolls in Papua New Guinea. Sustainable Agriculture Series Workshop Paper 1/93, Lowlands Agricultural Experiment Station, Department of Agriculture and Livestock, Keravat.

Other References

Spriggs, M. 1991 Nissan, the island in the middle. Summary report on excavations at the north end of the Solomons and the south end of the Bismarcks. In Allen, J. and C. Gosden (eds), Report of the Lapita Homeland Project. Canberra, Department of Prehistory, Research School of Pacific Studies, Australian National University, 222-243.

PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 2	**Subsystem No.** 1 **of** 1
Districts 1 Buka	**Subsystem Extent** 100 %	**Area (sq km)** 16
Population 1,607	**Population density** 100 **persons/sq km**	**Population absent** 26 **%**

System Summary

Located on the Tulun (Carteret), Takuu (Mortlock), Nukumanu (Tasman) and Nuguria (Fead) atolls. Food sources are purchased food, coconut, swamp taro, fish, fruit, nuts and some garden food. The most important garden food is swamp taro; sweet potato and cassava are important garden foods; other crops include banana, taro, Chinese taro and Alocasia taro. Cultivation of coconuts, swamp taro and banana is permanent. Sweet potato tends to be planted continuously. Other crops follow short woody regrowth fallows, and 2-3 plantings are made before land is fallowed for short periods. Occasionally, a cassava planting follows sweet potato. Swamp taro is planted in separate plots where soil fertility is maintained by mulching with coconut fronds. Within gardens, sweet potato and cassava are planted in separate sections. Sweet potato is planted in mounds about 20 cm high. Household gardens are common.

Extends across provincial border to System(s) None

Altitude range (m) 0-3 **Slope** Flat (<2 degrees)

CROPS

STAPLES DOMINANT	Coconut, Swamp taro
STAPLES SUBDOMINANT	Cassava, Sweet potato
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Swamp taro, Sweet potato, Taro (Alocasia), Taro (Colocasia)
OTHER VEGETABLES	Aibika, Pumpkin tips, Valangur, Bean (snake), Taro leaves, Other
FRUITS	Bukabuk, Coastal pandanus, Malay apple, Pawpaw, Sugarcane
NUTS	Breadfruit, Java almond, Pao, Polynesian chestnut
NARCOTICS	None

FALLOW & CROPPING PERIOD

FALLOW TYPE	No long fallow
SHORT FALLOW	Minor
LONG FALLOW PERIOD	Not significant
CROPPING PERIOD	>40 plantings
R VALUE	100 (high)

GARDEN SEGREGATION

GARDEN SEGREGATION	Very significant
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	Significant

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Coconuts	Minor
2 Fish	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Minor
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	Significant
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	None
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In September 1992, a visit to the Nuguria group (1 day). In October 1992, extensive interviews of Takuu, Nukumanu and Tulun Islanders at Keravat, East New Britain, during training courses.

Boundary definition

The atolls were allocated to a separate system after visits to Nissan and Pinipel Islands, interviews with islanders and a literature review.

Notes

This system is distinguished from System 2001 where sweet potato is the most important crop and, together with other crops, follow short woody regrowth fallows about three years long.

People eat a lot of purchased food, including rice, flour and biscuits. Fish are an important food on all island groups. There is considerable land pressure on these tiny atolls. There is no land available for making food gardens on some inhabited atolls, for example, in the Takuu group. Food production comes from permanent stands of coconut and swamp taro and mostly continuous plantings of sweet potato. Triploid banana stands are also permanent. Swamp taro is planted in pits that go down to the water lens in the centre of the atoll. It is mulched with coconut fronds and other vegetation. On Nukumanu Island, birds feed on fish and their droppings fertilise the soil.

Food gardens are commonly made among coconut palms. In the Nuguria gardens, Woruba and Humphrey (1993) noted that sweet potato, cassava, pawpaw and pumpkin are grown under coconut. Where garden land is fallowed, the fallow vegetation is short woody regrowth. For crops other than sweet potato, two or three plantings are made before land is fallowed.

Breadfruit is an important food seasonally and the flesh is eaten; bukabuk fruit is common and grows well. Polynesian chestnut is a common tree, especially in the Tulun Islands. On all islands, a coconut variety with a soft edible fibre is grown. The fibre is cooked in stone ovens before consumption. Household gardens containing aibika, Chinese taro, banana and other crops are common.

The literature is somewhat divided with regard to the nature of the subsistence economies of these atolls prior to European contact. Bayliss-Smith (1974) argued that of the three main staples, taro, coconut and fish, the last named was the least important. Parkinson (1907), on the other hand, claimed that fishing was the main occupation of the islanders, but said little of the relative importance of fish as a dietary staple. The latter issue was, however, raised by Feinberg (1986), who argued that the subsistence sector of the economy of the Tasman Islands (Nukumanu) was, and always had been, dominated by fish and other marine products (such as trochus and bêche-de-mer). These provided the primary source of dietary protein. Wankowski (1979) described fishing methods on Nuguria, Nukumanu and Takuu atolls.

The literature does, however, agree on the nature of the quite unique system of agriculture which is practised on these atolls. Parkinson (1907) provided the earliest description of this system, a description which was subsequently enriched by other authors including Boag and Curtis (1959), Bayliss-Smith (1974), Lefroy (1981), O'Collins (1990), and Woruba and Humphrey (1993).

The most important crop which is cultivated in this system is the swamp taro. Pits are dug down to the fresh water lens in the centre of the larger islands. The pits are then filled with leaf litter which composts to produce a rich dark soil in the bottom of the pits. The main pit area is divided into three or four channels, each of which is two to three feet deep, and planting is carried out along the edges of these channels. When a new plant commences to grow, leaf mulch is regularly applied to its base, which has the dual function of protecting the young plant from the heat of the sun and fertilising the soil. (Note that Boag and Curtis (1959) reported that, in the Mortlock Islands (Takuu) the latter benefit of fertilisation was not apparently appreciated by farmers). The material which is removed in the construction of the pits is heaped-up to form protective banks (up to 3 m high) around each pit. These banks also serve as access tracks, as clan and family plot boundaries, and as areas upon which to cultivate coconut, breadfruit, pao nut and various other tree crops.

Boag and Curtis (1959) reported that most of the swamp taro pits which were in use in the Mortlock (Takuu) Islands were in fact constructed by the ancestors of the islanders when the atoll group was first settled, and have been in constant use since that time. It is, however, important to note that it was still customary in some families to constuct a new pit to celebrate the birth of a boy.

Notes continued
Feinberg (1986, 273) reported that, in the Tasman (Nakumanu) Islands, the islanders claimed that Colocasia taro 'used to grow' on their atoll, but has all died. Colocasia taro is, however, regarded as an important secondary crop in the Mortlock (Takuu) Islands where five varieties are cultivated (Lefroy 1981, 11). In the late 1950s, the Mortlock islanders came to the realisation that Colocasia taro is better suited to dry conditions (until then it had been grown in the swamp taro pits, with unsatisfactory results) and commenced cultivating Colocasia taro on the raised intervals between the swamp taro pits and channels (Boag and Curtis 1959, 24). They also observed that the islanders had commenced cultivating Colocasia taro in the dry soils of the coconut fringe.

It is important to note that coconut is widely regarded as the most plentiful and important species on all the atolls (Lefroy 1981, 10; Feinberg 1986, 272). Coconuts are used as a source of food, fuel, constructon material, and perhaps most importantly, dietary liquid. Coconut was originally introduced to the islands in ancient times (Lefroy 1981, 10). However it seems that the German colonial administration was instrumental in encouraging the planting of coconut, resulting in the high concentrations of coconut trees which now characterise the islands (Boag and Curtis 1959, 25; Feinberg 1986, 274).

Thus, the literature indicates that the most important subsistence staples are coconut, swamp taro and fish (and other marine products). Other crops of minor importance include: breadfruit, pao nut, banana, pandanus, sugarcane, giant (Alocasia) taro, pawpaw, pumpkin, cassava, Polynesian arrowroot, bukabuk [misidentified by Lefroy as Pouteria], Chinese taro, Amorphophallus taro, sago, mango, guava, oranges, valangur, golden apple, watery rose apple and Java almond (Terminalia). Yam (D. esculenta) was found to be an important standby crop in the Mortlock and Carteret Islands (Boag and Curtis 1959, 24; Lefroy 1981, 12). Moreover, kangkong (Ipomoea aquatica) which is ideally suited to the swamp taro pits, Polynesian chestnut and sago palm are minor crops in the Carteret Islands; and sweet potato, purslane, mangrove and Malay apple are minor crops in the Nuguria (Fead) Islands (Lefroy 1981, 12-13).

With the developement of income generating activities and modern trade, imported food products are becoming increasingly important. Lefroy (1981, 10) pointed out that more rice was being eaten on some of the atolls. Indeed, in the Nukumanu (Tasman) Islands, Feinberg (1986, 275-6) claimed that, next to coconut, the atoll's major staples had become wheat flour and rice. He also reported that cash generating activities in the Tasman Islands were, in descending order of importance: collecting and preparing bêche-de-mer; trochus shell; and copra production (Feinberg 1986, 276). O'Collins (1990, 250) observed that in the Carteret Islands cash income levels were extremely unreliable and inconsistent due to the fact that sales of copra, shells, bêche-de-mer and other fish products depended on regular sea transport to Kieta on Bougainville Island.

The case of the Tulun (Carteret) Islands is particularly significant because the resources of the island have been widely regarded as being over-exploited (Kukang et al. 1987; O'Collins 1990). Indeed, the island has periodically experienced food shortages of varying severity since the 1960s. As a consequence an 'Atolls Resettlement Scheme' has been in operation since late 1984, and has seen the resettlement of Tulun Islanders in an area of Bougainville known as Kuveria, which is 30 km from Arawa, along the Kieta-Buka Highway (Kukang et al. 1987; O'Collins 1990). All of the settlers reportedly had left the scheme in the late 1980s, prior to the Bougainville crisis.

Some copra is made in Tulun, Nukumanu and Nugaria groups. Small quantities of smoked fish are sold at Buka, Kokopo and Honiara markets. Other minor cash income sources include sale of bêche-de-mer and trochus shell.

National Nutrition Survey 1982/83
In this province, the survey was conducted during 1980 and no dietary recall information was collected.

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Parkinson, R. 1907 Dreissig Jahre in der Südsee. Land und Leute, Sitten und Gebräuche im Bismarckarchipel und auf den Deutschen Salomoinseln. (Thirty Years in the South Seas. The Bismarck Archipelago: Land, Natives and Customs - English translation by N.C. Barry). Stuttgart, Berlag von Strecker and Schröder.
Wankowski, J.W.J. 1979 Subsistence fishing methods on Nuguria, Nukumanu and Takuu atolls. Harvest 5, 3, 179-185.
Woruba, M. and W. Humphrey 1993 A survey report of cropping practices on atolls in Papua New Guinea. Sustainable Agriculture Series Workshop Paper 1/93, Lowlands Agricultural Experiment Station, Department of Agriculture and Livestock, Keravat.

PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 3	**Subsystem No.** 1 **of** 1
Districts 1 Buka	**Subsystem Extent** 100 %	**Area (sq km)** 678
Population 17,739	**Population density** 26 **persons/sq km**	**Population absent** 18 **%**

System Summary

Located on Buka Island and the northern tip of Bougainville Island. Fallow vegetation is tall woody regrowth, typically 5-6 years old, with a range of 2-10 years. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, taro and coconut are important crops; other crops are cassava and Chinese taro. Sweet potato and taro are grown in separate gardens. Banana, cassava and Chinese taro are planted on the edge of gardens. Generally, two or three plantings are made before fallowing, but up to five plantings may be made. Sweet potato is planted in mounds about 30 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-80 **Slope** Flat (<2 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Coconut, Taro (Colocasia)
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Colocasia)
OTHER VEGETABLES	Aibika, Choko tips, Corn, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Tulip, Bean (snake), Other
FRUITS	Bukabuk, Malay apple, Mango, Pawpaw, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	3-5 plantings
R VALUE	29 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Significant
CROP SEGREGATION	Minor
CROP SEQUENCES	None
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Coconuts	Very significant
2 Cocoa	Significant
3 Fresh food	Significant
4 Betel nut	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Minor
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In June and October 1996, interviews with five people from north, east and south Buka Island. No field visits were made.

Boundary definition

Buka Island was allocated to a separate system after interviewing five people from Buka Island; two people from small islands west of Buka (System 2004); and field visits and interviews with people from the atolls (Systems 2001 and 2002). The boundaries with Systems 2005 and 2006 between Baniu and Soraken Harbour on northern Bougainville are based on the extent of the flat raised coral reefs. This estimate is confirmed by interviews with people from Buka and the Tinputz area.

Notes

This system is distinguished from Nissan and Pinipel atolls (System 2001) where fallows are short woody regrowth fallows about three years old. It is distinguished from the small atolls (System 2002) where coconut, swamp taro, fish, fruit, nuts and some sweet potato and cassava are the main foods. It is distinguished from System 2004 on the small islands west of Buka where land use is more intensive with fallow periods of only about one year. This system is almost identical to System 2005 to the south on Bougainville, but garden segregation is less important there and there is a weak tendency for more plantings to be made before land is fallowed in that system. The system is also very similar to System 2006 on the west coast of Bougainville, but in that system cassava is somewhat more important and taro less important than in this system.

Fallow vegetation is mostly tall woody regrowth, but some short woody regrowth is used where land pressure is most intensive on the east coast. Fallow periods on the east coast are estimated at about 5-6 years, but two of the five informants indicated that fallow periods were only 2-4 years. Two or three plantings are usually made before fallowing, with a range of 1-5 plantings.

Significant quantities of imported rice are eaten. Some fish is eaten in coastal villages. In south Buka, villagers obtain a lot of seafood, such as mud crabs and shell fish, from mangrove stands. The pith of a self-sown plant that is similar to a banana, but with thin stems, is commonly eaten as a vegetable. It is known as 'tsip' in south Buka. The mangos eaten come from wild trees, not the cultivated species. Nuts of Pangium edule ('sel') are eaten in inland Buka. Tobacco is more common in inland and north Buka. Some peanuts are grown in inland Buka.

An archaeological survey (Wickler 1990, 140) found evidence suggesting that Colocasia taro had been used in this region in the Pliestocene and Holocene eras. Evidence was also discovered suggesting the use of Canarium spp., particularly C. indicum and C. solomonese, from about 9000 BP.

Blackwood (1935, 271-312) conducted field work in the north of Bougainville in the late 1920s and observed that taro was the most important staple crop. Many different varieties of taro were known; one woman identified twelve varieties in her garden, and claimed that there were many more. Coconut was also identified as an important staple, and it was certainly the most important of the nut species.

Blackwood provided an exhaustive list of the other vegetables, nuts and fruits which were eaten, including: sweet potato, yam, breadfruit, pumpkin, squash, sugarcane, several varieties of mushrooms, leaves of taro and other plants, coconut, galip, Java almond, pao, banana, wild passion fruit, mango, pawpaw, orange and lime. In addition to these foodstuffs, various animals were hunted including wild pig, opossum, flying fox, bats, birds, lizards, frogs and insects. Taro was frequently traded for fish. Breadfruit was identified as particularly important when in season, during which time people reduced their consumption of taro. Moreover, people indicated that sago was eaten in times of scarcity, when the taro crop had failed. Importantly, Blackwood noted that, compared to other parts of Bougainville, sweet potato and yam were relatively unimportant in this region.

According to Blackwood, taro was predominantly cultivated on its own, although pumpkins, bananas, and other fruit and nut trees were sometimes planted in taro gardens. Taro was cultivated using a form of shifting agriculture. Plots of bush were cleared and burnt, and taro ‘stalks’ were planted in holes which had been made with the sharpened end of a pole. The gardens were fenced in order to prevent pigs from damaging the crops. Only one planting of taro was made before the garden returned to fallow (Blackwood 1935, 298).

With regard to narcotic crops, Blackwood (1935, 292-295) reported the cultivation of tobacco, betel nut and betel pepper, all of which were produced for local consumption.

Notes continued

Rimoldi and Rimoldi (1992, 56-59) reported that food gardens on Buka were destroyed during the World War II, leading to a severe food shortage. During this period people survived by eating pigs, dogs, sago, banana, and especially pawpaw. Moreover, following on from the destruction of the gardens, the fungus Phytophthora colocasiae became established and wiped out taro, which never regained its former position as the most important staple on Buka. In 1948, the agricultural office noticed that people were planting more cassava and yams, and that village pig populations were starting to build up again. It was also noticed that sweet potato had become the new dominant staple.

Dearden and Freyne (n.d.) conducted field work in the region in 1980 and reported that sweet potato was by far the most important staple crop, whilst taro, banana and yam were the other important staples. Other food crops grown were: corn, coconut, beans, aibika, peanuts and pineapple. Crops were planted in the following sequence before the garden was left to fallow: firstly, sweet potato was interplanted with corn and other crops; then for the second planting, sweet potato was interplanted with other crops, but not corn; and finally, a third planting of sweet potato was made on its own. Moreover, it was found that sugarcane, banana and pawpaw were normally planted in newly cleared gardens, and continued growing until the abandonment of the garden. Dearden and Freyne (n.d.) found that pigs were not fenced in many villages on Buka, and subsequently caused crop damage. Furthermore, crop failure due to droughts was found to occur quite commonly, especially on north Buka.

With regard to cash cropping, Dearden and Freyne (n.d.) reported that the vast majority of families had at least a small area of cash crops, and due to the low price of copra at the time, it was discovered that more cocoa than coconut was being planted. It was common practice for crops of sweet potato to be interplanted with cocoa, so that the gardens would be transformed into cocoa blocks after the sweet potato cropping sequence had run it course. It was also reported that the large increase in cash cropping in the coastal areas of Buka and northern Bougainville had pushed gardens inland a long way from the villages.

Copra is now the main source of cash income for most villagers. Cocoa is less important, but is still a significant income source. Production has increased as copra prices have fallen. Using Cocoa Board figures, the main annual income from cocoa sales for 1991-95 is estimated as about K250 per household per year. Significant quantities of fresh food are sold in Buka Passage market, including sweet potato, coconuts, fruit and vegetables. Food is also sold or exchanged with people from the islands west of Buka at the Kessa barter market. Buka Island people sell sweet potato, taro, banana and other garden food. They receive fish and other seafood from the small island people (System 2004). Betel nut provides some cash income. Some tobacco is sold by people from north Buka and inland locations.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

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PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 4	**Subsystem No.** 1 **of** 1
Districts 1 Buka	**Subsystem Extent** 100 %	**Area (sq km)** 6
Population 1,423	**Population density** 237 **persons/sq km**	**Population absent** 35 **%**

System Summary

Located on Matsungan, Petats, Yame, Pororan and Hitau Islands, off the west coast of Buka Island. Fallow vegetation is short regrowth, typically about one year old. Fallow vegetation is cut, dried and burnt. Three plantings of sweet potato and cassava are made before fallowing, but more plantings may be made. Sweet potato is the most important crop; cassava, banana and coconut are important crops; other crops are taro and Chinese taro. Cassava is planted on the edge of sweet potato plots, but it is sometimes planted after a number of sweet potato plantings. Sweet potato is planted in mounds about 30 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-20 **Slope** Flat (<2 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Cassava, Coconut
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Colocasia)
OTHER VEGETABLES	Aibika, Choko tips, Corn, Ferns, Kumu musong, Lowland pitpit, Peanuts, Pumpkin tips, Other
FRUITS	Bukabuk, Malay apple, Mandarin, Mango, Pawpaw, Sugarcane, Watermelon
NUTS	Breadfruit, Galip, Java almond, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland)

FALLOW & CROPPING PERIOD

FALLOW TYPE	Short woody regrowth
SHORT FALLOW	Minor
LONG FALLOW PERIOD	1-4 years
CROPPING PERIOD	3-5 plantings
R VALUE	57 (medium)

GARDEN SEGREGATION

GARDEN SEGREGATION	None
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	Minor

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Coconuts	Very significant
2 Fish	Significant

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	None
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In September and October 1996, interviews with two persons from Petats and Matsungan Islands respectively. No field visits were made.

Boundary definition

The islands off the west coast of Buka Island were assigned to a separate system after interviews with two people from the islands and five informants from Buka.

Notes

This system is distinguished from that on Buka Island (System 2003) where fallow periods are longer and fallow vegetation is tall woody regrowth.

There is very high population pressure on these islands and much land is devoted to coconut plots. Fallow vegetation is short regrowth, probably consisting of a mix of herbaceous plants and a few woody plants. Soil fertility is reported to be poor because of the intensity of land use. Few green vegetables grow well apart from aibika and pumpkin. These two crops are sometimes planted in small household gardens.

Informants indicated that several plantings of sweet potato may be followed by plantings of cassava. In some places, planting of sweet potato is more-or-less continuous with little fallowing. Plantings of peanuts are sometimes made between sweet potato plantings.

Specht (1974, 229) reported that, because of population presure, there is insufficient land to support the islands' population. Considerable amounts of taro were imported from western Buka. This situation continues with people eating a lot of rice and other imported food, and garden food purchased from Buka people.

Island people sell or barter seafood at the Kessa market and sell it at Buka Passage market. People from the northern islands (Pororan and Hitau) probably travel more to Kessa while those from the southern islands (Matsungan, Petats and Yame) go more to Buka Passage.

There is little literature available on this agricultural system. Blackwood (1935, 273, 439-441) reported that Petats Island was unsuitable for taro growing, but was well situated with respect to fishing activities. Consequently, regular exchange meetings took place between people from Petats and people from the hill villages in the interior of Buka Island. Fish was exchanged for taro at these meetings.

Copra is the main source of cash income. Sale of seafood including fresh fish, smoked fish, mudcrab and shellfish is also important. Some cocoa is grown on blocks on the west coast of Buka.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

None.

Other References

Blackwood, B. 1935 Both Sides of Buka Passage: An Ethnographic Study of Social, Sexual, and Economic Questions in the North-western Solomon Islands. Oxford, Clarendon Press.
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PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 5	**Subsystem No.** 1 **of** 1
Districts 1 Buka, 3 Kieta	**Subsystem Extent** 100 %	**Area (sq km)** 846
Population 12,500	**Population density** 15 **persons/sq km**	**Population absent** 4 **%**

System Summary

Located on the northeast coast and inland area of Bougainville Island in the Tinputz, Wakunai and Togarau areas. Fallow vegetation is tall woody regrowth, about 5-6 years old. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, coconut and taro are important crops; other crops are cassava and Chinese taro. The number of plantings made before fallowing range from 1-5, with 2-4 the most comon range. Sweet potato is planted in mounds 30-50 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-700 **Slope** Multiple classes

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Coconut, Taro (Colocasia)
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Colocasia)
OTHER VEGETABLES	Aibika, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Tulip, Taro leaves, Other
FRUITS	Malay apple, Mango, Orange, Pawpaw, Pineapple, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	3-5 plantings
R VALUE	29 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Minor
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Very significant
2 Betel nut	Minor
3 Coconuts	Minor
4 Fish	Minor
5 Fresh food	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	None
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	Minor

OTHER DOCUMENTATION

Survey description

In December 1980, a road traverse and garden visits from Kieta to Wakunai and Togarau (1 day). In August-October 1996, interviews with three informants from the Tinputz-Teop and Wakunai areas.

Boundary definition

The boundary with System 2003 near Baniu is based on the extent of flat raised coral reefs. This estimate was confirmed by interviews with people from Buka Island and the Tinputz area. The southern boundary with System 2007 was taken as the Pukarobi River and is an estimate only. This system was distinguished from System 2006 to the west after interviews with three people from the east coast and a group of people from the west coast. The boundary with System 2006 was taken as the 600 m contour and is an estimate only.

Notes

This system is almost identical to that used to the north and on Buka Island (System 2003), but garden segregation is more important there and there is a weak tendency for more plantings to be made in this system before fallowing. It is also very similar to the system on the west coast (System 2006) where cassava is an important food, but taro is less important. This system is distinguished from that to the south (System 2007) where generally only one planting is made before fallowing and Chinese taro is an important crop.

Fallow vegetation is tall woody regrowth, about 10-15 m high. Fallow periods are probably 4-8 years, but this is uncertain. The number of plantings made before fallowing varies between locations. In the Teop area, two plantings are said to be the most common practice; two or three plantings are made in the Ruruvu area; and three or four plantings on the volcanic ash soil in the Baniu area. In the inland areas where population pressure is less, one or two plantings only are made before fallowing. Occasionally, a planting of taro will be followed with one or more sweet potato plantings.

Sweet potato is the most important food. It had become dominant after taro was devastated by taro blight. There is some resurgence in taro planting and more is said to be eaten in the 1990s than during the 1970s and 1980s. The relative importance of the staple foods varies between locations. Taro and Chinese taro are more important in inland locations. A little rice was grown during the crisis years of the early 1990s, but production had ceased by 1996. Cassava is used to prepare puddings. A little sago is eaten. When food was scarce during the crisis period, some wild yam were gathered and eaten. Fish is a reasonably important food in coastal locations.

Page et al. (1987) surveyed foods eaten in a number of different communities in North Solomons. On Bougainville, the areas chosen for the study were Nasioi, Nagovisi and Aita. Aita, located inland on the northern end of the island in this system and away from the money of the Bougainville Copper Mine stood out in the comparison. People in the Aita area ate substantially more taro and yam than did those living in Nagovisi and Nasioi. For example, 78 per cent claimed they ate 'plenty' of taro compared with 12 per cent in Nasioi and 4 per cent in Nagovisi. People in Nagovisi and Nasioi ate substantially more introduced (or purchased) foods. For example, 86 per cent of people in Nasioi and 90 per cent in Nagovisi claimed they ate 'plenty' of rice compared with only 21 per cent in Aita.

Minor vegetable crops include amaranthus, Chinese cabbage, snake bean, karakap, peanuts, kangkong, Chinese taro leaves, sweet potato leaves, ginger, spring onion, watercress, winged bean, tomato, eggplant and capsicum. Choko tips are a more important vegetable in inland locations. Minor fruits include golden apple, mandarin, pomelo, soursop, custard apple, ton, avocado and rambutan. Galip and pao are common nut trees with Java almond eaten on the coast. Polynesian chestnut is a minor nut tree. Both the flesh and fruit of breadfruit are eaten. Tobacco is mainly grown by Sepik settlers. Fences are rarely made, except in the Tinputz area. Corn, cucumber and watermelon are planted in the middle of the year and harvested in October-December. Other crops are not planted seasonally.

There is quite a lot of variation in agricultural practices employed in this system, and this variation is largely dependent on soil type and altitude. Monsen (1975, 12-13) reported that the mountain and hill peoples grew the best taro. Similarly, Dearden and Freyne (n.d.) found that the people of Iuan village only grew taro on higher ground, whilst sweet potato was grown on the lower slopes and in the low flat areas. Furthermore, Monsen (1975, 7) argued that the people of Tearaka have always traded with the inland people, exchanging fish for taro. This indicates that variation in agricultural practices may have existed in this agricultural system for quite some time.

A fungal disease of taro (taro blight) arrived on Bougainville immediately prior to the Japanese invasion in 1942. The disease spread throughout all of Buka and Bougainville, and devastated taro production. Villagers switched to sweet potato as their staple food everywhere on Bougainville and Buka (Packard 1975).

Notes continued

At Iaun, it was found that two crops of taro were generally grown before the taro gardens were left to fallow (Dearden and Freyne n.d.). In the low lying areas, three plantings of sweet potato were usually made before fallowing. Sweet potato was always interplanted with other crops including: taro, Chinese taro, yam, cassava, banana, corn, pitpit, coconut, pawpaw, sugarcane, watermelon, beans, peanuts, pumpkin, aibika, European cabbage, cucumber, onion, spring onion, tomato and tobacco (Dearden and Freyne n.d.; Monsen 1975, 11-12). Upon completion of the cropping sequence, the sweet potato gardens were often turned over to coconut or cocoa.

At Tearaka, new gardens were made by cutting the bush, allowing it to dry, and then burning it (Monsen 1975, 11). Taro was planted in holes made with digging sticks, whilst sweet potato was planted in mounds constructed with hoes and spades. At Togarau village, Dearden and Freyne (n.d.) found that it was common practice to allow the cut bush to rot for up to six years before burning it and establishing a new garden. Moreover, it was also reported that some farmers in Togarau had established 'permanent' gardens (Dearden and Freyne n.d.). One such garden, from which six consecutive crops had successfully been cultivated, was examined, and the crops were found to be in good health. Importantly, Dearden and Freyne (n.d.) found that Iaun village was susceptible to periodic food shortages as a result of crop damage caused by pigs and heavy rainfall.

Cash cropping has been carried out throughout this agricultural system since the 1950s (Rutherford 1977; Dearden and Freyne n.d.). Copra and cocoa have been the primary cash crops, although coffee and garden vegetables have also been important in some areas (Rutherford 1977). Dearden and Freyne (n.d.) and Monsen (1975, 13) reported that the sale of garden vegetables was an important secondary source of cash income in Togarau and Tearaka respectively. In some areas, most of the land close to villages has been put under coconut and cocoa, with the result that subsistence gardens have been pushed further away from the villages (Dearden and Freyne n.d.; Monsen 1975, 16-17, 27-29).

This region was, and remains, the main cocoa producing area in North Solomons Province. Cocoa is the main source of cash income. Village production has continued throughout the crisis, although it collapsed in 1994-95 because of transport and marketing problems. Between 1991 and 1994, cocoa sales were worth about K800 per household per year (estimates derived from Cocoa Board figures). Some copra is produced and sold, but production has declined in recent years because of poor returns. There has been considerable damage to the plantations in this region and most infrastructure on them have been destroyed. Some harvesting is occurring by villagers, but all plantations have been abandoned by management.

Some betel nut is sold at Buka Passage. A little is taken to Lae and Port Moresby for sale, and this continued even during the crisis period of the early 1990s. Some fresh food is sold locally. Prior to the crisis, potatoes and temperate fruit and vegetables, such as cabbage, carrot and strawberry, were grown in the Togarau area, but this production has probably ceased because of lack of demand. Fish also provides some cash income, especially for Teop Island people. The traditional exchange of fish and garden food between coastal and inland people was revived during the crisis years. A little tobacco provides some cash income, particularly for those few remaining people of Sepik origin. Cardamom was trialled in the mountainous areas and some sold prior to the crisis, but it is no longer being produced.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

None.

Other References

Dearden, P.N. and D.F. Freyne n.d. Land use: a rapid rural appraisal, North Solomons Province. Unpublished paper, Land Use Section, Department of Primary Industry, Port Moresby.

Monsen, J. 1975 Tearaka - a case study of village change on Bougainville. Student Research Papers No. 2, Department of Geography, University of Papua New Guinea, Port Moresby.

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PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 6	**Subsystem No.** 1 **of** 1
Districts 1 Buka, 2 Buin	**Subsystem Extent** 100 %	**Area (sq km)** 849
Population 7,834	**Population density** 9 **persons/sq km**	**Population absent** 8 **%**

System Summary

Located on the west coast of Bougainville Island between Soraken Harbour/Taiof Island and Empress Augusta Bay, and centred on Kunua station. Fallow vegetation is tall woody regrowth, probably about 4-6 years old. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, cassava and coconut are important crops; other crops are Chinese taro, taro and yam (D. alata). Separate gardens are made for taro. A typical planting sequence is three plantings of sweet potato followed by a planting of cassava, Chinese taro and banana. Only one planting of taro is made before fallowing in taro gardens. Sweet potato is planted in mounds 30-40 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-500 **Slope** Multiple classes

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Cassava, Coconut
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Colocasia), Yam (D. alata)
OTHER VEGETABLES	Aibika, Choko tips, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Bean (snake), Other
FRUITS	Malay apple, Mandarin, Mango, Orange, Pawpaw, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	3-5 plantings
R VALUE	29 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Minor
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Significant
2 Betel nut	Minor
3 Coconuts	Minor
4 Fish	Minor
5 Fresh food	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	None
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In October 1996, interviews with three informants as a group from the Kunua area. Information was provided on the region from Soraken Harbour and Taiof Island to Korepovi village (Cape Moltke). No information is available for the Soraken Harbour to Empress Augusta Bay area. No field visits were made.

Boundary definition

The boundary with System 2003 between Baniu and Soraken Harbour is based on the extent of the flat raised coral reefs of Buka Island and Buka Passage, and was confirmed by interviews. This system was distinguished from System 2005 to the east after interviews with three people from the east coast and a group of people from the west coast. The boundary was taken as the 600 m contour and is an estimate only. The boundary with System 2007 was taken as the Crown Prince Range. The southern boundary with System 2008 is an estimate only as agriculture in the Cape Moltke-Empress Augusta Bay area is presumed to be similar to that between Soraken Harbour and Cape Moltke.

Notes

This system is very similar to nearby ones on Buka and Bougainville. It is distinguished from Systems 2003, 2005 and 2008 where cassava is not an important crop. The system is very different from that used on the small islands west of Buka (System 2004) where land use is more intensive and fallow periods are only about one year long. This system is distinguished from those used in southeast and south Bougainville (Systems 2007 and 2009) where usually only one planting is made before land is fallowed.

People are reported to shift village sites from time to time. Hence they clear land after very long fallows of several decades and then gardens are moved within this area for some years. Fallow periods are unknown but informants' descriptions of fallow vegetation suggest about 4-6 years. A typical sequence is said to be three plantings of sweet potato followed by a planting of cassava, banana and Chinese taro. Coconut cream is used to cook food daily, but they are reported to be used less in the southern part of the system.

River fish, reef fish and prawns are commonly eaten. On Taiof Island, cassava is said to be a more important food than sweet potato. Not a lot of taro is grown in this system now. It was the most important staple prior to 1941, as it was for all Bougainville. Minor vegetables include the young shoots and leaves of Chinese taro, taro and sweet potato; and amaranthus, watercress, kangkong, karakap and mushrooms. Minor fruits and nuts include soursop, pomelo and Polynesian chestnut.

Little literature exists on the agricultural activities in this system. Oliver (n.d., 7), after fieldwork on Bougainville Island in 1938-39, described the ‘Bougainville cultures’ as appearing ‘remarkably uniform’. Basically, they relied primarily on gardening for subsistence, with taro as the dominant staple and sweet potato next in importance in most areas; yams were grown and some sago was collected. Hunting, fishing, wild-plant collecting and pig raising were of secondary importance. When in season, galip (canarium) and breadfruit were eaten. Gardens were cleared, planted and fallowed on a rotation basis, with taro planting and harvesting a year-round activity.

Three significant events since that time have seen this uniformity altered. These events were: taro blight during World War II, after which sweet potato replaced taro as the dominant staple crop in most places; the introduction of cash cropping; and the development of the Bougainville Copper Mine.

Ward (1975, 26) gives a brief description of crops grown in the Buin subdistrict, part of which forms the southern half of this system. Sweet potato and yams replaced taro as the dominant staples after taro blight killed off taro during World War II; other crops grown were banana, sugarcane, pawpaw, pitpit, breadfruit, coconut, cassava, corn, tomato, pineapple, bean and tobacco. Sago was also eaten.

Several attempts were made to introduce various crops for income purposes but were unsuccessful. By far the most successful introduction was that of cacao in about 1959 (Ward 1975, 27). Cocoa and, to a lesser degree, copra are now the main sources of cash income. Since the Bougainville crisis, less cocoa and copra has been produced because of transport constraints. The plantations in this region have been abandoned because of the crisis and are overgrown. Other sources of cash income are fresh food which is sold locally; fish and betel nut which are sold locally and in Buka Passage market; and bêche-de-mer. There is likely to be less cash cropping in the Cape Moltke-Empress Augusta Bay region because of transport constraints and lack of road access to Buka Passage.

National Nutrition Survey 1982/83
In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References
None.

Other References
Oliver, D.L. n.d. Somatic Variability and Human Ecology on Bougainville, Solomon Islands. Cambridge, MA, Harvard University.
Packard, J.C. 1975 The Bougainville taro blight. Miscellaneous Working Papers 1975: 1, Pacific Islands Program, University of Hawaii.
Scott, R.M., P.B. Heyligers, J.R. McAlpine, J.C. Saunders and J.G. Speight 1967 Lands of Bougainville and Buka Islands, Territory of Papua and New Guinea. Land Research Series No. 20, Commonwealth Scientific and Industrial Research Organization, Melbourne.
Ward, M.W. 1975 Road and development in southwest Bougainville. New Guinea Research Bulletin No. 62, New Guinea Research Unit, Australian National University, Port Moresby and Canberra.

PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 7	**Subsystem No.** 1 **of** 1
Districts 3 Kieta	**Subsystem Extent** 100 %	**Area (sq km)** 858
Population 16,557	**Population density** 19 **persons/sq km**	**Population absent** 5 **%**

System Summary

Located on the east coast of Bougainville Island between the Pukarobi River and the Laluai River, inland to the Crown Prince Range, and centred on Arawa. Fallow vegetation is tall woody regrowth, probably 5-10 years old. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, Chinese taro and coconut are important crops; other crops are taro and yam (D. alata). Taro is more important in inland locations at higher altitude. Generally, only one planting is made before fallowing, but up to three plantings may be made. Sweet potato is planted in very small mounds on steep land and in small mounds on flatter land.

Extends across provincial border to System(s) None

Altitude range (m) 0-1100 **Slope** Steep (10-25 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Chinese taro, Coconut
STAPLES PRESENT	Banana, Chinese taro, Coconut, Sweet potato, Taro (Colocasia), Yam (D. alata)
OTHER VEGETABLES	Aibika, Choko tips, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Watercress
FRUITS	Malay apple, Mandarin, Mango, Orange, Pawpaw, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	1 planting
R VALUE	9 (very low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Minor
CROP SEGREGATION	Minor
CROP SEQUENCES	None
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Significant
2 Fresh food	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	Significant
SMALL MOUNDS	Minor
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Minor
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In December 1980, a road traverse between Kieta and Panguna with garden visits (1 day). In August and October 1996, interviews with three people from the Kieta, Arawa ad Panguna areas.

Boundary definition

The northern boundary with System 2005 is taken as the Pukarobi River; that with System 2009 is near the Laluai River; that with Systems 2006 and 2008 is the Crown Prince Range. All boundaries are estimates based on interviews, not field traverses, and are not precise.

Notes

This system is distinguished from those to the north (System 2005) and to the west (Systems 2006 and 2008) where 2-4 plantings are made before fallowing and Chinese taro is not an important crop. It is similar to that used in South Bougainville (System 2009) except that fallow periods seem to be shorter there (2-5 years) and fallow vegetation is shorter. The Bougainville crisis has had a major impact on the economy in this system. The most important known effect on agriculture has been the collapse of cash cropping.

Fallow periods were reported as 1-4 years, but from descriptions of vegetation are probably in the range of 5-10 years. Generally, only one planting is made before fallowing, but two or three plantings may be made. In inland areas, separate gardens may be made for taro and sweet potato. Elsewhere, Chinese taro, taro and sweet potato tend to be planted in separate sections of gardens.

Taro is more common in the inland mountainous part of the system than near the coast. Some cassava and rice are also grown and occasionally sago is produced and eaten. Minor vegetables reported include tulip, taro leaves, snake bean, peanuts, Chinese cabbage, capsicum, spring onion and tomato. Minor fruits are pineapple, rambutan, granadilla and avocado.

On steeper land, sweet potato is planted with a digging stick without mounding. Small mounds are made with spades on flat land. Sticks are laid around the contour to delineate plots within gardens, but they do not seem to serve a soil erosion control purpose.

Some river fish and reef fish are eaten. Barter occurs between inland and coastal villagers. The coastal people provide coconuts while the inland people give taro and choko tips. Prior to the Bougainville crisis, coastal people provided store food and clothing.

The main language group lying within this system is the Nasioi language group. A brief description of the agricultural practices of the Nasioi is given by Ogan (1972). He reported four main stages of garden establishment: heavy clearing of fallow vegetation, including felling of trees; clearing shrubs and vines and placing the cut material into heaps around the garden site; final clearing of the garden site and burning of the heaps; and, the final stage, planting. Fences were constructed around gardens to keep pigs out. Fence building took place before the burning stage in garden establishment (Ogan 1972, 24-26). In the 1990s, informants reported that gardens are not usually fenced as pigs are kept in areas separate from food gardens.

Prior to World War II, taro was the dominant staple. Only one planting was made before fallowing land, deterioration of fencing played as big a role in garden abandonment as did the decline in soil fertility (Ogan 1972, 25-26). Bananas, which were planted in taro gardens, continued to be harvested for 1-2 years after garden abandonment (Ogan 1972, 25). At the time of Ogan's fieldwork, the most important crops grown were sweet potato, yam and banana; other crops grown were tomato, pineapple, cucumber, scallions and other green vegetables (Ogan 1972, 118).

The introduction of cash crops also involved changes in the subsistence gardening practices. Firstly, the size and distribution of gardens changed. A larger area of land was required for growing coconut and cacao trees than for a subsistence garden. Therefore, several subsistence gardens were made in a single area of cleared land, before the land was left to the cash crops. Secondly, the larger garden areas required also made fencing a more difficult task and the Nasioi chose to give up pigs until the trees were large enough, rather than fence the gardens (Ogan 1972, 118). Unlike the Nagovisi, the Nasioi did not choose to fence the pigs in (Ogan 1972, 119). One other change from traditional practices was the introduction of metal tools. As an example, women occasionally used iron rods instead of the traditional wooden digging stick (Ogan 1972, 116).

Notes continued

Galip nut and betel nut are consumed by the Nasioi, however the plants were apparently not cultivated (Ogan 1972, 25). Fishing and hunting (for birds, possums and pigs) were carried out on a casual basis (Ogan 1972, 129). Foods purchased with money included rice, tinned fish, tinned meat, and sweet and salted biscuits (Ogan 1972, 148).

Connell and Hamnett (1978) reviewed sago production on Bougainville. They reported that it was produced regularly as part of the normal diet in the Siwai (System 2008) and Eivo (this system) language areas and, to a lesser extent, in other parts of Bougainville.

The average garden size over all of Bougainville was estimated as 2 acres per annum under cultivation (Moulik 1977, 29). However, garden sizes tended to be smaller in the Kieta District (this system) that in the Buin District (System 2009). In the Kieta area, gardens tended to be located on gentle upper slopes of hills, broad ridge tops and stream terraces (Moulik 1977, 29).

Development of the Bougainville Copper Mine also brought about changes during the 1970s and 1980s. The mine had a policy that as much as possible of the fresh food requirements of the workforce be purchased from local sources (Moulik 1977, 28). This policy had a number of substantial impacts on agricultural activities in the Kieta District. Firstly, new crops were introduced to cater for the tastes of the mine's workforce. These new crops included: tomato, onions, pumpkin, pineapple, maize, eggplant, beans, potato, cabbage, watermelon, mandarin and oranges (Moulik 1977, 29). Traditional gardening methods, however, continued to be used. Secondly, the loss of man-power as more men gained wage employment, meant that less attention was paid to cash crops and production decreased (Moulik 1977, 37). Pig raising also became less important, for a variety of reasons, and many households no longer kept pigs.

Construction of the Bougainville Copper Mine resulted in the relocation of some villages. Applied Geology Associates (1989) undertook a study of these villages and their gardens. It was found that a greater incidence of disease and poor production of certain crops occurred in these relocated village when compared with villages located further away from the mine. Applied Geology Associates (1989, 5.36-5.37) suggested two main reasons for this: firstly, reduced access to land meant that gardens could not be moved as frequently; and secondly, with the increased flow of cash, less attention was paid to gardens.

An Atolls Resettlement Scheme operated from 1984. Carteret Islanders resettled at Kuveria, 30 km from Arawa along the Kieta-Buka Highway (Kukang et al. 1987; O'Collins 1990). All the settlers reportedly had left the scheme in the late 1980s, prior to the Bougainville crisis.

Page et al. (1987) conducted a study of foods eaten by a number of different communities in North Solomons. On Bougainville, the areas chosen for the study were Nasioi (this system), Nagovisi (System 2008) and Aita (System 2005). Aita, located inland on the northern end of the island and away from the money of the Bougainville Copper Mine certainly stood out in the comparison. People in the Aita area ate substantially more taro and yam than did those living in Nagovisi and Nasioi. For example, 78 per cent claimed they ate 'plenty' of taro compared with 12 per cent in Nasioi and 4 per cent in Nagovisi. People in Nagovisi and Nasioi ate substantially more introduced (or purchased) foods. For example, 86 per cent of people in Nasioi and 90 per cent in Nagovisi claimed they ate 'plenty' of rice compared with only 21 per cent in Aita.

The main cash crop grown in the Nasioi area in the early 1970s was coconut, for the production of copra, though it was not cultivated until during the German administration (Ogan 1972, 25). There was some cacao grown in the area, but it was not so widely nor so uniformly distributed as coconut. This was mainly because of the greater care required to grow cacao trees, due to their need for shading, and because they produced for fewer years than coconut trees (Ogan 1972, 125).

Lea (1970) conducted a study of activities in a number of villages in Papua New Guinea, including Pavaese near Kieta. He reported that it was the most cash-oriented village in the study and that considerable areas of the village were planted with cocoa and coconuts.

Prior to the Bougainville crisis, cocoa, copra and marketed food provided signficant cash income. Some temperate climate vegetables were also grown for sale in Arawa. The cash economy largely collapsed as a result of the Bougainville crisis. In 1996, some fresh food, seafood and fish were being marketed in Arawa and in the nearby government controlled area. Pig meat, chickens and ducks also provided a little income. By late 1998, production and sale of cocoa had commenced again. Minor quantities of bêche-de-mer were sold occasionally. Villagers were bartering garden produce for manufactured household needs such as soap, sugar and kerocene.

National Nutrition Survey 1982/83
In this province, the survey was conducted during 1980 and no dietary recall information was collected.

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PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 8	**Subsystem No.** 1 **of** 1
Districts 2 Buin	**Subsystem Extent** 100 %	**Area (sq km)** 1179
Population 23,122	**Population density** 20 **persons/sq km**	**Population absent** 4 **%**

System Summary

Located in southwest Bougainville, bounded by Empress Augusta Bay, the Crown Prince Range and the Mivo River, and centered on Boku station. Fallow vegetation is tall woody regrowth, typically 4-8 years old. Some previous unused forest has been cleared during the Bougainville crisis. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana and coconut are important crops; other crops are Chinese taro, cassava, sago, yam (D. alata), taro and rice. Two to four plantings are made before land is fallowed. Sweet potato is usually planted in mounds about 30-40 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-950 **Slope** Gentle (2-10 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Coconut
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sago, Sweet potato, Taro (Colocasia), Yam (D. alata), Other
OTHER VEGETABLES	Aibika, Choko tips, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Tulip, Bean (snake)
FRUITS	Malay apple, Mango, Pawpaw, Pineapple, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	3-5 plantings
R VALUE	29 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	None
CROP SEGREGATION	Minor
CROP SEQUENCES	None
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Significant
2 Fresh food	Minor
3 Pig meat	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	Minor
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Minor
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	Minor
SEASONAL SEC'DARY CROPS	Minor

OTHER DOCUMENTATION

Survey description

In June-October 1996, interviews with four people from the Nagovisi and Siwai areas. No field visits were made.

Boundary definition

The boundary with System 2006 is in the Empress Augusta Bay area; that with System 2007 is the Crown Prince Range; and that with System 2009 is the Mivo River. All boundaries are based on interviews and are not precise.

Notes

This system is very similar to System 2006 to the northwest but cassava is an important food there. It is distinguished from the systems to the east and southeast (Systems 2007 and 2009) where generally only one planting is made before fallowing and Chinese taro is an important crop.

The Bougainville crisis (1989-1997) has had a major impact on southwest Bougainville. However, conditions were becoming more normal by late 1996. Many people in the Siwai language area had been living in national government controlled care centres and some were dependent on rice for food supplied by the government. By late 1996, it was reported that virtually all villages in this system were producing their own food. The crisis has resulted in the collapse of the cash economy, particularly cocoa production. Many villagers have moved into forested areas to avoid fighting. Food gardens are reported to be larger now because of the unavailablity of imported food. People were growing some rice for subsistence; growing more tobacco than pre-crisis; and eating more self sown foods, including ferns, ficus leaves, wild yams and the basal portion of a wild banana-type plant.

Fallow periods are typically 4-8 years long. Because of the crisis situation, many people have moved further from villages and roads and are making food gardens in previously unused forest. It is not known what proportion of gardens are being cleared from previously unused forest. Fallow periods have become much shorter since the late 1960s-early 1970s when Mitchell (1976, 24-25) reported that some gardens followed fallows 20 or more years in length. Three persons interviewed reported that two or three plantings were made before fallowing and a fourth informant stated that three or four plantings were made. Hence the range is reported here as 2-4 plantings.

Some river fish are eaten, but only people living on the coast eat sea fish. Sago is eaten when garden food is scarce, particularly in the wettest months of June and July. Connell (1978) reported that sago was produced regularly as part of the normal diet in the Siwai (this system) and Eivo (System 2007) language areas and, to a lesser extent, in other parts of Bougainville. A semi-permanent type of yam is planted in non-garden areas. The tubers are harvested and vines persist for up to three years. It is used as an emergency food. Pigs are generally kept in separate locations away from food gardens and they are fenced in. Hence gardens are rarely fenced. Sweet potato is usually planted in mounds 30-40 cm high, but the first planting after a fallow may not be grown in mounds.

Taro is now only a minor food crop and and is planted in plots on the edge of sweet potato gardens. Very occasionally, a planting of sweet potato will be followed by a planting of Chinese taro. Occasionally, a crop of peanuts is planted as the first planting after a fallow. This is followed by a sweet potato crop. Minor vegetables eaten include Chinese cabbage, ginger, mushrooms, spring onion and tomato. Galip was a very important seasonal food previously and is still a significant seasonal food. Connell's (1977) review of hunting and gathering among the Siwai has an extensive review of galip (canarium) nut collection (p. 11-13), as well as sago production (p. 14-21), hunting and fishing. More tobacco has been planted since the crisis because people cannot purchase tobacco or cigarettes.

There are three main language groups which fall within the boundaries of this system: the Nagovisi, the Siwai and the Banoni. Detailed accounts of the agricultural practices are given by Mitchell (1976) for the Nagovisi and by Oliver (n.d., 1955; 1973; 1991) for the Siwai.

Oliver (1955) described the agricultural practices of the Siwai in 1938. Taro dominated as the most important crop with sweet potato, then a recent introduction, increasing in importance (Oliver 1955, 27). Progressive cultivation of gardens was used. This involved different plots within each garden containing taro at different stages of maturity. Using Mitchell's (1976, 50) terminology, the 'leading edge' of the garden was cleared of fallow vegetation and then planted with taro as the 'trailing edge' was abandoned following a harvest. Only one planting of taro was made before fallowing, with planting and harvesting being continuous processes (Oliver 1955, 22-23). This procedure was followed, not only for plots within gardens, but also for rotation of gardens. The 'ideal' technique was to have three gardens used in a rotation with each garden containing different stages of the cropping/fallow cycle. This would ensure a garden was under fallow for the appropriate time required for restoration of soil fertility (Oliver 1955, 24).

Notes continued

Gardens were almost always made in secondary forest after fallow periods of approximately 6 years, by which time trees were of an appropriate size for use in fence building (Oliver 1955, 23). All gardens were fenced to keep pigs out (Oliver 1955, 22). Mitchell (1976, 59-60) suggested that this had also been the case for the Nagovisi but that the fences had since been moved from around gardens to around the pigs.

Taro and sweet potato were planted in separate gardens. Other crops grown in taro gardens included: tobacco, banana, yam, gourd; and occasionally maize, tomatoes and tiny red peppers (Oliver 1955, 26-27). Coconut palms were grown around dwellings and coconuts were consumed daily (Oliver 1955, 27). Breadfruit was eaten in early May-mid June. Galip nuts were eaten in July-August. Galip trees were not planted, however special care was taken not to damage these trees during the clearing of fallow for a new garden, and fences were erected around seedling to protect them. Sago was eaten as a substitute staple, often when gardens had been left unattended for long periods.

Nuts, edible leaves, ferns, mushroom and fungi were collected from the forest; 'wild' sago, wild yam and wild taro were eaten during food shortages which very rarely occurred; hunting, mainly for pigs and possums, was important and fishing was an occasional activity (Oliver 1955, 30-31).

During his 1938-39 fieldwork, Oliver (n.d., 42) observed some differences in the diets of 'mountain tribes' as compared with those of the 'plainsmen', and between 'coast dwellers' and 'inlanders'. Mountain tribes tended to rely more heavily on yams and sweet potato than did the plainsmen; they ate less coconut flesh and oil because they had fewer stands; and they ate less pork because their pigs tended to be smaller. Coast dwellers ate substantially more fish than did inlanders.

Sweet potato became dominant after taro blight devastated taro during World War II (Mitchell 1976, Nash 1974, 13). Mitchell (1976) described these sweet potato gardens. He gave a detailed description of what he referred to as 'the ideal garden' (Mitchell 1976, 50-52). Whilst it is 'idealised', it is representative of the general procedure used by the Nagovisi in garden management. The general concept is that there are three main areas or plots within the garden; each with either a first, second or third (and final) planting. These were, of course, not strictly adhered to since some mixing of plantings occurred (for example, second plantings in first planting plots) and there were sometimes more than three plantings (Mitchell 1976, 68). The 'leading edge' of the garden was cleared for first plantings as the 'trailing edge' was abandoned and left to fallow after the third, or final, planting. This was a fairly continuous process as new plantings were made within four days of a harvest (Mitchell 1976, 58). Ideally, a garden would 'drift' in this manner until there was no more bush to clear at the leading edge. This progressive cultivation continuing for more than five years was not uncommon (Mitchell 1976, 50). He gives sweet potato yields for plantings 1-5, with highest yield in the first planting (p. 72).

In a typical Nagovisi garden, 85-90 per cent of the area was planted with sweet potato; yams were planted along the edges of the garden; Xanthosoma or Colocasia taro were planted between sweet potato plots; and cassava planted in plots which were being abandoned. Other crops grown included banana, pawpaw, cucumber, watermelon, pumpkin, tomato, green onion, peanuts, edible pitpit, sugarcane, beans, various leafy greens, tobacco and, only immediately after clearing fallows, corn (Mitchell 1976, 54).

Sweet potato was grown on mounds, called 'gan', which averaged 1 m in diameter, but ranged between 0.75-1.5 sq m in area, and between 25-35 cm in height. In general, these mounds tended to be larger for second and third plantings and smaller, and more widely spaced, on slopes (Mitchell 1976, 57). The main tool used in the garden was a large hoe, called a 'baila' and was used to form mounds. The traditional dibble stick was used occasionally to plant taro but a spade was never used in the garden (Mitchell, 1976, 56-57).

Approximately 0.1 ha of fallow vegetation was cleared at the leading edge of the garden at any one time and such 'heavy clearing' was done 5-6 times a year (Mitchell 1976, 58). In some sites, the fallow period was 20 years or more and in other sites the period was shorter (p. 24-25). Mitchell (1976, 56) described the procedure used to clear fallow vegetation. The first step was the clearing of small trees (up to 10 cm in diameter) and underbrush using a bush knife. Then, some time up to a month or more later, scaffolding would be erected around the larger trees to assist with felling. Where possible, these trees were felled to form boundaries either between different gardens or between different sections within a garden. Some palms of the Areca family were left standing, their slender trunks later acting as stakes for yams. The cleared areas were then left for 2-4 months, during which time herbaceous and shrubby vegetation, called 'lakena', grew. The 'lakena' would then gradually be cut away as the area was prepared for first plantings. All cut vegetation was left to dry then heaped against stumps or fallen trees and carefully set alight; staying alight for several

days as more material was heaped onto the fire. The ash produced was rarely spread around the garden. It was usually left where it was and tobacco or tomato would later be planted in the ash heap.

Notes continued

According to Nash (1981, 122), Buin and Siwai farming practices had always tended to produce a greater output than those of the Nagovisi. She suggested that more efficient work organisation and longer working hours may have explained this.

Page et al. (1987) conducted a study of foods eaten by a number of different communities in North Solomons. On Bougainville, the areas chosen for the study were Nasioi (System 2007), Nagovisi (this system) and Aita (System 2005). Aita, located inland on the northern end of the island and away from the money of the Bougainville Copper Mine certainly stood out in the comparison. People in the Aita area ate substantially more taro and yam than did those living in Nagovisi and Nasioi. For example, 78 per cent claimed they ate 'plenty' of taro compared with 12 per cent in Nasioi and 4 per cent in Nagovisi. People in Nagovisi and Nasioi ate substantially more introduced (or purchased) foods. For example, 86 per cent of people in Nasioi and 90 per cent in Nagovisi claimed they ate 'plenty' of rice compared with only 21 per cent in Aita.

Connell (1978) described the search for a successful cash crop among the Siwai, beginning with rice in the 1950s, coffee, copra, cattle and finally, the widespread adoption of cocoa. The introduction of cacao as a cash crop had two major impacts on the Nagovisi agricultural practices (Mitchell 1976, 81). Cacao is a relatively permanent crop. This meant that the flexibility of the subsistence agriculture decreased. Thus, areas planted with permanent crops could not then be used again for subsistence purposes. The second impact was a disruption to the fallow cycle. Cacao was usually planted in the areas of the garden which were being abandoned after the final planting of subsistence crops and thus inhibited the return of fallow vegetation. Poor growth of coconut palms and associated low yields in southwest Bougainville were attributed by Sumbak (1970) to insufficient solar radiation.

Prior to the Bougainville crisis, cocoa was the main source of cash income and significant areas of land were devoted to cocoa. Production collapsed during the crisis, but cocoa was again becoming important by late 1998. During the crisis years, cash income was restricted to sale of fresh food, pigs, chickens, ducks and a little locally grown rice. Very small quantities of copra were sent out to Buka Passage from Marau (near the Joba River) on the west coast during the crisis.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

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PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 9	**Subsystem No.** 1 **of** 1
Districts 2 Buin	**Subsystem Extent** 100 %	**Area (sq km)** 574
Population 13,528	**Population density** 24 **persons/sq km**	**Population absent** 5 **%**

System Summary

Located in southern Bougainville between the Laluai and Mivo Rivers, and centred on Buin station. Fallow vegetation is short woody regrowth, typically 2-5 years old. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, Chinese taro and coconut are important crops; other crops are taro, yam (D. alata) and rice. Chinese taro and taro are planted in plots on the edge of sweet potato gardens. Usually only one planting is made before fallowing. Sweet potato is usually, but not always, planted in mounds 30-40 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-800 **Slope** Multiple classes

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Chinese taro, Coconut
STAPLES PRESENT	Banana, Chinese taro, Coconut, Sweet potato, Taro (Colocasia), Yam (D. alata), Other
OTHER VEGETABLES	Aibika, Choko tips, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Peanuts, Pumpkin tips, Tulip
FRUITS	Malay apple, Mango, Pawpaw, Pineapple, Sugarcane, Watermelon, Golden apple, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Short woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	1-4 years
CROPPING PERIOD	1 planting
R VALUE	25 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	None
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Significant
2 Fresh food	Minor
3 Pig meat	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Minor
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In August and October 1996, interviews with four people from the Buin area. No field visits were made.

Boundary definition

The boundary with System 2007 is near the Laluai River; that with System 2008 is near the Mivo River. These boundaries are based on interviews, not field traverses, and are not precise.

Notes

This system is similar to that to the north (System 2007), except that fallow periods there are somewhat longer (5-10 years) and fallow vegetation is consequently taller. It differs from that to the west (System 2008) where fallow periods are longer, fallow vegetation is taller, 2-4 plantings are made before land is fallowed and Chinese taro is not an important crop.

The Bougainville crisis (1989-1997) has had a major impact on the economy and lives of people in this system. Many villagers have been living in national government controlled care centres and have been dependent on imported rice for their subsistence. Even in early 1997, there were an estimated 13,000 people still subsisting on rice. The crisis has resulted in the collapse of the cash economy, particularly cocoa production.

Fallow periods were reported by the four informants as ranging from 2-5 years in the flat lowlands. In inland mountainous locations, fallow periods were reported as 10-15 years and sometimes more than 20 years. The crisis situation has resulted in the concentration of people in care centres with food gardens located near these centres. This has resulted in even shorter fallow periods over the past eight years. Usually only one planting is made before fallowing, except where a crop of peanuts follows sweet potato. Occasionally, a second planting of sweet potato is made.

Taro is uncommon in the lowlands but more is grown at higher elevations in inland locations. Some subsistence rice is now being grown because people cannot purchase imported rice as a result of the crisis. A little cassava is grown and sago is eaten very occasionally. The main green vegetables are aibika and pumpkin tips. Choko tips are more significant at higher altitude locations. Tulip leaves and the young tips are gathered from self-sown trees. Galip trees are very common.

Chinese taro and taro are planted in plots on the edge of sweet potato gardens. Banana is interplanted with sweet potato. Fallow vegetation is usually cut, dried and burnt, but sometimes tree trunks and other material are thrown onto the edge of the garden. Chinese taro is planted in these sites.

Sweet potato is usually planted in mounds 30-40 cm high, but sometimes it is grown without mounding, especially on hilly land. The soil is usually not tilled completely, except for peanut crops. Pigs are kept in locations separate from food gardens and hence garden fences are uncommon.

In 1973-74, Moulik (1977) conducted a study of the effects of the Bougainville Copper Mine in both the Buin and Kieta subdistricts. However, he does not differentiate within these boundaries. Throughout the Buin subdistrict, sweet potato was the most important crop with taro and yam also important. Other crops grown were sugarcane, pawpaw, banana, breadfruit, sago, some nuts and leafy vegetables. Gardens were located 10-140 minutes walk from the village (average of 55 minutes) on inland plains and plateaux. The average garden size over all of Bougainville was estimated at two acres per annum under cultivation. However, garden sizes tended to be smaller in the Kieta subdistrict than in the Buin subdistrict (Moulik 1977, 29). Fishing was an almost non-existent activity, but pig raising remained important (p. 31).

Moulik (1977, 28) suggested that road access was one explanation for differences in the changes in agricultural practices which occurred between these two regions. In the Buin subdistrict, lack of road access to Bougainville Copper Mine, and therefore to its employees, meant that sale of fresh food was not an appealing source of cash income, so the new crops which were introduced into the Kieta subdistrict were not adopted in the Buin subdistrict. That is, more traditional subsistence activities were continued in the Buin subdistrict than in the Kieta subdistrict (Moulik 1977, 29).

According to Nash (1981, 122), Buin and Siwai farming practices had always tended to produce a greater output than those of the Nagovisi. She suggested that more efficient work organisation and longer working hours may explain this.

Notes continued

Moulik (1977, 36) stated that cash cropping activities were more important in the Buin subdistrict (this system) than in the Kieta subdistrict (System 2007). In contrast to Kieta, all Buin households included in the study had some land under cash crops. Cocoa and copra sales contributed over 80 per cent of total cash income in the Buin area (Moulik 1977, 35). Moulik suggested that in the Kieta subdistrict, having paid employment at the Bougainville Copper Mine meant less time was available for tending crops. Poor growth of coconut palms and associated low yields in southwest Bougainville were attributed by Sumbak (1970) to insufficient solar radiation.

Prior to the Bougainville crisis, cocoa was the main source of cash income and most households were involved in cocoa production. A little copra was also produced and sold. During the crisis years, export cash cropping collapsed. Cocoa production had resumed by late 1998. There is some sale of fresh food, such as sweet potato and peanuts, pig meat, chickens and ducks. The market at Tokaino is said to be well supplied.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

Moulik, T.K. 1977 Bougainville in Transition. Canberra, Development Studies Centre, Australian National University.

Other References

Nash, J. 1981 Sex, money, and the status of women in aboriginal south Bougainville. American Ethnologist 8, 1, 107-126.

Packard, J.C. 1975 The Bougainville taro blight. Miscellaneous Working Papers 1975: 1, Pacific Islands Program, University of Hawaii.

Scott, R.M., P.B. Heyligers, J.R. McAlpine, J.C. Saunders and J.G. Speight 1967 Lands of Bougainville and Buka Islands, Territory of Papua and New Guinea. Land Research Series No. 20, Commonwealth Scientific and Industrial Research Organization, Melbourne.

Sumbak, J.H. 1970 Poor coconut growth in south-west Bougainville. Papua and New Guinea Agricultural Journal 2, 1, 1-5.

4. AGRICULTURAL SYSTEMS: MAPS

The maps show the location of the Agricultural Systems identified in the Province and selected important characteristics of the systems. Where subsystems exist within an Agricultural System, the maps display information from the first subsystem only. Subsequent subsystem information is not displayed, but it is available in the text summaries. For crop combinations, cash income activities, population density and population absent, the maps show information for the entire system. A note in the key on the Agricultural Systems map lists the systems in which subsystems occur. Maps can be produced from computer files at any scale down to 1:500 000.

The following notes explain the classes used on the maps.

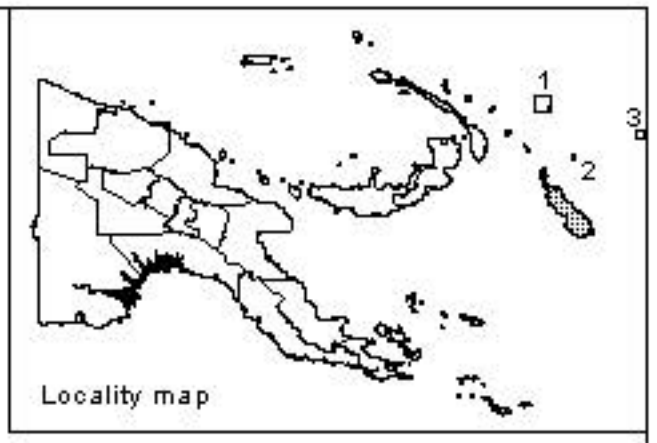
Map title	Notes
1. Agricultural Systems	Boundaries and identification numbers (eg. 1 = System 1401). See key for subsystem occurrences.
2. Fallow vegetation	The vegetation cleared from garden sites at the beginning of a new period of cultivation (8 classes).
3. Long fallow period	An estimate of the length of time land is left fallow before it is cultivated again (4 classes).
4. Number of plantings before fallow	The number of times staple crops are planted in the main gardens before those gardens are returned to a long fallow (5 classes).
5. Intensity of land use	Ratio of the cropping period (estimated from the number of plantings) to the length of the complete cultivation cycle, ie. cropping period plus fallow period (4 classes based on Ruthenberg's R factor)[1]. Very low: (R < 10) Low: (R = 10 - 32) Medium: (R = 33 - 66) High: (R > 66).
6. Crop combinations	Combinations of the most important (dominant staple) and important (subdominant staple) crops in this Province.

[1] R = (Number of years of cultivation x 100) / (Number of years of cultivation + Number of years of long fallow), (Ruthenberg 1980, 15)

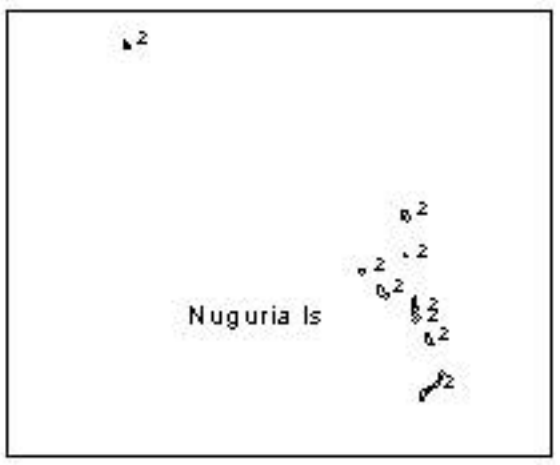
Map title	Notes
7. Garden and crop segregation	Separation of crops into different gardens or into different plots within a garden (4 classes). A combination of Fields 28 and 29. For both fields, 'nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present'. Classes are: both absent = 'No segregation'; garden segregation present only = 'Garden segregation'; crop segregation present only = 'Crop segregation'; both present = 'Garden and crop segregation'.
8. Soil fertility maintenance	The presence or absence of the following: legume rotation, planted tree fallow, composting and mulching. For all features, 'nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present'.
9. Soil tillage	The use of tillage in the preparation of land for cultivation (4 classes).
10. Fallow clearing practices	A combination of the practices of burning fallow vegetation before planting, and cutting down fallows onto crops after planting. For both features, 'none' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present' (3 classes).
11. Soil mounds and beds	A combination of measures of significance for mounds and beds: Medium and large mounds are classed together as 'large mounds'. Square and long beds are classed together as 'beds'. Very small mounds are excluded. Absent = 'none' and 'minor or insignificant' for all mounds and beds. Present = 'significant' and 'very significant' for all mounds and beds (6 classes).
12. Water management techniques	The presence or absence of the following: drainage, irrigation and soil retention barriers. For all features, 'nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present' (4 classes).

Map title	Notes
13. Cash income activities	Combinations of cash earning activities specific to this province. For all activities, 'nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present'.
14. Seasonality of the main food crops	Whether the dominant staple (most important) crops and the subdominant staple (important) are planted at about the same time each year. 'Nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present' (2 classes).
15. Population density	Persons per square kilometre, based on the 1980 National Population Census and the area occupied by the System (6 classes). 'Not applicable' refers to Systems where there are no census points.
16. Population absent	The proportion of the 'total' population listed in the 1979 Provincial Data System Rural Community Register as being 'absent 6 months or more' from the Census Unit (5 classes). 'Not applicable' refers to Systems where either there are no census points, or where the PDS data do not distinguish between the 'total' and 'resident' populations.

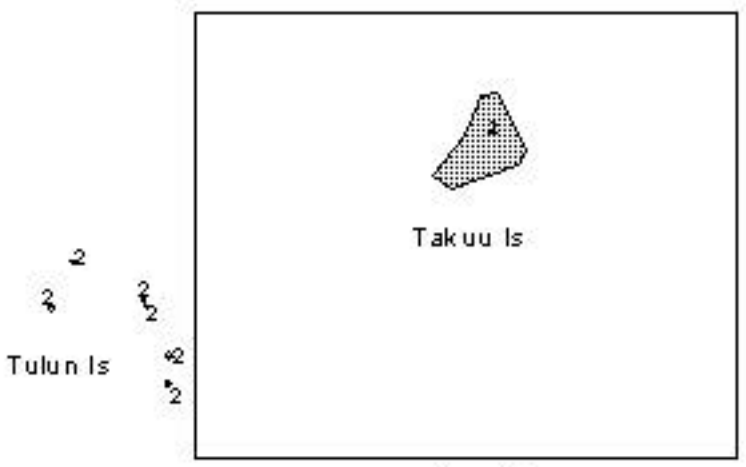
BOUGAINVILLE PROVINCE
Agricultural systems




Nissan Is



Inset 1



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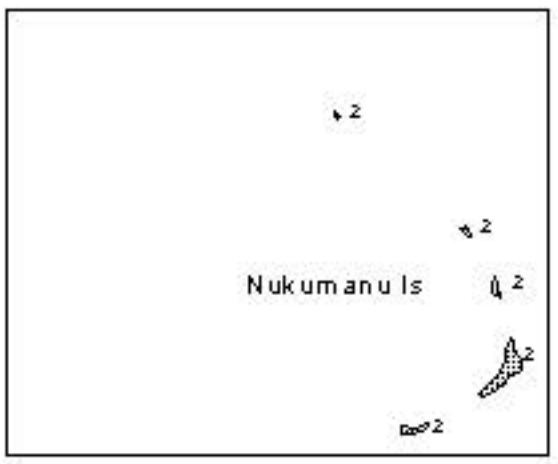
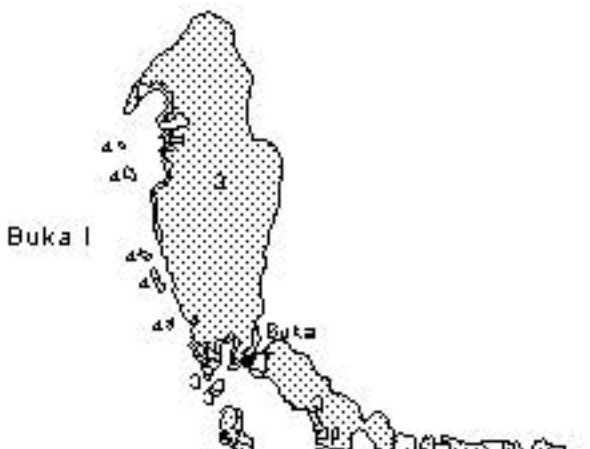
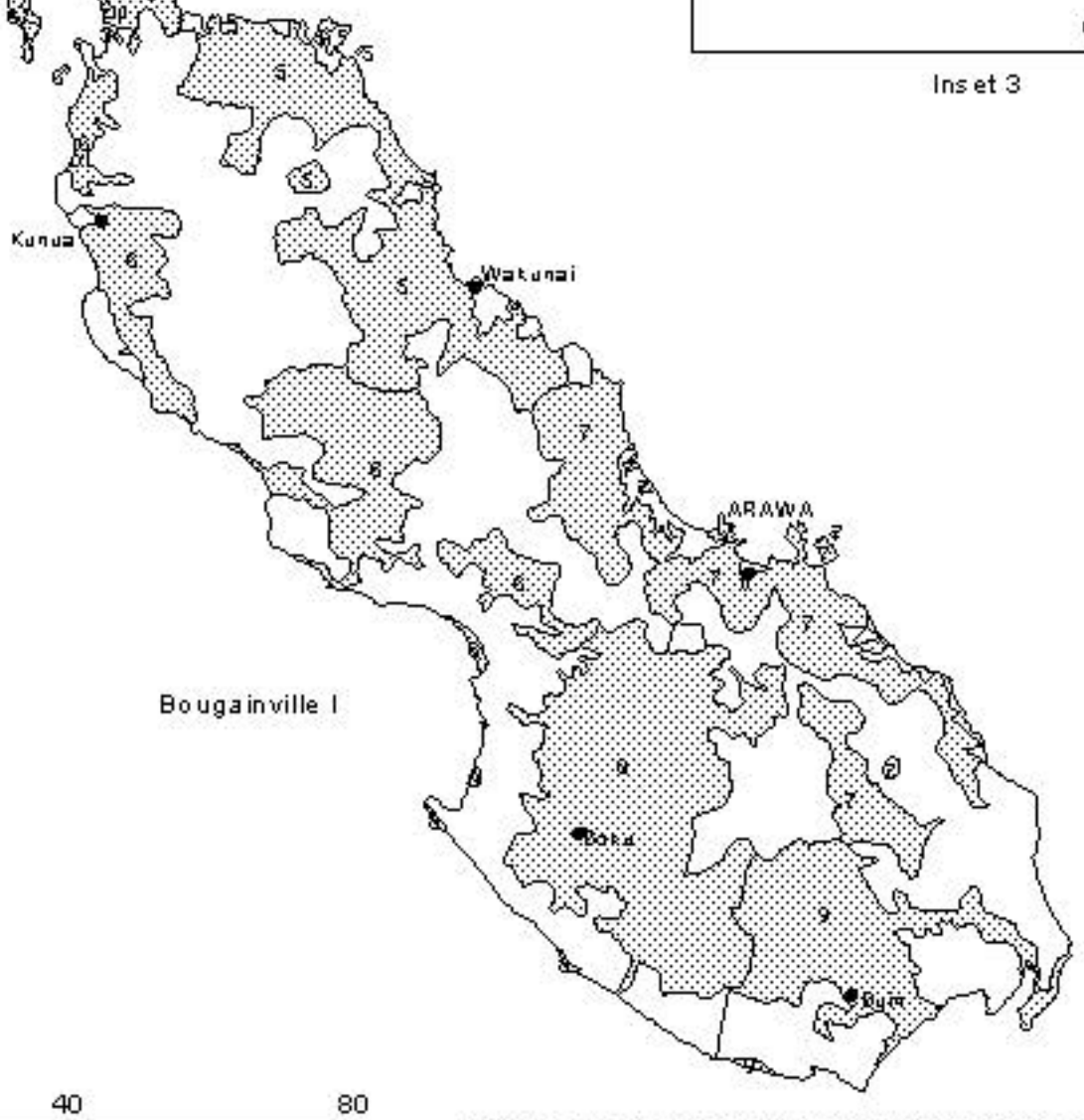


Inset 3





No agriculture
Agricultural system identified by number

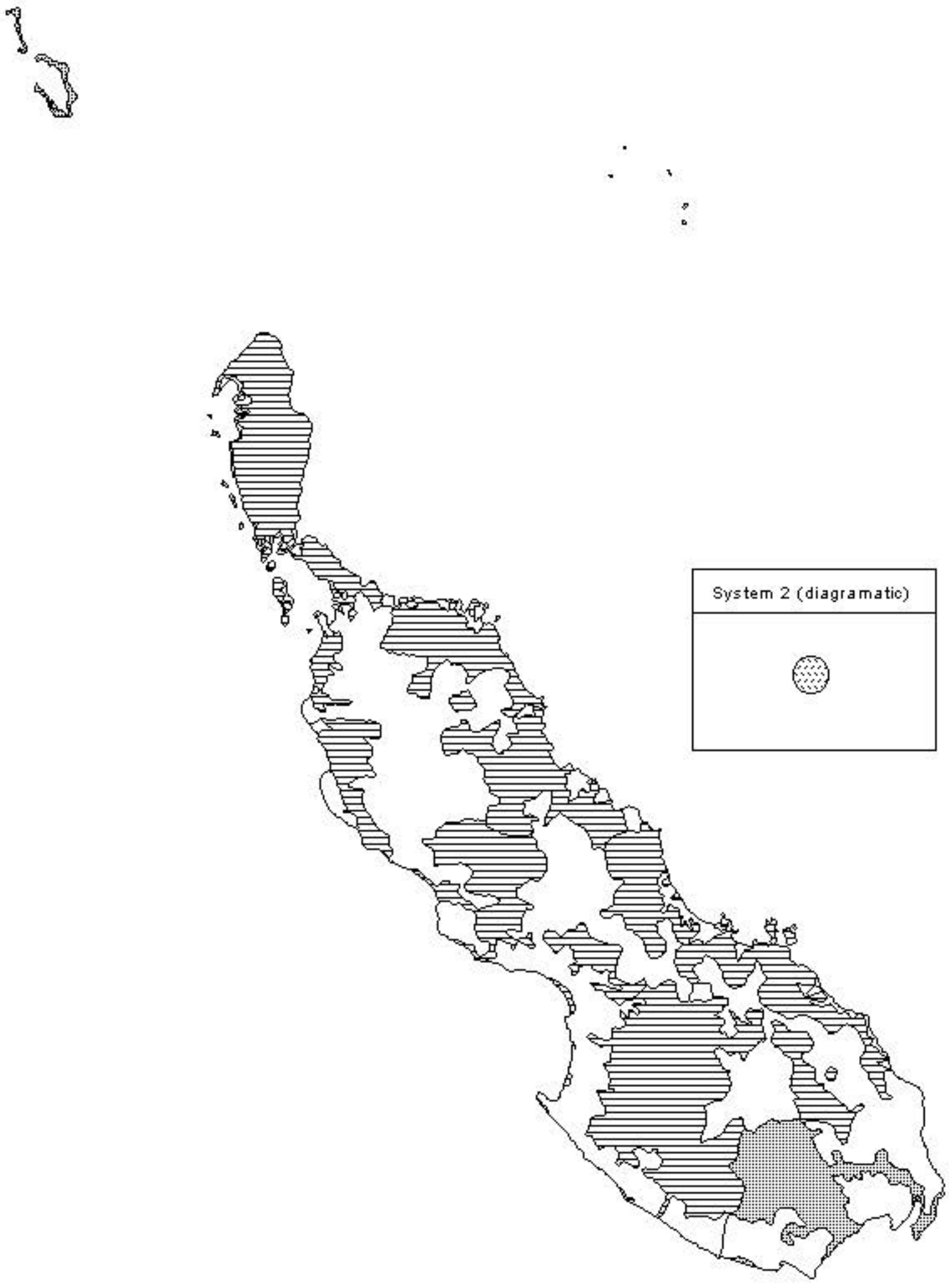
40 0 40 80
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Fallow vegetation

- Short woody regrowth
- Tall woody regrowth
- No long fallow



System 2 (diagramatic)

40 0 40 80

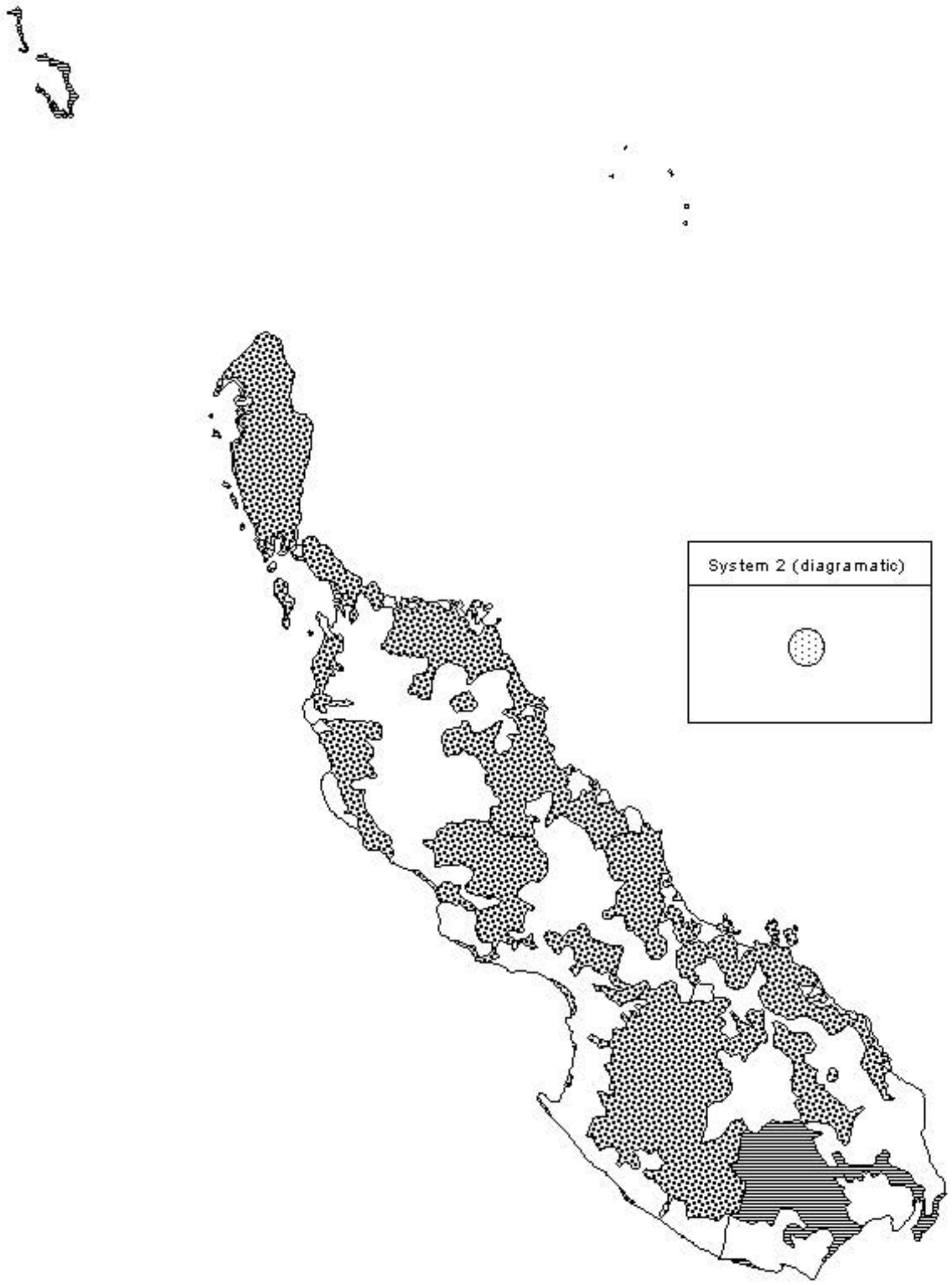
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Long fallow period

- No long fallow
- 1 to 4 years
- 5 to 15 years



System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Number of plantings before fallow

- 1 planting only
- 3 to 5 plantings
- More than 40 plantings

System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

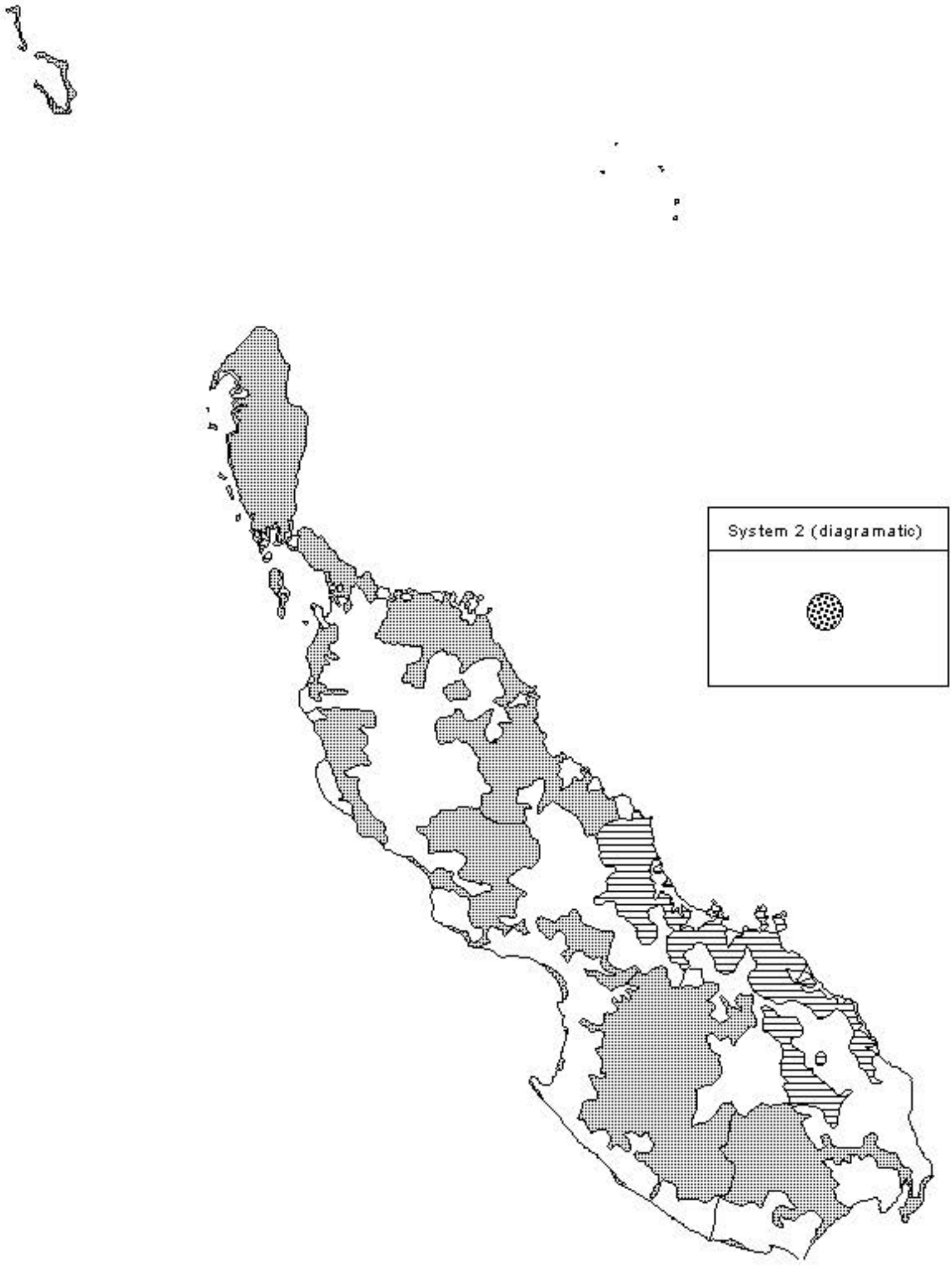
BOUGAINVILLE PROVINCE

Intensity of land use

Ratio of cropping period to fallow period

- Very low
- Low
- High

System 2 (diagramatic)



40 0 40 80

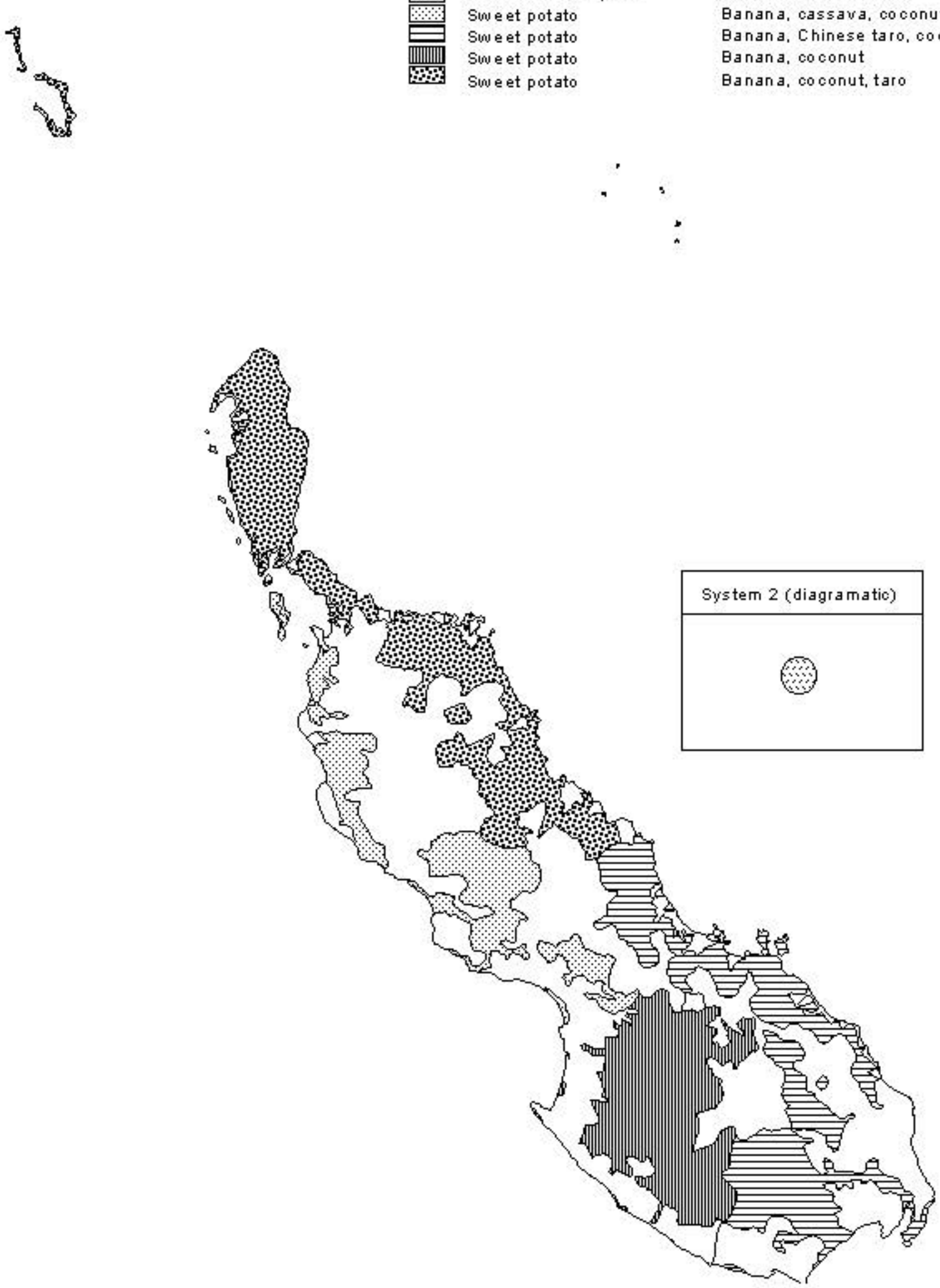
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Crop combinations

Most important crops	Important crops
Coconut, swamp taro	Cassava, sweet potato
Sweet potato	Banana, cassava, coconut
Sweet potato	Banana, Chinese taro, coconut
Sweet potato	Banana, coconut
Sweet potato	Banana, coconut, taro



40 0 40 80

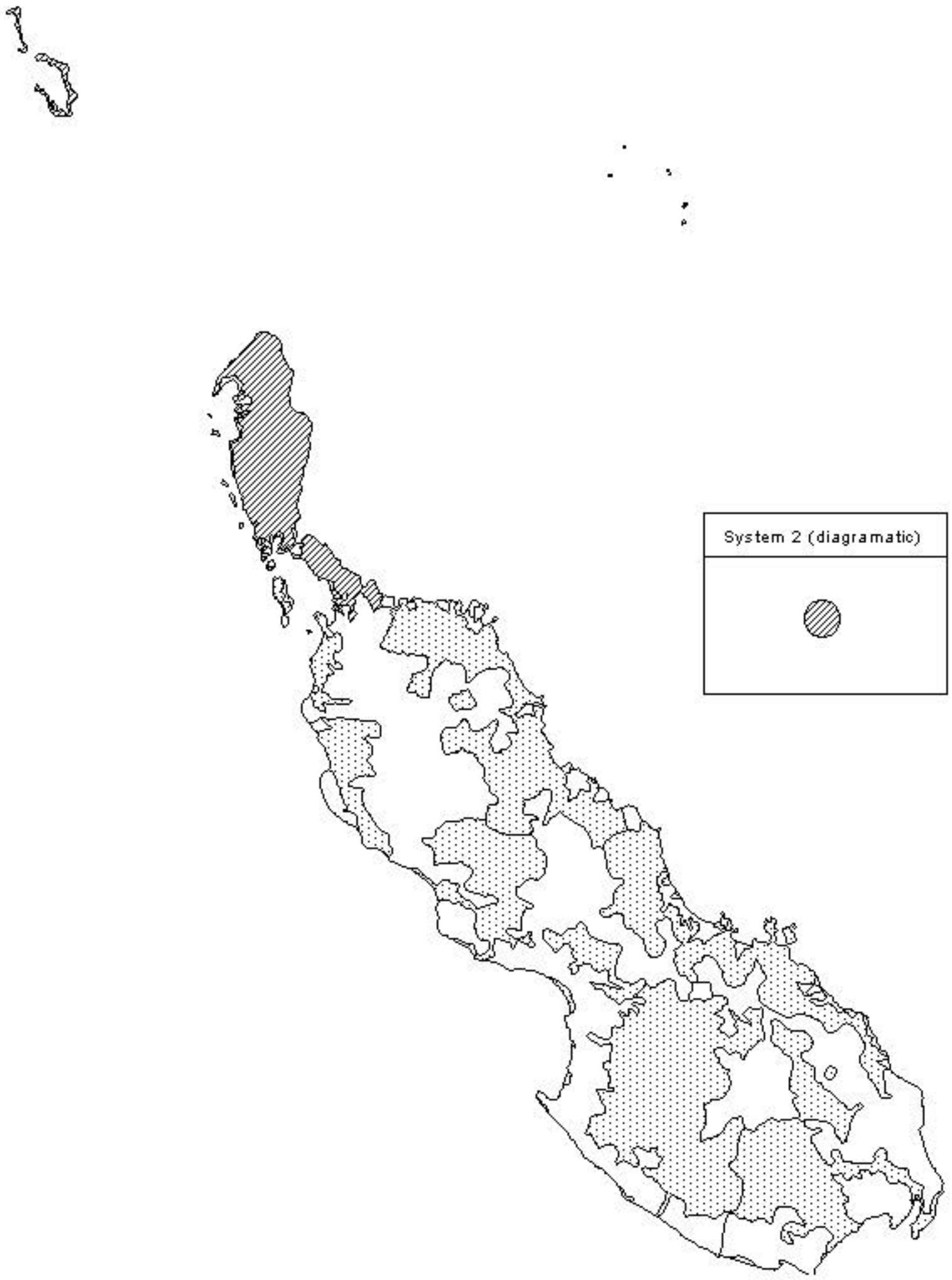
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Garden and crop segregation

- No segregation
- Garden segregation



System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Soil fertility maintenance

Long fallow only
Mulch

System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Soil tillage

None

System 2 (diagramatic)

40 0 40 80

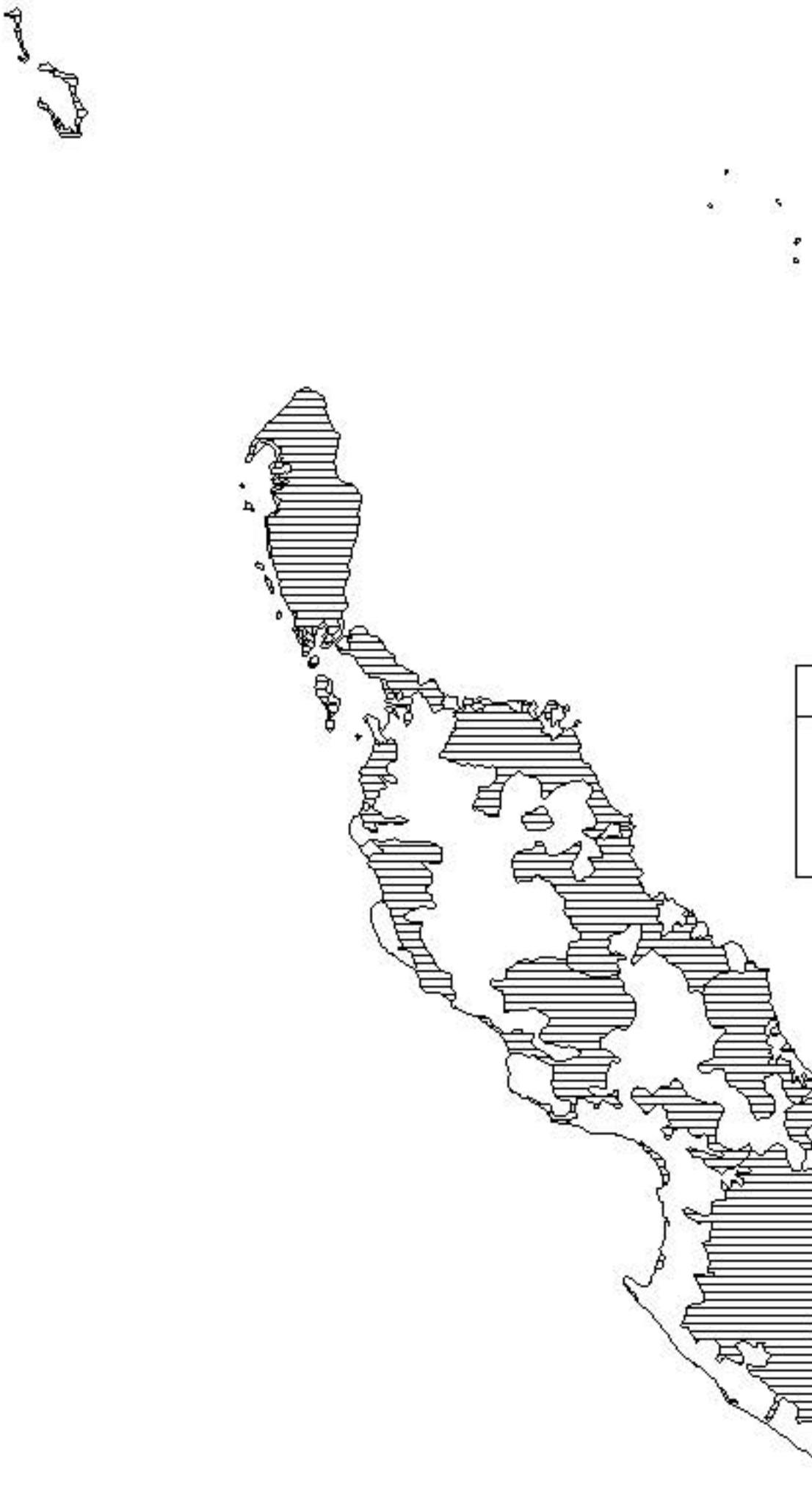
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Fallow clearing practices

- Fallow cut and not burnt
- Fallow cut and burnt



System 2 (diagramatic)

40 0 40 80

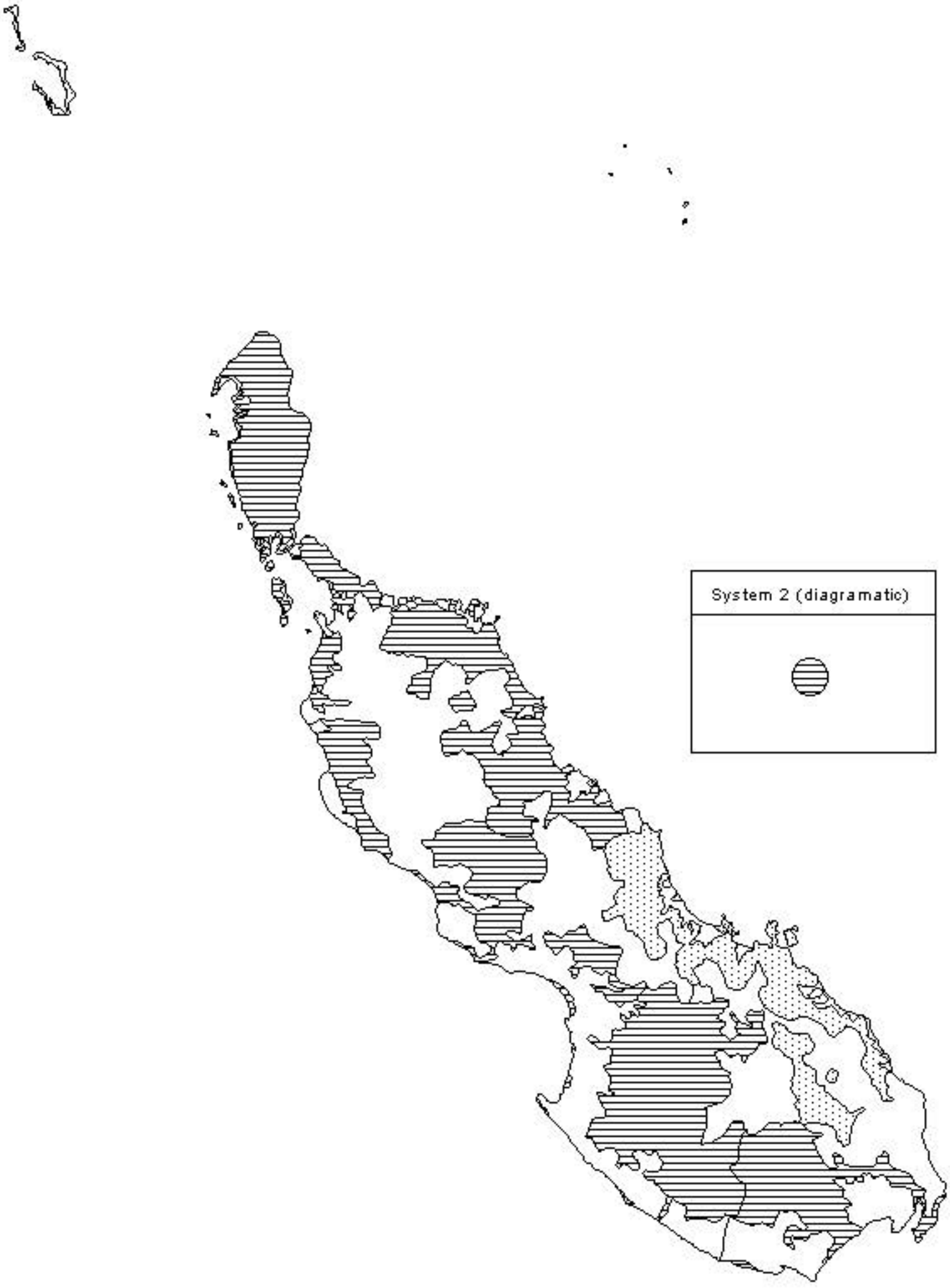
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Soil mounds and beds

- Mounds and beds absent
- Small mounds present and beds absent



40 0 40 80

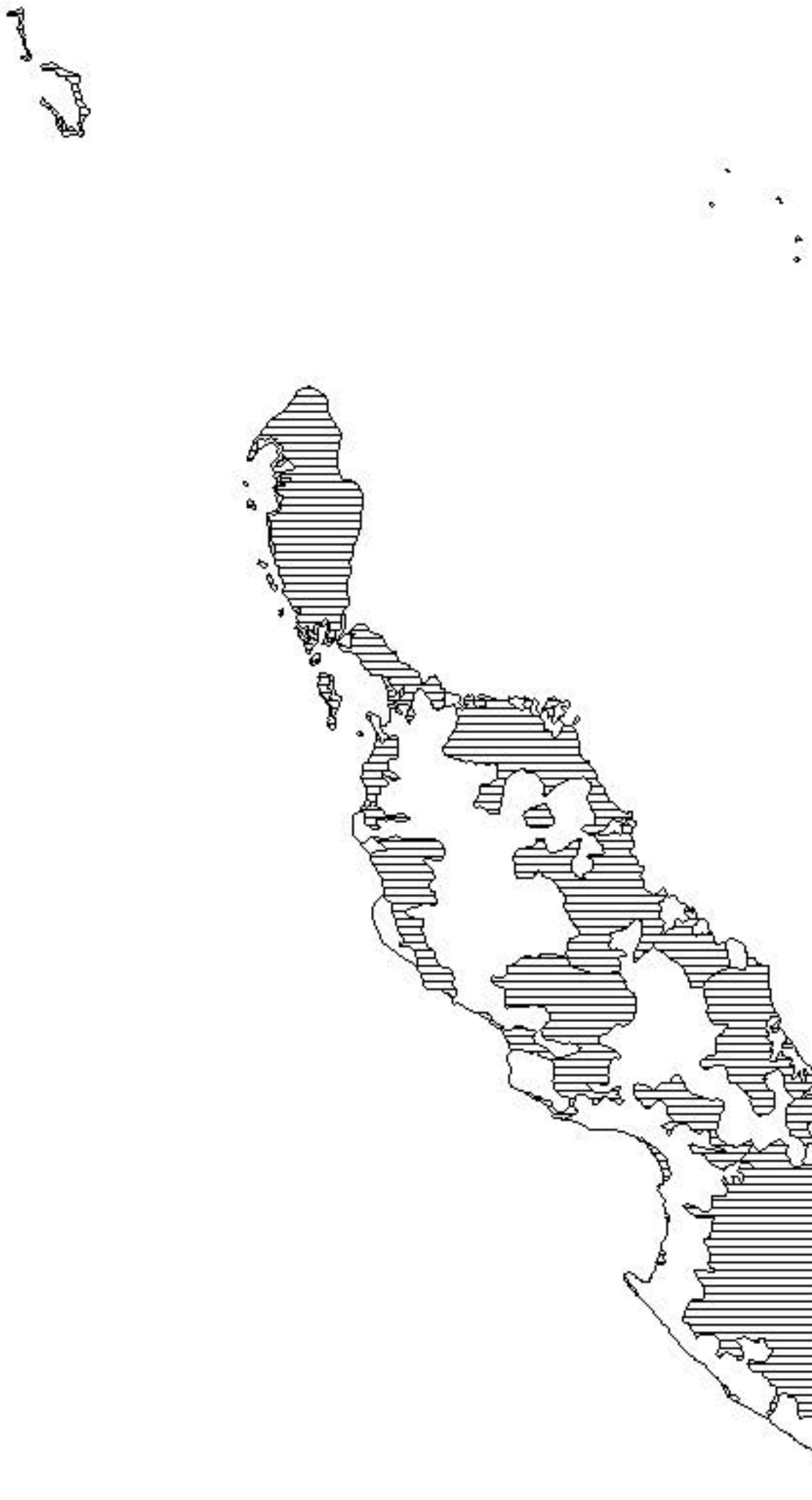
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Water management techniques

No water control



System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Cash income activities

- No significant cash income
- Cocoa
- Cocoa, coconut, fresh food
- Coconut, fish
- Fish

System 2 (diagramatic)

40 0 40 80

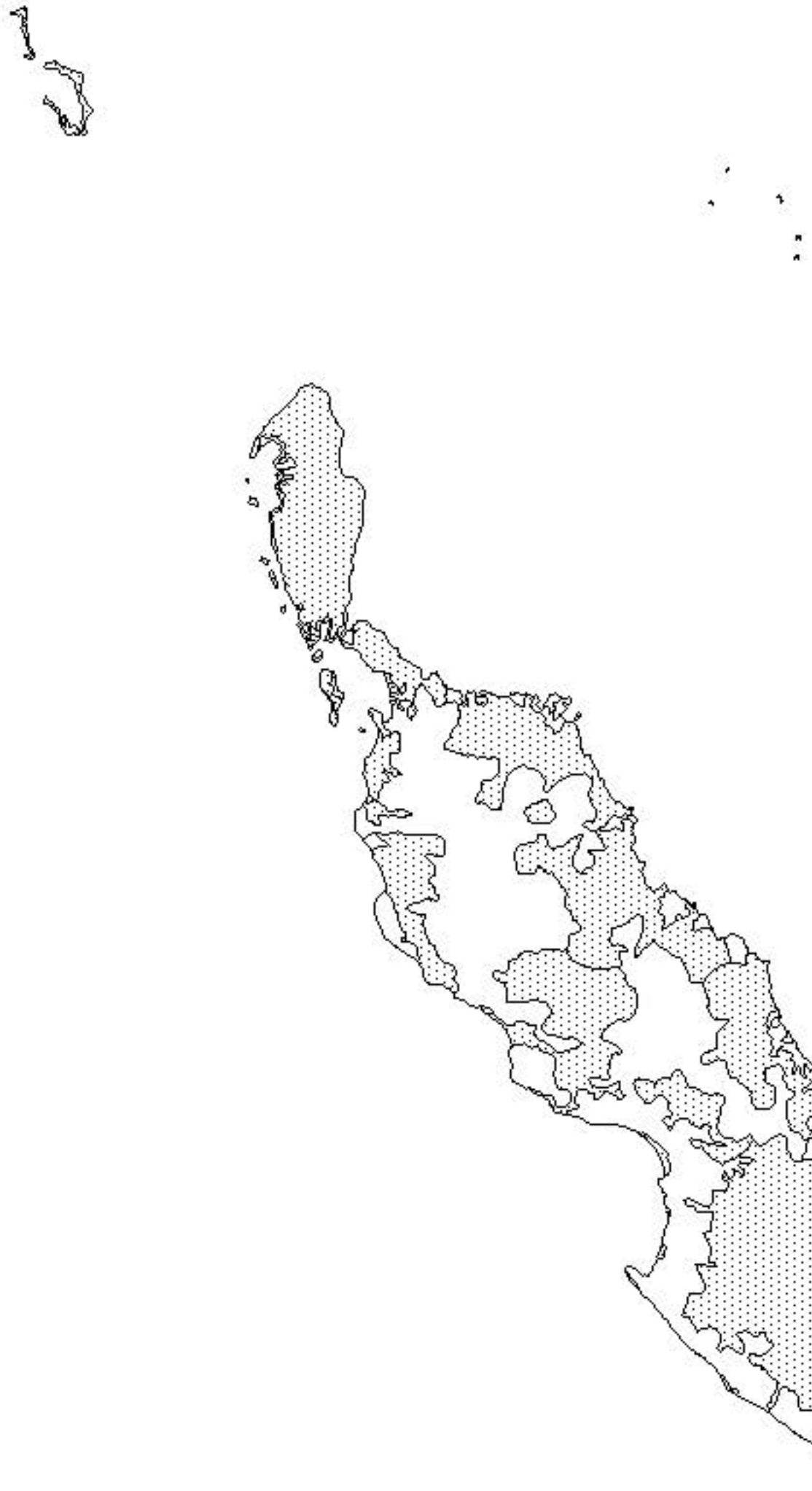
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Seasonality of main food crops

No seasonal planting



System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

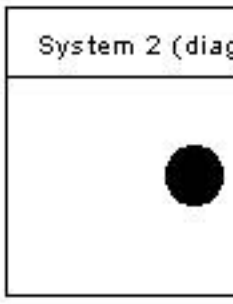
BOUGAINVILLE PROVINCE

Population density

Persons per square kilometre

- below 10
- 10 - 24
- 25 - 49
- 50 - 74
- 75 - 99
- above 99

System 2 (diagramatic)



40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Population absent

Percentage

- below 5
- 5 - 9
- 10 - 14
- 15 - 19
- above 19

System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

5. AGRICULTURAL SYSTEMS: DATA LISTING BY CODES

The following tables list all of the information contained within the database in coded form. The codes are contained in Section 2, Database Structure, Definitions and Codes.

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub sys	No. of subsys	Subsys extent	Same sys oth prov	Districts	Census Divisions
2001	1	1	4		1	01
2002	1	1	4		1	01
2003	1	1	4		1	02-03-04
2004	1	1	4		1	03
2005	1	1	4		1-3	06-16
2006	1	1	4		1-2	05-07
2007	1	1	4		3	13-14-15
2008	1	1	4		2	07-08-09-10
2009	1	1	4		2	11-12

KEY

Subsys	Subsystem
Same sys oth prov	Same system in other province

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub sys	Area km^2	Population			Altitude range m		Slope	Fallows		
			Total	Abs	Den	Low	High		Veg	Sht	Per
2001	1	38	2991	13	79	0	20	2	4	0	1
2002	1	16	1607	26	100	0	3	1	7	1	0
2003	1	678	17739	18	26	0	80	1	5	0	2
2004	1	6	1423	35	237	0	20	1	4	1	1
2005	1	846	12500	4	15	0	700	5	5	0	2
2006	1	849	7834	8	9	0	500	5	5	0	2
2007	1	858	16557	5	19	0	1100	3	5	0	2
2008	1	1179	23122	4	20	0	950	2	5	0	2
2009	1	574	13528	5	24	0	800	5	4	0	1

KEY

Subsys	Subsystem		
Area km^2	Area of System		
Population		**Fallows**	
Total	Resident population 1980	Veg	Type of Fallow vegetation
Abs	Absent population (%)	Sht	Short fallows
Den	Population density (persons/km^2)	Per	Long fallow period

AGRICULTURAL SYSTEM DATA LISTING - CODES Province: 20 Bougainville

System	Sub sys	Staple crops			Narcotic crops
		Most import	Important	Present	
2001	1	11	02-06-13	02-04-05-06-11-12-13-14-15	2-4-5
2002	1	06-10	04-11	02-04-05-06-10-11-12-13	
2003	1	11	02-06-13	02-04-05-06-11-13	2-4-5
2004	1	11	02-04-06	02-04-05-06-11-13	2-4
2005	1	11	02-06-13	02-04-05-06-11-13	2-4-5
2006	1	11	02-04-06	02-04-05-06-11-13-14	2-4-5
2007	1	11	02-05-06	02-05-06-11-13-14	2-4-5
2008	1	11	02-06	02-04-05-06-09-11-13-14-17	2-4-5
2009	1	11	02-05-06	02-05-06-11-13-14-17	2-4-5

KEY

Subsys Subsystem

AGRICULTURAL SYSTEM DATA LISTING - CODES Province: 20 Bougainville

System	Sub sys	Vegetable crops	Fruit crops	Nut crops
2001	1	01-07-09-15-21-24-27	03-04-07-12-15-16-23-35	01-06-07-12-15
2002	1	01-21-24-27-30-32	03-04-05-12-15	01-07-12-15
2003	1	01-08-09-11-15-16-21-23-27-32	03-05-07-12-15-17-23	01-06-12
2004	1	01-08-09-11-15-16-19-21-32	03-05-06-07-12-15-17	01-06-07-12
2005	1	01-09-10-11-15-16-21-23-30-32	05-07-09-12-13-15-17-23	01-06-12
2006	1	01-08-09-10-11-15-16-21-27-32	05-06-07-09-12-15-17-23	01-06-12
2007	1	01-08-09-10-11-15-16-21-31	05-06-07-09-12-15-17-23	01-06-12
2008	1	01-08-09-10-11-15-16-21-23-27	05-07-12-13-15-17-23	01-06-12
2009	1	01-08-09-10-11-15-16-19-21-23	05-07-12-13-15-17-20-23	01-06-12

KEY

Subsys Subsystem

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub	Segregation		Crop	Gard types		Soil fertility maintenance techniques						
	Sys	Gar	Crp	Seq	Mix	H'ld	Leg	Tre	Com	Man	Isl	Sil	Fer
2001	1	2	1	0	0	2	0	0	0	0	0	0	0
2002	1	3	1	1	0	2	0	0	0	0	0	0	0
2003	1	2	1	0	0	0	0	0	0	0	0	0	0
2004	1	0	1	1	0	1	0	0	0	0	0	0	0
2005	1	1	1	1	0	0	0	0	0	0	0	0	0
2006	1	1	1	1	0	0	0	0	0	0	0	0	0
2007	1	1	1	0	0	0	0	0	0	0	0	0	0
2008	1	0	1	0	0	0	0	0	0	0	0	0	0
2009	1	0	1	1	0	0	0	0	0	0	0	0	0

KEY

Subsys Subsystem

Segregation

Gar Garden

Crp Crop

Crop seq Crop sequences

Gard types **Garden types**

Mix Mixed vegetable gardens

H'ld Household gardens

Soil fertility maintenance techniques

Leg Legume rotation

Tre Planted tree fallow

Com Compost

Man Animal manure

Isl Island bed

Sil Silt from floods

Fer Inorganic fertilizer

AGRICULTURAL SYSTEM DATA LISTING - CODES Province: 20 Bougainville

System	Sub sys	Management techniques											
		Water		Soil						Fallow		Other	
		Irr	Drn	Pig	Till	Hol	Bar	Mul	Mec	Brn	Cut	Fen	Stk
2001	1	0	0	0	0	0	0	0	0	2	0	3	1
2002	1	0	0	0	0	0	0	2	0	1	0	0	0
2003	1	0	0	0	0	0	0	0	0	3	0	1	0
2004	1	0	0	0	0	0	0	0	0	2	0	0	0
2005	1	0	0	0	0	0	0	0	0	3	0	0	0
2006	1	0	0	0	0	0	0	0	0	3	0	0	0
2007	1	0	0	0	0	0	0	0	0	3	0	1	0
2008	1	0	0	0	0	0	0	0	0	3	0	1	0
2009	1	0	0	0	0	0	0	0	0	2	0	1	0

KEY

Subsys Subsystem

Management techniques

Water management

Irr Irrigation

Drn Drainage

Soil management

Pig Pigs placed in gardens

Till Tillage

Hol Deep holing (for yams)

Bar Soil retention

Mul Mulching

Mec Mechanized soil tillage

Fallow management

Brn Burning of cut vegetation

Cut Fallow cut onto crops

Other

Fen Fencing

Stk Staking of crops

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub sys	Management techniques						Crop planting seasonality		Cropping intensity	R value
		Soil mounds				Garden beds					
		Vsm	Sm	Md	Lge	Sq	Lg	Maj	Min		
2001	1	2	0	0	0	0	0	1	1	1	25
2002	1	0	2	0	0	0	0	0	0	6	100
2003	1	0	3	0	0	0	0	0	0	3	29
2004	1	0	3	0	0	0	0	0	0	3	57
2005	1	0	3	0	0	0	0	0	1	3	29
2006	1	0	3	0	0	0	0	0	0	3	29
2007	1	2	1	0	0	0	0	0	0	1	9
2008	1	1	3	0	0	0	0	1	1	3	29
2009	1	0	2	0	0	0	0	0	0	1	25

KEY

Subsys Subsystem

Management techniques

Soil mounds

Vsm Very small
Sm Small
Md Medium
Lge Large

Garden beds

Sq Square
Lg Long

Crop planting seasonality

Maj Dominant
Min Other crops

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub	Cash income sources											
	sys	An	Bet	Crd	Cat	Chi	Coc	Cnt	CfA	CfR	Crc	Fwd	Fsh
2001	1	0	0	0	0	0	0	1	0	0	0	0	2
2002	1	0	0	0	0	0	0	1	0	0	0	0	1
2003	1	0	1	0	0	0	2	3	0	0	0	0	0
2004	1	0	0	0	0	0	0	3	0	0	0	0	2
2005	1	0	1	0	0	0	3	1	0	0	0	0	1
2006	1	0	1	0	0	0	2	1	0	0	0	0	1
2007	1	0	0	0	0	0	2	0	0	0	0	0	0
2008	1	0	0	0	0	0	2	0	0	0	0	0	0
2009	1	0	0	0	0	0	2	0	0	0	0	0	0

KEY

Subsys Subsystem

Cash Income Sources

An	Animal skins	Chi	Chillie	CfR	Coffee Robusta
Bet	Betel nut	Coc	Cocoa	Crc	Crocodile
Crd	Cardamom	Cnt	Coconut	Fwd	Firewood
Cat	Cattle	CfA	Coffee Arabica	Fsh	Fish

AGRICULTURAL SYSTEM DATA LISTING - CODES
Province: 20 Bougainville

System	Sub	Cash income sources										
	sys	Fod	Op	Pot	Pyr	Ric	Rub	Shp	Tea	Tob	Ot1	Ot2
2001	1	0	0	0	0	0	0	0	0	0	0	0
2002	1	0	0	0	0	0	0	0	0	0	0	0
2003	1	2	0	0	0	0	0	0	0	0	0	0
2004	1	0	0	0	0	0	0	0	0	0	0	0
2005	1	1	0	0	0	0	0	0	0	0	0	0
2006	1	1	0	0	0	0	0	0	0	0	0	0
2007	1	1	0	0	0	0	0	0	0	0	0	0
2008	1	1	0	0	0	0	0	0	0	0	1	0
2009	1	1	0	0	0	0	0	0	0	0	1	0

KEY

Subsys Subsystem

Cash Income Sources

Fod	Fresh food	Ric	Rice	Tob	Tobacco
Op	Oil Palm	Rub	Rubber	Ot1	Other 1
Pot	Potato	Shp	Sheep	Ot2	Other 2
Pyr	Pyrethrum	Tea	Tea		

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub sys	Survey 1				Survey 2				Survey 3			
		Date mth yr	Period yrs	Sv tp	Sv in	Date mth yr	Period yrs	Sv tp	Sv in	Date mth yr	Period yrs	Sv tp	Sv in
2001	1	09 92	-	3	H/W	- -	-	-		- -	-	-	
2002	1	09 92	-	2	MW	01 92	-	-	MW	- -	-	-	
2003	1	06 96	-	-	RMB	- -	-	-		- -	-	-	
2004	1	09 96	-	-	RMB	- -	-	-		- -	-	-	
2005	1	12 80	-	2	RMB	08 96	-	-	RMB	- -	-	-	
2006	1	10 96	-	-	RMB	- -	-	-		- -	-	-	
2007	1	12 80	-	2	RMB	08 96	-	-	RMB	- -	-	-	
2008	1	06 96	-	-	RMB	- -	-	-		- -	-	-	
2009	1	08 96	-	-	RMB	- -	-	-		- -	-	-	

KEY

Subsys	Subsystem	H/W	W. Humphrey/M. Woruba
Sv tp	Survey type	MW	M. Woruba
Sv in	Surveyor initials	RMB	R.M. Bourke

6. LISTINGS OF RURAL VILLAGES (CENSUS UNITS) INDEXED TO AGRICULTURAL SYSTEMS

All rural village Census Units in the 1980 National Population Census which are locatable on either the 1980 or 1990 Census Maps are assigned to an Agricultural System. The village name, National Population Census identification codes (Province, District, Census Division, Census Unit), population and Agricultural System number for each village is held as a single record in a population database (AGPOP). District and Census Division codes for this Province are listed in Appendix A.2.

This section provides three different listings from that database of rural villages indexed by Agricultural Systems:

6.1 Rural villages listed in census order (District, Census Division).

6.2 Rural villages listed in alphabetical order.

6.3 Rural villages listed by Agricultural System number (alphabetically within agricultural systems) with PNGRIS Resource Mapping Unit (RMU) numbers.

Abbreviations used are:

Dist	District name and number (see Appendix A.2)
Div	Census Division number (see Appendix A.2)
Population	1980 National Population Census count of population in a Unit
RMU	Provincial Resource Mapping Unit number (PNGRIS)
System	Agricultural System number
Village	Census Unit name
Unit	Census Unit number

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
DISTRICT	1 Buka		
Division	1 Islands		
1	AMOTU	241	2002
2	BALIL	335	2001
3	IANGAIN	121	2002
4	IESILA	86	2002
5	ILOSA	64	2002
6	IOLOHANAN	348	2002
7	KULIS	113	2001
8	LIHON	234	2001
9	MAPIRI	308	2001
10	MONTONIA	198	2001
11	NUGURIA	240	2002
12	NUKUTOA	507	2002
13	PIUL	143	2003
14	PORIWON	159	2001
15	ROGOS	124	2001
16	SALEPEN	128	2001
17	SIAKEN	128	2001
18	SIAR	136	2001
19	SIROT	69	2001
20	TANAHERAN	131	2001
21	TANAMALIT	205	2001
22	TARONGAL	157	2001
23	TEAH	199	2001
24	TERAUTUP	184	2001
25	YOTCHIBOL	183	2001
Division	2 Haku-Halia		
1	ELUTUPAN	446	2003
2	HAGUS	326	2003
3	HAHALIS	677	2003
4	HANAHAN	642	2003
5	HANPAN	179	2003
6	IELELINA	321	2003
7	KETSKETS	338	2003
8	KOTOPAN	283	2003
9	LEMANKOA	1096	2003
10	LEMANMANU	869	2003
11	LONTIS	941	2003
12	TANDEKI	373	2003
13	TOHATSI	406	2003
Division	3 Punen		
1	BARIKUA	337	2003
2	BEI	257	2003
3	BEIKUT	334	2003
4	GAGAN	585	2003
5	HAPAN	359	2003
6	HITAU	90	2004
7	KAHULE	162	2003
8	KOHINO	265	2003
9	KOHISO	410	2003
10	MATSUNGAN	214	2004
11	NOPAN	201	2003
12	NOVAH	335	2003
13	PETATS	588	2004
14	POKA	173	2003
15	PORORAN	357	2004
16	SAPANI	151	2003
17	TELATU	188	2003
18	TUNG	178	2003
19	YAPARU	174	2004
20	YEGITS	196	2003
Division	4 Buka Passage		
1	ANAKEI	135	2003
2	CHUNDAWAN	152	2003
3	GOGOHEI NO.1	322	2003
4	GOGOHEI NO.2	266	2003
5	GOHI	238	2003
6	HANGAN	230	2003
7	IETA	368	2003
8	KATSUNKOVERI	174	2003
9	LONAHAN	670	2003
10	MALASANG	886	2003
11	MANOB	231	2003
12	PORAPORA	61	2003
13	RAMUNDATA	100	2003
14	RATSUA	72	2003
15	RURI	192	2003
16	SIARA	244	2003
17	SING	537	2003
18	SOROM	156	2003
19	SUHIN	215	2003
20	TAHAITAHAI	608	2003
21	TAPSANWARA	215	2003
22	TARBUT	289	2003
23	TOROTEI	149	2003
24	UMUM	58	2003
Division	5 Konua		
1	AKOPAI	271	2006
2	AMUM	92	2006
3	ASTAPAI	212	2006
4	ATSILIMA	217	2006
5	AUKEI	127	2006
6	BETERAIO	269	2006
7	BOBOASI	54	2006
8	GOTON	94	2006
9	KAKAPARA	140	2006
10	KARARITU	73	2006
11	KAUBATEI	165	2006
12	KAUNA	332	2006
13	KAVIKI	249	2006
14	KEPUI	102	2006
15	KIAKARA	111	2006
16	KOATOROI	88	2006
17	KOPAI	123	2006
18	KOREPOVI	213	2006
19	KOSIPAI	79	2006
20	KUNAPOPO	114	2006
21	KUNOKOMOK	160	2006
22	KURUR	56	2006
23	LALUM	98	2006
24	LONKOGARI	96	2006
25	MAPISI	136	2006
26	MATITSORA	49	2006
27	MOSILAIE	68	2006
28	NAMBAROSI	89	2006

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
29	PETSPETS	77	2006
30	POKUITO	87	2006
31	POPOHERAI	133	2006
32	PUTO	92	2006
33	RUKUSSIA	71	2006
34	SAPOSA	381	2006
35	SISIAPAI	173	2006
36	MUIRE	179	2006
37	TAIOF	445	2006
38	TOHEI	185	2006
39	TOSIAVI	109	2006
40	TOTOKI	146	2006
Division	6 Teop		
1	ARAVIA	134	2005
2	DEOS	105	2005
3	HANTOBIN	120	2005
4	IAUN NO.1	44	2005
5	IAUN NO.2	151	2005
7	IRUE	90	2005
10	KOTOITA	179	2005
11	KOVANIS	160	2005
12	KUKURINA	91	2005
13	MELELUP	289	2005
14	MUTAHI	288	2005
15	NAMAKERIO	152	2005
16	NAMASIORA	186	2005
17	NAMATOA	320	2005
18	NEBLAHIU	156	2005
19	PATEAVEAVE	235	2005
20	POKAPA NO.1	279	2005
21	POKAPA NO.2	166	2005
22	PUSKOMBU	124	2005
24	RARIE	158	2005
25	ROMSIS	265	2005
26	SUANGU	80	2005
27	SUNVAHORA	282	2005
30	TEABES	52	2005
31	TEANANA	149	2005
32	TENDU	45	2005
33	TEOBUHIN NO.1	202	2005
34	TEOBUHIN NO.2	267	2005
35	TEOP	233	2005
36	TETAKUTS	48	2005
37	TOROBAI	62	2005
38	TOROKOKAPIA	265	2005
39	TSIKOT	75	2005
40	TSISIKO	290	2005
41	TSUNPETS	82	2005
42	TUMURI	110	2005
44	VAINANA	220	2005
45	VAROPA	203	2005
46	VASPOS	173	2005
47	WAUWANGINUVA	162	2005
DISTRICT	2 Buin		
Division	7 Bagana		
1	AGABAI	131	2008
2	ATANGATO	60	2006
3	BEREREKI	117	2008
4	JABA	148	2008
5	KABANAMI	53	2008
6	KARATO	137	2006
7	KAREKOPA	107	2006
8	KASIPEKE	50	2008
9	KAVAKAKATSU	67	2006
10	KENAIA	197	2006
11	KOIARE	156	2006
12	KORO	293	2008
13	KOROMAKETO	120	2006
14	KOROVI	165	2006
15	KUNIKA	149	2008
16	KUPON	201	2008
17	LABALAM	240	2008
18	LABONAMI	181	2008
19	LARUMA	92	2006
20	MAROWA	160	2006
21	MITSIKORI	91	2006
22	MOKOKOREU	190	2008
23	MOM	38	2006
24	MOMOGANARI	150	2008
25	NARINAI	107	2008
26	PANAM	258	2008
27	PIVA	99	2006
28	POLANAVIA	179	2008
29	RELA	230	2008
30	SIANEKI	203	2008
31	SIKOREWA	154	2008
32	TARUBA	193	2008
33	TSITO	80	2006
34	WARARIU	247	2008
35	WARUWARU	255	2008
36	WIWIARO	128	2008
Division	8 Basina		
1	AGAWA	111	2008
2	AUMARI	93	2008
3	BAKORAM NO.1	312	2008
4	BAKORAM NO.2	92	2008
5	BERETEMBA	35	2008
6	BIROI	111	2008
7	BIROS	237	2008
8	BOKU	170	2008
9	KONAWA	34	2008
10	KONGARA	86	2008
11	LARENAI	211	2008
12	LAVORO	123	2008
13	LOPERE	135	2008
14	MABES	129	2008
15	MARIGA	90	2008
16	MASIWAKORE	135	2008
17	MASUNKE	36	2008
18	MATONA	67	2008
19	MAWERE	138	2008
20	MENDAI	169	2008
21	MEWA	137	2008
22	MEWARAKA	30	2008
23	MINGETA	43	2008

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
24	MOAINO	120	2008
25	MOSIGETA	228	2008
26	MOSINO	202	2008
27	NAIRONA	31	2008
28	NUKUI	134	2008
29	OKARU	307	2008
30	ORORO	205	2008
31	OSIAGE	181	2008
32	OSILADA	64	2008
33	PERE	47	2008
34	PIKEI	280	2008
35	POMARATE	273	2008
36	LORO	325	2008
37	ROMARI	109	2008
38	ROTARE NO.1	115	2008
39	ROTARE NO.2	156	2008
40	SINSIRUAI	75	2008
41	SIPI	190	2008
42	TAGURI	149	2008
43	TAIDORIMA	75	2008
44	TAKEMARI	164	2008
45	WAITAWUNA	124	2008
46	WAKUPA	171	2008
Division	9 Rino		
1	AITARA	56	2008
2	AMEO	178	2008
3	ARAI	32	2008
4	DOMONINO	84	2008
5	HARI	190	2008
6	HARI KAKU	52	2008
7	HIRE	191	2008
8	HIRUHIRU	97	2008
9	HORINO	283	2008
10	HUKOHAH	158	2008
11	IRU	90	2008
12	KAKOTOKORI	147	2008
13	KAPARO	270	2008
14	KIMMAKU	94	2008
15	KOROPO	61	2008
16	KOTU	52	2008
17	KUMUKI	124	2008
18	KUPINKU	55	2008
19	LAKEMBA	63	2008
20	MAINOIATA	68	2008
21	MAMAGOTA	84	2008
22	MATUKORI	209	2008
23	MIHERO	134	2008
24	MOIBINEI	70	2008
25	MUWOKU	104	2008
26	NUKUI	94	2008
27	OSOKOLI	81	2008
28	PININAI	140	2008
29	PURIKORI	68	2008
30	RABAULU	179	2008
31	RUUNAI	49	2008
32	SININNAI	62	2008
33	SIRARUHO	80	2008
34	SIROI	176	2008
35	TOHU	79	2008
36	TOIRA	48	2008
37	TOITOI	94	2008
38	TOKUNUTU	133	2008
39	TONNUI	121	2008
40	TONU	91	2008
41	UNUNAI	130	2008
42	USO	118	2008
43	MANNAKE	34	2008
44	RUPUMMO	56	2008
Division	10 Pongo		
1	HANONG	78	2008
2	HINO	100	2008
3	IEGU	83	2008
4	KAPANA	121	2008
5	KINIRUI	176	2008
6	KOKUI	184	2008
7	KUHINO	54	2008
8	KUNU	210	2008
9	KUTIN	94	2008
10	LAKU	90	2008
11	MAISUA	97	2008
12	MATERAS	103	2008
13	MOKOLINO.1	88	2008
14	MOKOLINO.2	103	2008
15	MOROKAIMORO	149	2008
16	MORONEI	210	2008
17	MUNU	196	2008
18	MUSIMINOI	232	2008
19	NARONAI	72	2008
20	PANAKE	171	2008
21	ROKUSEI	21	2008
22	RUSEI	366	2008
23	SIKUMONE	72	2008
24	SIKURAI	56	2008
25	SIURUHINO	154	2008
26	TURUGUM	172	2008
Division	11 Rerebere		
1	AKU	204	2009
2	BORUPI	102	2009
3	BURUBURUNNO	106	2009
4	IBIRO	96	2009
5	KANNAURO	309	2009
6	KIKIMOGU	189	2009
7	KOGISAGANO	102	2009
8	KOKOPO	239	2009
9	KONIGURU	229	2009
10	KUGUGAI	63	2009
11	KUKUMARU	259	2009
12	KUMIROGU	39	2009
13	LAGUAI	539	2009
14	LEROTU	174	2009
15	LOBIGOU	82	2009
16	LUKARARO	345	2009
17	MARAMUKU	83	2009
18	MATSIOUGU	138	2009
19	MOROU	309	2009
20	MORULA	138	2009

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
21	MOUAKEI	111	2009
22	NABAKU	237	2009
23	NAKARO	130	2009
24	NAKOREI	174	2009
25	NUMAKEI	124	2009
26	OKOMO	116	2009
27	OMITARO	74	2009
28	OREMUTSI	114	2009
29	PARERONO	177	2009
30	PIARINO	117	2009
31	PIRURUINO	66	2009
32	SIALAU	22	2009
33	SIURU	126	2009
34	TARAPA	131	2008
35	TOGULEGU	26	2009
36	TOKUAKA	14	2009
37	TSIMBO	150	2009
38	TUARAGAI	124	2009
39	TUBARU	192	2009
40	TUBOBISOU	113	2009
41	TUGIOGU N0.1 & 2	369	2009
42	TUGIU	282	2009
43	TURIGAU	158	2009
44	UBANMOIUTO	143	2009
Division	12 Porobere		
1	BOGISAGO	237	2009
2	BOTULAI	114	2007
3	IAMARU	104	2009
4	IPILAI	224	2009
5	IULA NO.1	189	2009
6	IULA NO.2	165	2009
7	IULA NO.3	99	2009
8	KAITU	133	2009
9	KAMOURO	270	2009
10	KEKEMONO	141	2007
11	KIKIBATSIOGU	98	2009
12	KOGU	95	2009
13	KOGUIKIRU	111	2009
14	KOMAI	32	2009
15	KOUKOUSINO	95	2007
16	KUGUIOGU	144	2009
17	KUKUMAI	150	2009
18	LAITARO	349	2009
19	LAKOVE	136	2009
20	LAMUAI	70	2009
21	LUAGUO	170	2009
22	LUILAU	134	2009
23	LUKAUKO	179	2009
24	MAIKA	136	2009
25	MALABITA	277	2009
26	MAMAROMINO NO.1	170	2009
27	MAMAROMINO NO.2	179	2009
28	MITUAI	87	2009
29	MOGOROI	188	2009
30	MORIU	95	2009
31	MUGUAI	184	2009
32	MUISURU	107	2009
33	NKUMU	50	2009
34	OKOIRAGU	126	2009
35	ORAVA	66	2009
36	OREMAI	307	2007
37	ORIA	182	2007
38	ORO ROI	112	2009
39	ORUMOI	82	2009
40	PAGUI	228	2007
41	PARERO	86	2009
42	PARIRO	455	2009
43	PAULOUKU	100	2009
44	PIRIRARO	123	2009
45	SADI	53	2009
46	SIUL	118	2009
47	SIURAI	116	2007
48	SULUKUNU	198	2007
49	TABAGO	127	2009
50	TAGURUAI	115	2009
51	TANTAREKI	233	2009
52	TUBARO	115	2009
53	TURUTAI	75	2009
54	UGUPAKOGU	76	2009
DISTRICT	3 Kieta		
Division	13 Koromira-Kongara		
1	AMAPONG	187	2007
2	AURUI	152	2007
3	BAKAKANI	156	2007
4	BANEI	181	2007
5	DAMBEWEI	51	2007
6	DAMAOSI	69	2008
7	DAMUNA	93	2007
8	DAMUNG	173	2008
9	DONGETA	222	2007
10	IORO	98	2007
11	ISINA	180	2007
12	KAMAROVI	151	2007
13	KAPIKAVE	236	2007
14	KARURU	72	2008
15	KEREMONA	150	2007
16	KURAI	207	2007
17	KURITAVE	187	2008
18	MANGONA	106	2007
19	MARILAU	110	2008
20	MARURA	134	2007
21	MINANI	84	2007
22	MORO	123	2008
23	MUAU	196	2008
24	MUNIAS	116	2007
25	NABUIA	64	2007
26	PEIWANA	147	2007
27	PIRENEIU	287	2007
28	PONDONA	68	2007
29	ROMEINA	122	2007
30	SIOROVI	132	2007
31	SIPURU	104	2008
32	SIPUREI	121	2007
33	SIROVAI	133	2008
34	TAKE	113	2007

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
35	WIDA	100	2007
Division	14 Nasioi-Pirung		
1	AMION	123	2007
2	ANGANAI	155	2007
3	ARAWA	231	2007
4	BAIRIMA	120	2007
5	BAKATUNG	195	2007
6	BAKAWORI	106	2007
7	BONAMUNG	155	2007
8	BUNUMANG	114	2007
9	DAITA	85	2007
10	DARUTUE NO.1	207	2007
11	DARUTUE NO.2	279	2007
12	DINGUNA	114	2007
13	DOKOTORO	89	2007
14	DONSIRO	208	2007
15	KARAKUNG	119	2007
16	KARIKIRA	135	2007
17	KOBUAN	79	2007
18	KOKADEI	133	2007
19	KOVENANG	102	2007
20	KUKA	57	2007
21	KUPEI	169	2007
22	MAKENIKO	64	2007
23	MAUANG	171	2007
24	MOINANG	87	2007
25	MONGONTORO	102	2007
26	MORANGISINA	166	2007
27	NASIOI	207	2007
28	PANKAMA	51	2007
29	PARAIANO	142	2007
30	PAVAIRE	166	2007
31	PIDIA	174	2007
32	POKPOK	303	2007
33	POMA	248	2007
34	POMAUA	134	2007
35	ROROVANA NO.1	246	2007
36	ROROVANA NO.2	264	2007
37	RUMBA	291	2007
38	SIAIE	142	2007
39	SIBUNA	112	2007
40	SINKAI	64	2007
41	SIPA	50	2007
42	SIROMBA	117	2007
43	SIROMBANA	106	2007
44	TAULAPELIA	47	2007
45	TAVIDUA	112	2007
46	TOBOROI	141	2007
47	TOPINA	153	2007
48	UNABATO	103	2007
Division	15 Ioro-Eivo		
1	ALAKABAU	64	2007
2	ATAMO	413	2007
3	BOIRA	239	2007
4	BORUMAI	198	2007
5	BOVE	225	2007
6	DAPERA	431	2007
7	DARENAI	326	2008
8	DARU	112	2007
9	GUAVA	131	2008
10	IRANG	274	2008
11	KARNIVITU	326	2007
12	KOKOMATE	127	2008
13	KOKORE	396	2008
14	KOPANI	533	2007
15	KOPIKIRI	172	2007
16	KORPEI	420	2007
17	MAINOKI	346	2008
18	MORONI	89	2007
19	MUMURAI	318	2008
20	MUSINAU	235	2008
21	NASIWOIWA	243	2007
22	ONOVI	238	2008
23	ORAMI	333	2008
24	PAKIA	275	2007
25	PANKA	172	2008
26	PIAWORA	166	2008
27	PISINAU	225	2008
28	SIREONDJI	174	2007
29	SIROWAI	172	2007
30	SUIEMA(PAURA)	197	2007
31	TARARA	152	2007
32	VITO	145	2007
Division	16 Rotokas		
1	BULISTORO	231	2005
2	IBU	203	2005
3	INUS	112	2005
4	IPARAKA	312	2005
5	KAKARAPAIA	303	2005
6	KOROBORA	244	2005
7	KUSI NO.1 & 2	133	2005
8	MAPEARO	327	2005
9	NUPATORO NO.1 & 2	405	2005
10	OKOBUPAIA	215	2005
11	OSOWAIPA	162	2005
12	OWAIWAIPA	213	2005
13	PIPIAIA	281	2005
14	POKAIA	245	2005
15	RURUVU	246	2005
16	SIRORIPAIA	255	2005
17	SISIVI	310	2006
18	TEARAKA	283	2005
19	TEPEROI	135	2005
20	TOGARAO	458	2005
21	TOKAI	325	2005
22	TURIMA	193	2005
23	TUTUPAIA	318	2005
24	TUVIA	209	2005

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
AGABAI	2	7	1	2008
AGAWA	2	8	1	2008
AITARA	2	9	1	2008
AKOPAI	1	5	1	2006
AKU	2	11	1	2009
ALAKABAU	3	15	1	2007
AMAPONG	3	13	1	2007
AMEO	2	9	2	2008
AMION	3	14	1	2007
AMOTU	1	1	1	2002
AMUM	1	5	2	2006
ANAKEI	1	4	1	2003
ANGANAI	3	14	2	2007
ARAI	2	9	3	2008
ARAVIA	1	6	1	2005
ARAWA	3	14	3	2007
ASTAPAI	1	5	3	2006
ATAMO	3	15	2	2007
ATANGATO	2	7	2	2006
ATSILIMA	1	5	4	2006
AUKEI	1	5	5	2006
AUMARI	2	8	2	2008
AURUI	3	13	2	2007
BAIRIMA	3	14	4	2007
BAKAKANI	3	13	3	2007
BAKATUNG	3	14	5	2007
BAKAWORI	3	14	6	2007
BAKORAM NO.1	2	8	3	2008
BAKORAM NO.2	2	8	4	2008
BALIL	1	1	2	2001
BANEI	3	13	4	2007
BARIKUA	1	3	1	2003
BEI	1	3	2	2003
BEIKUT	1	3	3	2003
BERERÉKI	2	7	3	2008
BERETEMBA	2	8	5	2008
BETERAIO	1	5	6	2006
BIROI	2	8	6	2008
BIROS	2	8	7	2008
BOBOASI	1	5	7	2006
BOGISAGO	2	12	1	2009
BOIRA	3	15	3	2007
BOKU	2	8	8	2008
BONAMUNG	3	14	7	2007
BORUMAI	3	15	4	2007
BORUPI	2	11	2	2009
BOTULAI	2	12	2	2007
BOVE	3	15	5	2007
BULISTORO	3	16	1	2005
BUNUMANG	3	14	8	2007
BURUBURUNNO	2	11	3	2009
CHUNDAWAN	1	4	2	2003
DAITA	3	14	9	2007
DAMAOSI	3	13	6	2008
DAMBEWEI	3	13	5	2007
DAMUNA	3	13	7	2007
DAMUNG	3	13	8	2008
DAPERA	3	15	6	2007
DARENAI	3	15	7	2008
DARU	3	15	8	2007
DARUTUE NO.1	3	14	10	2007
DARUTUE NO.2	3	14	11	2007
DEOS	1	6	2	2005
DINGUNA	3	14	12	2007
DOKOTORO	3	14	13	2007
DOMONINO	2	9	4	2008
DONGETA	3	13	9	2007
DONSIRO	3	14	14	2007
ELUTUPAN	1	2	1	2003
GAGAN	1	3	4	2003
GOGOHEI NO.1	1	4	3	2003
GOGOHEI NO.2	1	4	4	2003
GOHI	1	4	5	2003
GOTON	1	5	8	2006
GUAVA	3	15	9	2008
HAGUS	1	2	2	2003
HAHALIS	1	2	3	2003
HANAHAN	1	2	4	2003
HANGAN	1	4	6	2003
HANONG	2	10	1	2008
HANPAN	1	2	5	2003
HANTOBIN	1	6	3	2005
HAPAN	1	3	5	2003
HARI	2	9	5	2008
HARI KAKU	2	9	6	2008
HINO	2	10	2	2008
HIRE	2	9	7	2008
HIRUHIRU	2	9	8	2008
HITAU	1	3	6	2004
HORINO	2	9	9	2008
HUKOHAH	2	9	10	2008
IAMARU	2	12	3	2009
IANGAIN	1	1	3	2002
IAUN NO.1	1	6	4	2005
IAUN NO.2	1	6	5	2005
IBIRO	2	11	4	2009
IBU	3	16	2	2005
IEGU	2	10	3	2008
IELELINA	1	2	6	2003
IESILA	1	1	4	2002
IETA	1	4	7	2003
ILOSA	1	1	5	2002
INUS	3	16	3	2005
IOLOHANAN	1	1	6	2002
IORO	3	13	10	2007
IPARAKA	3	16	4	2005
IPILAI	2	12	4	2009
IRANG	3	15	10	2008
IRU	2	9	11	2008

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
IRUE	1	6	7	2005
ISINA	3	13	11	2007
IULA NO.1	2	12	5	2009
IULA NO.2	2	12	6	2009
IULA NO.3	2	12	7	2009
JABA	2	7	4	2008
KABANAMI	2	7	5	2008
KAHULE	1	3	7	2003
KAITU	2	12	8	2009
KAKAPARA	1	5	9	2006
KAKARAPAIA	3	16	5	2005
KAKOTOKORI	2	9	12	2008
KAMAROVI	3	13	12	2007
KAMOURO	2	12	9	2009
KANNAURO	2	11	5	2009
KAPANA	2	10	4	2008
KAPARO	2	9	13	2008
KAPIKAVE	3	13	13	2007
KARAKUNG	3	14	15	2007
KARARITU	1	5	10	2006
KARATO	2	7	6	2006
KAREKOPA	2	7	7	2006
KARIKIRA	3	14	16	2007
KARNIVITU	3	15	11	2007
KARURU	3	13	14	2008
KASIPEKE	2	7	8	2008
KATSUNKOVERI	1	4	8	2003
KAUBATEI	1	5	11	2006
KAUNA	1	5	12	2006
KAVAKAKATSU	2	7	9	2006
KAVIKI	1	5	13	2006
KEKEMONO	2	12	10	2007
KENAIA	2	7	10	2006
KEPUI	1	5	14	2006
KEREMONA	3	13	15	2007
KETSKETS	1	2	7	2003
KIAKARA	1	5	15	2006
KIKIBATSIOGU	2	12	11	2009
KIKIMOGU	2	11	6	2009
KIMMAKU	2	9	14	2008
KINIRUI	2	10	5	2008
KOATOROI	1	5	16	2006
KOBUAN	3	14	17	2007
KOGISAGANO	2	11	7	2009
KOGU	2	12	12	2009
KOGUIKIRU	2	12	13	2009
KOHINO	1	3	8	2003
KOHISO	1	3	9	2003
KOIARE	2	7	11	2006
KOKADEI	3	14	18	2007
KOKOMATE	3	15	12	2008
KOKOPO	2	11	8	2009
KOKORE	3	15	13	2008
KOKUI	2	10	6	2008
KOMAI	2	12	14	2009
KONAWA	2	8	9	2008
KONGARA	2	8	10	2008
KONIGURU	2	11	9	2009
KOPAI	1	5	17	2006
KOPANI	3	15	14	2007
KOPIKIRI	3	15	15	2007
KOREPOVI	1	5	18	2006
KORO	2	7	12	2008
KOROBORA	3	16	6	2005
KOROMAKETO	2	7	13	2006
KOROPO	2	9	15	2008
KOROVI	2	7	14	2006
KORPEI	3	15	16	2007
KOSIPAI	1	5	19	2006
KOTOITA	1	6	10	2005
KOTOPAN	1	2	8	2003
KOTU	2	9	16	2008
KOUKOUSINO	2	12	15	2007
KOVANIS	1	6	11	2005
KOVENANG	3	14	19	2007
KUGUGAI	2	11	10	2009
KUGUIOGU	2	12	16	2009
KUHINO	2	10	7	2008
KUKA	3	14	20	2007
KUKUMAI	2	12	17	2009
KUKUMARU	2	11	11	2009
KUKURINA	1	6	12	2005
KULIS	1	1	7	2001
KUMIROGU	2	11	12	2009
KUMUKI	2	9	17	2008
KUNAPOPO	1	5	20	2006
KUNIKA	2	7	15	2008
KUNOKOMOK	1	5	21	2006
KUNU	2	10	8	2008
KUPEI	3	14	21	2007
KUPINKU	2	9	18	2008
KUPON	2	7	16	2008
KURAI	3	13	16	2007
KURITAVE	3	13	17	2008
KURUR	1	5	22	2006
KUSI NO.1 & 2	3	16	7	2005
KUTIN	2	10	9	2008
LABALAM	2	7	17	2008
LABONAMI	2	7	18	2008
LAGUAI	2	11	13	2009
LAITARO	2	12	18	2009
LAKEMBA	2	9	19	2008
LAKOVE	2	12	19	2009
LAKU	2	10	10	2008
LALUM	1	5	23	2006
LAMUAI	2	12	20	2009
LARENAI	2	8	11	2008
LARUMA	2	7	19	2006
LAVORO	2	8	12	2008
LEMANKOA	1	2	9	2003
LEMANMANU	1	2	10	2003
LEROTU	2	11	14	2009
LIHON	1	1	8	2001

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
LOBIGOU	2	11	15	2009
LONAHAN	1	4	9	2003
LONKOGARI	1	5	24	2006
LONTIS	1	2	11	2003
LOPERE	2	8	13	2008
LORO	2	8	36	2008
LUAGUO	2	12	21	2009
LUILAU	2	12	22	2009
LUKARARO	2	11	16	2009
LUKAUKO	2	12	23	2009
MABES	2	8	14	2008
MAIKA	2	12	24	2009
MAINOIATA	2	9	20	2008
MAINOKI	3	15	17	2008
MAISUA	2	10	11	2008
MAKENIKO	3	14	22	2007
MALABITA	2	12	25	2009
MALASANG	1	4	10	2003
MAMAGOTA	2	9	21	2008
MAMAROMINO NO.1	2	12	26	2009
MAMAROMINO NO.2	2	12	27	2009
MANGONA	3	13	18	2007
MANNAKE	2	9	43	2008
MANOB	1	4	11	2003
MAPEARO	3	16	8	2005
MAPIRI	1	1	9	2001
MAPISI	1	5	25	2006
MARAMUKU	2	11	17	2009
MARIGA	2	8	15	2008
MARILAU	3	13	19	2008
MAROWA	2	7	20	2006
MARURA	3	13	20	2007
MASIWAKORE	2	8	16	2008
MASUNKE	2	8	17	2008
MATERAS	2	10	12	2008
MATITSORA	1	5	26	2006
MATONA	2	8	18	2008
MATSIOUGU	2	11	18	2009
MATSUNGAN	1	3	10	2004
MATUKORI	2	9	22	2008
MAUANG	3	14	23	2007
MAWERE	2	8	19	2008
MELELUP	1	6	13	2005
MENDAI	2	8	20	2008
MEWA	2	8	21	2008
MEWARAKA	2	8	22	2008
MIHERO	2	9	23	2008
MINANI	3	13	21	2007
MINGETA	2	8	23	2008
MITSIKORI	2	7	21	2006
MITUAI	2	12	28	2009
MOAINO	2	8	24	2008
MOGOROI	2	12	29	2009
MOIBINEI	2	9	24	2008
MOINANG	3	14	24	2007
MOKOKOREU	2	7	22	2008
MOKOLI NO.1	2	10	13	2008
MOKOLI NO.2	2	10	14	2008
MOM	2	7	23	2006
MOMOGANARI	2	7	24	2008
MONGONTORO	3	14	25	2007
MONTONIA	1	1	10	2001
MORANGISINA	3	14	26	2007
MORIU	2	12	30	2009
MORO	3	13	22	2008
MOROKAIMORO	2	10	15	2008
MORONEI	2	10	16	2008
MORONI	3	15	18	2007
MOROU	2	11	19	2009
MORULA	2	11	20	2009
MOSIGETA	2	8	25	2008
MOSILAIE	1	5	27	2006
MOSINO	2	8	26	2008
MOUAKEI	2	11	21	2009
MUAU	3	13	23	2008
MUGUAI	2	12	31	2009
MUIRE	1	5	36	2006
MUISURU	2	12	32	2009
MUMURAI	3	15	19	2008
MUNIAS	3	13	24	2007
MUNU	2	10	17	2008
MUSIMINOI	2	10	18	2008
MUSINAU	3	15	20	2008
MUTAHI	1	6	14	2005
MUWOKU	2	9	25	2008
NABAKU	2	11	22	2009
NABUIA	3	13	25	2007
NAIRONA	2	8	27	2008
NAKARO	2	11	23	2009
NAKOREI	2	11	24	2009
NAMAKERIO	1	6	15	2005
NAMASIORA	1	6	16	2005
NAMATOA	1	6	17	2005
NAMBAROSI	1	5	28	2006
NARINAI	2	7	25	2008
NARONAI	2	10	19	2008
NASIOI	3	14	27	2007
NASIWOIWA	3	15	21	2007
NEBLAHIU	1	6	18	2005
NKUMU	2	12	33	2009
NOPAN	1	3	11	2003
NOVAH	1	3	12	2003
NUGURIA	1	1	11	2002
NUKUI	2	8	28	2008
NUKUI	2	9	26	2008
NUKUTOA	1	1	12	2002
NUMAKEI	2	11	25	2009
NUPATORO NO.1 & 2	3	16	9	2005
OKARU	2	8	29	2008
OKOBUPAIA	3	16	10	2005
OKOIRAGU	2	12	34	2009
OKOMO	2	11	26	2009
OMITARO	2	11	27	2009

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
ONOVI	3	15	22	2008
ORAMI	3	15	23	2008
ORAVA	2	12	35	2009
OREMAI	2	12	36	2007
OREMUTSI	2	11	28	2009
ORIA	2	12	37	2007
ORORO	2	8	30	2008
ORUROI	2	12	38	2009
ORUMOI	2	12	39	2009
OSIAGE	2	8	31	2008
OSILADA	2	8	32	2008
OSOKOLI	2	9	27	2008
OSOWAIPA	3	16	11	2005
OWAIWAIPA	3	16	12	2005
PAGUI	2	12	40	2007
PAKIA	3	15	24	2007
PANAKE	2	10	20	2008
PANAM	2	7	26	2008
PANKA	3	15	25	2008
PANKAMA	3	14	28	2007
PARAIANO	3	14	29	2007
PARERO	2	12	41	2009
PARERONO	2	11	29	2009
PARIRO	2	12	42	2009
PATEAVEAVE	1	6	19	2005
PAULOUKU	2	12	43	2009
PAVAIRE	3	14	30	2007
PEIWANA	3	13	26	2007
PERE	2	8	33	2008
PETATS	1	3	13	2004
PETSPETS	1	5	29	2006
PIARINO	2	11	30	2009
PIAWORA	3	15	26	2008
PIDIA	3	14	31	2007
PIKEI	2	8	34	2008
PININAI	2	9	28	2008
PIPIAIA	3	16	13	2005
PIRENEIU	3	13	27	2007
PIRIRARO	2	12	44	2009
PIRURUINO	2	11	31	2009
PISINAU	3	15	27	2008
PIUL	1	1	13	2003
PIVA	2	7	27	2006
POKA	1	3	14	2003
POKAIA	3	16	14	2005
POKAPA NO.1	1	6	20	2005
POKAPA NO.2	1	6	21	2005
POKPOK	3	14	32	2007
POKUITO	1	5	30	2006
POLANAVIA	2	7	28	2008
POMA	3	14	33	2007
POMARATE	2	8	35	2008
POMAUA	3	14	34	2007
PONDONA	3	13	28	2007
POPOHERAI	1	5	31	2006
PORAPORA	1	4	12	2003
PORIWON	1	1	14	2001
PORORAN	1	3	15	2004
PURIKORI	2	9	29	2008
PUSKOMBU	1	6	22	2005
PUTO	1	5	32	2006
RABAULU	2	9	30	2008
RAMUNDATA	1	4	13	2003
RARIE	1	6	24	2005
RATSUA	1	4	14	2003
RELA	2	7	29	2008
ROGOS	1	1	15	2001
ROKUSEI	2	10	21	2008
ROMARI	2	8	37	2008
ROMEINA	3	13	29	2007
ROMSIS	1	6	25	2005
ROROVANA NO.1	3	14	35	2007
ROROVANA NO.2	3	14	36	2007
ROTARE NO.1	2	8	38	2008
ROTARE NO.2	2	8	39	2008
RUKUSSIA	1	5	33	2006
RUMBA	3	14	37	2007
RUPUMMO	2	9	44	2008
RURI	1	4	15	2003
RURUVU	3	16	15	2005
RUSEI	2	10	22	2008
RUUNAI	2	9	31	2008
SADI	2	12	45	2009
SALEPEN	1	1	16	2001
SAPANI	1	3	16	2003
SAPOSA	1	5	34	2006
SIAIE	3	14	38	2007
SIAKEN	1	1	17	2001
SIALAU	2	11	32	2009
SIANEKI	2	7	30	2008
SIAR	1	1	18	2001
SIARA	1	4	16	2003
SIBUNA	3	14	39	2007
SIKOREWA	2	7	31	2008
SIKUMONE	2	10	23	2008
SIKURAI	2	10	24	2008
SING	1	4	17	2003
SININNAI	2	9	32	2008
SINKAI	3	14	40	2007
SINSIRUAI	2	8	40	2008
SIOROVI	3	13	30	2007
SIPA	3	14	41	2007
SIPI	2	8	41	2008
SIPUREI	3	13	32	2007
SIPURU	3	13	31	2008
SIRARUHO	2	9	33	2008
SIREONDJI	3	15	28	2007
SIROI	2	9	34	2008
SIROMBA	3	14	42	2007
SIROMBANA	3	14	43	2007
SIRORIPAIA	3	16	16	2005
SIROT	1	1	19	2001
SIROVAI	3	13	33	2008

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
SIROWAI	3	15	29	2007
SISIAPAI	1	5	35	2006
SISIVI	3	16	17	2006
SIUL	2	12	46	2009
SIURAI	2	12	47	2007
SIURU	2	11	33	2009
SIURUHINO	2	10	25	2008
SOROM	1	4	18	2003
SUANGU	1	6	26	2005
SUHIN	1	4	19	2003
SUIEMA(PAURA)	3	15	30	2007
SULUKUNU	2	12	48	2007
SUNVAHORA	1	6	27	2005
TABAGO	2	12	49	2009
TAGURI	2	8	42	2008
TAGURUAI	2	12	50	2009
TAHAITAHAI	1	4	20	2003
TAIDORIMA	2	8	43	2008
TAIOF	1	5	37	2006
TAKE	3	13	34	2007
TAKEMARI	2	8	44	2008
TANAHERAN	1	1	20	2001
TANAMALIT	1	1	21	2001
TANDEKI	1	2	12	2003
TANTAREKI	2	12	51	2009
TAPSANWARA	1	4	21	2003
TARAPA	2	11	34	2008
TARARA	3	15	31	2007
TARBUT	1	4	22	2003
TARONGAL	1	1	22	2001
TARUBA	2	7	32	2008
TAULAPELIA	3	14	44	2007
TAVIDUA	3	14	45	2007
TEABES	1	6	30	2005
TEAH	1	1	23	2001
TEANANA	1	6	31	2005
TEARAKA	3	16	18	2005
TELATU	1	3	17	2003
TENDU	1	6	32	2005
TEOBUHIN NO.1	1	6	33	2005
TEOBUHIN NO.2	1	6	34	2005
TEOP	1	6	35	2005
TEPEROI	3	16	19	2005
TERAUTUP	1	1	24	2001
TETAKUTS	1	6	36	2005
TOBOROI	3	14	46	2007
TOGARAO	3	16	20	2005
TOGULEGU	2	11	35	2009
TOHATSI	1	2	13	2003
TOHEI	1	5	38	2006
TOHU	2	9	35	2008
TOIRA	2	9	36	2008
TOITOI	2	9	37	2008
TOKAI	3	16	21	2005
TOKUAKA	2	11	36	2009
TOKUNUTU	2	9	38	2008
TONNUI	2	9	39	2008
TONU	2	9	40	2008
TOPINA	3	14	47	2007
TOROBAI	1	6	37	2005
TOROKOKAPIA	1	6	38	2005
TOROTEI	1	4	23	2003
TOSIAVI	1	5	39	2006
TOTOKI	1	5	40	2006
TSIKOT	1	6	39	2005
TSIMBO	2	11	37	2009
TSISIKO	1	6	40	2005
TSITO	2	7	33	2006
TSUNPETS	1	6	41	2005
TUARAGAI	2	11	38	2009
TUBARO	2	12	52	2009
TUBARU	2	11	39	2009
TUBOBISOU	2	11	40	2009
TUGIOGU NO.1&2	2	11	41	2009
TUGIU	2	11	42	2009
TUMURI	1	6	42	2005
TUNG	1	3	18	2003
TURIGAU	2	11	43	2009
TURIMA	3	16	22	2005
TURUGUM	2	10	26	2008
TURUTAI	2	12	53	2009
TUTUPAIA	3	16	23	2005
TUVIA	3	16	24	2005
UBANMOIUTO	2	11	44	2009
UGUPAKOGU	2	12	54	2009
UMUM	1	4	24	2003
UNABATO	3	14	48	2007
UNUNAI	2	9	41	2008
USO	2	9	42	2008
VAINANA	1	6	44	2005
VAROPA	1	6	45	2005
VASPOS	1	6	46	2005
VITO	3	15	32	2007
WAITAWUNA	2	8	45	2008
WAKUPA	2	8	46	2008
WARARIU	2	7	34	2008
WARUWARU	2	7	35	2008
WAUWANGINUVA	1	6	47	2005
WIDA	3	13	35	2007
WIWIARO	2	7	36	2008
YAPARU	1	3	19	2004
YEGITS	1	3	20	2003
YOTCHIBOL	1	1	25	2001

6.3 RURAL VILLAGES LISTED BY AGRICULTURAL SYSTEM Province: 20 Bougainville

Village	Dist	Div	Unit	RMU
SYSTEM 2001				
BALIL	1	1	2	2
KULIS	1	1	7	2
LIHON	1	1	8	2
MAPIRI	1	1	9	2
MONTONIA	1	1	10	1
PORIWON	1	1	14	2
ROGOS	1	1	15	1
SALEPEN	1	1	16	2
SIAKEN	1	1	17	2
SIAR	1	1	18	2
SIROT	1	1	19	2
TANAHERAN	1	1	20	2
TANAMALIT	1	1	21	2
TARONGAL	1	1	22	2
TEAH	1	1	23	1
TERAUTUP	1	1	24	2
YOTCHIBOL	1	1	25	2
SYSTEM 2002				
AMOTU	1	1	1	137
IANGAIN	1	1	3	129
IESILA	1	1	4	129
ILOSA	1	1	5	129
IOLOHANAN	1	1	6	129
NUGURIA	1	1	11	127
NUKUTOA	1	1	12	128
SYSTEM 2003				
ANAKEI	1	4	1	16
BARIKUA	1	3	1	4
BEI	1	3	2	130
BEIKUT	1	3	3	4
CHUNDAWAN	1	4	2	16
ELUTUPAN	1	2	1	3
GAGAN	1	3	4	4
GOGOHEI NO.1	1	4	3	3
GOGOHEI NO.2	1	4	4	3
GOHI	1	4	5	16
HAGUS	1	2	2	3
HAHALIS	1	2	3	3
HANAHAN	1	2	4	3
HANGAN	1	4	6	3
HANPAN	1	2	5	3
HAPAN	1	3	5	4
IELELINA	1	2	6	3
IETA	1	4	7	3
KAHULE	1	3	7	130
KATSUNKOVERI	1	4	8	16
KETSKETS	1	2	7	3
KOHINO	1	3	8	4
KOHISO	1	3	9	4
KOTOPAN	1	2	8	3
LEMANKOA	1	2	9	3
LEMANMANU	1	2	10	3
LONAHAN	1	4	9	3
LONTIS	1	2	11	3
MALASANG	1	4	10	3
MANOB	1	4	11	16
NOPAN	1	3	11	4
NOVAH	1	3	12	8
PIUL	1	1	13	129
POKA	1	3	14	130
PORAPORA	1	4	12	19
RAMUNDATA	1	4	13	16
RATSUA	1	4	14	140
RURI	1	4	15	16
SAPANI	1	3	16	4
SIARA	1	4	16	16
SING	1	4	17	3
SOROM	1	4	18	16
SUHIN	1	4	19	3
TAHAITAHAI	1	4	20	3
TANDEKI	1	2	12	3
TAPSANWARA	1	4	21	16
TARBUT	1	4	22	16
TELATU	1	3	17	3
TOHATSI	1	2	13	3
TOROTEI	1	4	23	16
TUNG	1	3	18	130
UMUM	1	4	24	16
YEGITS	1	3	20	130
SYSTEM 2004				
HITAU	1	3	6	126
MATSUNGAN	1	3	10	120
PETATS	1	3	13	120
PORORAN	1	3	15	7
YAPARU	1	3	19	7
SYSTEM 2005				
ARAVIA	1	6	1	26
BULISTORO	3	16	1	50
DEOS	1	6	2	21
HANTOBIN	1	6	3	19
IAUN NO.1	1	6	4	23
IAUN NO.2	1	6	5	23
IBU	3	16	2	50
INUS	3	16	3	53
IPARAKA	3	16	4	56
IRUE	1	6	7	141
KAKARAPAIA	3	16	5	50
KOROBORA	3	16	6	51
KOTOITA	1	6	10	52
KOVANIS	1	6	11	22
KUKURINA	1	6	12	19
KUSI NO.1 & 2	3	16	7	25
MAPEARO	3	16	8	57
MELELUP	1	6	13	25
MUTAHI	1	6	14	25
NAMAKERIO	1	6	15	143
NAMASIORA	1	6	16	19
NAMATOA	1	6	17	24
NEBLAHIU	1	6	18	24
NUPATORO NO.1 & 2	3	16	9	51
OKOBUPAIA	3	16	10	68
OSOWAIPA	3	16	11	25
OWAIWAIPA	3	16	12	25

6.3 RURAL VILLAGES LISTED BY AGRICULTURAL SYSTEM **Province: 20 Bougainville**

Village	Dist	Div	Unit	RMU
PATEAVEAVE	1	6	19	24
PIPIAIA	3	16	13	51
POKAIA	3	16	14	50
POKAPA NO.1	1	6	20	19
POKAPA NO.2	1	6	21	19
PUSKOMBU	1	6	22	23
RARIE	1	6	24	25
ROMSIS	1	6	25	19
RURUVU	3	16	15	49
SIRORIPAIA	3	16	16	57
SUANGU	1	6	26	19
SUNVAHORA	1	6	27	23
TEABES	1	6	30	22
TEANANA	1	6	31	23
TEARAKA	3	16	18	54
TENDU	1	6	32	143
TEOBUHIN NO.1	1	6	33	19
TEOBUHIN NO.2	1	6	34	19
TEOP	1	6	35	125
TEPEROI	3	16	19	55
TETAKUTS	1	6	36	19
TOGARAO	3	16	20	49
TOKAI	3	16	21	51
TOROBAI	1	6	37	25
TOROKOKAPIA	1	6	38	19
TSIKOT	1	6	39	143
TSISIKO	1	6	40	19
TSUNPETS	1	6	41	16
TUMURI	1	6	42	24
TURIMA	3	16	22	51
TUTUPAIA	3	16	23	50
TUVIA	3	16	24	24
VAINANA	1	6	44	23
VAROPA	1	6	45	23
VASPOS	1	6	46	25
WAUWANGINUVA	1	6	47	19
SYSTEM 2006				
AKOPAI	1	5	1	36
AMUM	1	5	2	34
ASTAPAI	1	5	3	35
ATANGATO	2	7	2	78
ATSILIMA	1	5	4	60
AUKEI	1	5	5	37
BETERAIO	1	5	6	35
BOBOASI	1	5	7	37
GOTON	1	5	8	17
KAKAPARA	1	5	9	17
KARARITU	1	5	10	36
KARATO	2	7	6	78
KAREKOPA	2	7	7	78
KAUBATEI	1	5	11	37
KAUNA	1	5	12	36
KAVAKAKATSU	2	7	9	66
KAVIKI	1	5	13	37
KENAIA	2	7	10	148
KEPUI	1	5	14	29
KIAKARA	1	5	15	33
KOATOROI	1	5	16	29
KOIARE	2	7	11	80
KOPAI	1	5	17	29
KOREPOVI	1	5	18	36
KOROMAKETO	2	7	13	63
KOROVI	2	7	14	78
KOSIPAI	1	5	19	33
KUNAPOPO	1	5	20	17
KUNOKOMOK	1	5	21	29
KURUR	1	5	22	29
LALUM	1	5	23	17
LARUMA	2	7	19	135
LONKOGARI	1	5	24	63
MAPISI	1	5	25	29
MAROWA	2	7	20	80
MATITSORA	1	5	26	17
MITSIKORI	2	7	21	63
MOM	2	7	23	78
MOSILAIE	1	5	27	33
MUIRE	1	5	36	36
NAMBAROSI	1	5	28	17
PETSPETS	1	5	29	29
PIVA	2	7	27	63
POKUITO	1	5	30	60
POPOHERAI	1	5	31	29
PUTO	1	5	32	17
RUKUSSIA	1	5	33	17
SAPOSA	1	5	34	123
SISIAPAI	1	5	35	33
SISIVI	3	16	17	49
TAIOF	1	5	37	11
TOHEI	1	5	38	33
TOSIAVI	1	5	39	29
TOTOKI	1	5	40	29
TSITO	2	7	33	66
SYSTEM 2007				
ALAKABAU	3	15	1	72
AMAPONG	3	13	1	76
AMION	3	14	1	76
ANGANAI	3	14	2	76
ARAWA	3	14	3	76
ATAMO	3	15	2	76
AURUI	3	13	2	76
BAIRIMA	3	14	4	76
BAKAKANI	3	13	3	89
BAKATUNG	3	14	5	76
BAKAWORI	3	14	6	145
BANEI	3	13	4	77
BOIRA	3	15	3	76
BONAMUNG	3	14	7	76
BORUMAI	3	15	4	76
BOTULAI	2	12	2	147
BOVE	3	15	5	72
BUNUMANG	3	14	8	76
DAITA	3	14	9	76
DAMBEWEI	3	13	5	77
DAMUNA	3	13	7	76
DAPERA	3	15	6	144
DARU	3	15	8	77

6.3 RURAL VILLAGES LISTED BY AGRICULTURAL SYSTEM Province: 20 Bougainville

Village	Dist	Div	Unit	RMU
DARUTUE NO.1	3	14	10	76
DARUTUE NO.2	3	14	11	77
DINGUNA	3	14	12	76
DOKOTORO	3	14	13	76
DONGETA	3	13	9	93
DONSIRO	3	14	14	76
IORO	3	13	10	76
ISINA	3	13	11	76
KAMAROVI	3	13	12	76
KAPIKAVE	3	13	13	139
KARAKUNG	3	14	15	76
KARIKIRA	3	14	16	77
KARNIVITU	3	15	11	76
KEKEMONO	2	12	10	93
KEREMONA	3	13	15	89
KOBUAN	3	14	17	76
KOKADEI	3	14	18	76
KOPANI	3	15	14	69
KOPIKIRI	3	15	15	69
KORPEI	3	15	16	76
KOUKOUSINO	2	12	15	93
KOVENANG	3	14	19	76
KUKA	3	14	20	76
KUPEI	3	14	21	77
KURAI	3	13	16	76
MAKENIKO	3	14	22	76
MANGONA	3	13	18	76
MARURA	3	13	20	139
MAUANG	3	14	23	76
MINANI	3	13	21	76
MOINANG	3	14	24	77
MONGONTORO	3	14	25	76
MORANGISINA	3	14	26	76
MORONI	3	15	18	144
MUNIAS	3	13	24	76
NABUIA	3	13	25	76
NASIOI	3	14	27	77
NASIWOIWA	3	15	21	76
OREMAI	2	12	36	93
ORIA	2	12	37	147
PAGUI	2	12	40	147
PAKIA	3	15	24	76
PANKAMA	3	14	28	76
PARAIANO	3	14	29	95
PAVAIRE	3	14	30	76
PEIWANA	3	13	26	76
PIDIA	3	14	31	138
PIRENEIU	3	13	27	76
POKPOK	3	14	32	96
POMA	3	14	33	76
POMAUA	3	14	34	76
PONDONA	3	13	28	76
ROMEINA	3	13	29	76
ROROVANA NO.1	3	14	35	76
ROROVANA NO.2	3	14	36	76
RUMBA	3	14	37	95
SIAIE	3	14	38	76
SIBUNA	3	14	39	76
SINKAI	3	14	40	76
SIOROVI	3	13	30	76
SIPA	3	14	41	138
SIPUREI	3	13	32	76
SIREONDJI	3	15	28	76
SIROMBA	3	14	42	76
SIROMBANA	3	14	43	76
SIROWAI	3	15	29	78
SIURAI	2	12	47	100
SUIEMA(PAURA)	3	15	30	78
SULUKUNU	2	12	48	147
TAKE	3	13	34	76
TARARA	3	15	31	70
TAULAPELIA	3	14	44	76
TAVIDUA	3	14	45	76
TOBOROI	3	14	46	76
TOPINA	3	14	47	76
UNABATO	3	14	48	77
VITO	3	15	32	72
WIDA	3	13	35	76
SYSTEM 2008				
AGABAI	2	7	1	85
AGAWA	2	8	1	85
AITARA	2	9	1	92
AMEO	2	9	2	131
ARAI	2	9	3	131
AUMARI	2	8	2	85
BAKORAM NO.1	2	8	3	85
BAKORAM NO.2	2	8	4	85
BEREREKI	2	7	3	85
BERETEMBA	2	8	5	85
BIROI	2	8	6	85
BIROS	2	8	7	85
BOKU	2	8	8	86
DAMAOSI	3	13	6	94
DAMUNG	3	13	8	94
DARENAI	3	15	7	78
DOMONINO	2	9	4	131
GUAVA	3	15	9	77
HANONG	2	10	1	87
HARI	2	9	5	131
HARI KAKU	2	9	6	131
HINO	2	10	2	131
HIRE	2	9	7	131
HIRUHIRU	2	9	8	131
HORINO	2	9	9	131
HUKOHAH	2	9	10	131
IEGU	2	10	3	87
IRANG	3	15	10	78
IRU	2	9	11	87
JABA	2	7	4	79
KABANAMI	2	7	5	86
KAKOTOKORI	2	9	12	131
KAPANA	2	10	4	131
KAPARO	2	9	13	131
KARURU	3	13	14	77
KASIPEKE	2	7	8	86
KIMMAKU	2	9	14	131
KINIRUI	2	10	5	131

6.3 RURAL VILLAGES LISTED BY AGRICULTURAL SYSTEM Province: 20 Bougainville

Village	Dist	Div	Unit	RMU
KOKOMATE	3	15	12	78
KOKORE	3	15	13	77
KOKUI	2	10	6	131
KONAWA	2	8	9	85
KONGARA	2	8	10	85
KORO	2	7	12	78
KOROPO	2	9	15	131
KOTU	2	9	16	131
KUHINO	2	10	7	87
KUMUKI	2	9	17	131
KUNIKA	2	7	15	83
KUNU	2	10	8	131
KUPINKU	2	9	18	131
KUPON	2	7	16	83
KURITAVE	3	13	17	77
KUTIN	2	10	9	131
LABALAM	2	7	17	78
LABONAMI	2	7	18	78
LAKEMBA	2	9	19	131
LAKU	2	10	10	87
LARENAI	2	8	11	85
LAVORO	2	8	12	85
LOPERE	2	8	13	85
LORO	2	8	36	85
MABES	2	8	14	85
MAINOIATA	2	9	20	131
MAINOKI	3	15	17	78
MAISUA	2	10	11	87
MAMAGOTA	2	9	21	118
MANNAKE	2	9	43	131
MARIGA	2	8	15	85
MARILAU	3	13	19	90
MASIWAKORE	2	8	16	85
MASUNKE	2	8	17	82
MATERAS	2	10	12	87
MATONA	2	8	18	85
MATUKORI	2	9	22	131
MAWERE	2	8	19	85
MENDAI	2	8	20	85
MEWA	2	8	21	85
MEWARAKA	2	8	22	79
MIHERO	2	9	23	131
MINGETA	2	8	23	85
MOAINO	2	8	24	87
MOIBINEI	2	9	24	131
MOKOKOREU	2	7	22	85
MOKOLI NO.1	2	10	13	87
MOKOLI NO.2	2	10	14	87
MOMOGANARI	2	7	24	85
MORO	3	13	22	77
MOROKAIMORO	2	10	15	87
MORONEI	2	10	16	87
MOSIGETA	2	8	25	85
MOSINO	2	8	26	85
MUAU	3	13	23	94
MUMURAI	3	15	19	78
MUNU	2	10	17	131
MUSIMINOI	2	10	18	131
MUSINAU	3	15	20	145
MUWOKU	2	9	25	87
NAIRONA	2	8	27	85
NARINAI	2	7	25	85
NARONAI	2	10	19	87
NUKUI	2	8	28	85
NUKUI	2	9	26	131
OKARU	2	8	29	86
ONOVI	3	15	22	78
ORAMI	3	15	23	78
ORORO	2	8	30	85
OSIAGE	2	8	31	85
OSILADA	2	8	32	85
OSOKOLI	2	9	27	131
PANAKE	2	10	20	131
PANAM	2	7	26	86
PANKA	3	15	25	77
PERE	2	8	33	85
PIAWORA	3	15	26	78
PIKEI	2	8	34	85
PININAI	2	9	28	131
PISINAU	3	15	27	78
POLANAVIA	2	7	28	85
POMARATE	2	8	35	85
PURIKORI	2	9	29	131
RABAULU	2	9	30	131
RELA	2	7	29	78
ROKUSEI	2	10	21	131
ROMARI	2	8	37	85
ROTARE NO.1	2	8	38	85
ROTARE NO.2	2	8	39	86
RUPUMMO	2	9	44	131
RUSEI	2	10	22	131
RUUNAI	2	9	31	131
SIANEKI	2	7	30	85
SIKOREWA	2	7	31	78
SIKUMONE	2	10	23	87
SIKURAI	2	10	24	131
SININNAI	2	9	32	131
SINSIRUAI	2	8	40	85
SIPI	2	8	41	85
SIPURU	3	13	31	77
SIRARUHO	2	9	33	131
SIROI	2	9	34	131
SIROVAI	3	13	33	76
SIURUHINO	2	10	25	131
TAGURI	2	8	42	85
TAIDORIMA	2	8	43	85
TAKEMARI	2	8	44	85
TARAPA	2	11	34	131
TARUBA	2	7	32	85
TOHU	2	9	35	131
TOIRA	2	9	36	131
TOITOI	2	9	37	131
TOKUNUTU	2	9	38	131
TONNUI	2	9	39	131
TONU	2	9	40	131
TURUGUM	2	10	26	87
UNUNAI	2	9	41	131
USO	2	9	42	131

Village	Dist	Div	Unit	RMU
WAITAWUNA	2	8	45	85
WAKUPA	2	8	46	85
WARARIU	2	7	34	85
WARUWARU	2	7	35	85
WIWIARO	2	7	36	85
SYSTEM 2009				
AKU	2	11	1	131
BOGISAGO	2	12	1	87
BORUPI	2	11	2	87
BURUBURUNNO	2	11	3	87
IAMARU	2	12	3	131
IBIRO	2	11	4	131
IPILAI	2	12	4	131
IULA NO.1	2	12	5	87
IULA NO.2	2	12	6	131
IULA NO.3	2	12	7	131
KAITU	2	12	8	87
KAMOURO	2	12	9	131
KANNAURO	2	11	5	131
KIKIBATSIOGU	2	12	11	131
KIKIMOGU	2	11	6	131
KOGISAGANO	2	11	7	87
KOGU	2	12	12	131
KOGUIKIRU	2	12	13	87
KOKOPO	2	11	8	131
KOMAI	2	12	14	131
KONIGURU	2	11	9	87
KUGUGAI	2	11	10	131
KUGUIOGU	2	12	16	131
KUKUMAI	2	12	17	131
KUKUMARU	2	11	11	131
KUMIROGU	2	11	12	87
LAGUAI	2	11	13	131
LAITARO	2	12	18	131
LAKOVE	2	12	19	131
LAMUAI	2	12	20	109
LEROTU	2	11	14	131
LOBIGOU	2	11	15	87
LUAGUO	2	12	21	131
LUILAU	2	12	22	131
LUKARARO	2	11	16	87
LUKAUKO	2	12	23	87
MAIKA	2	12	24	131
MALABITA	2	12	25	109
MAMAROMINO NO.1	2	12	26	131
MAMAROMINO NO.2	2	12	27	131
MARAMUKU	2	11	17	131
MATSIOUGU	2	11	18	87
MITUAI	2	12	28	131
MOGOROI	2	12	29	87
MORIU	2	12	30	87
MOROU	2	11	19	131
MORULA	2	11	20	87
MOUAKEI	2	11	21	131
MUGUAI	2	12	31	131
MUISURU	2	12	32	109
NABAKU	2	11	22	131
NAKARO	2	11	23	131
NAKOREI	2	11	24	131
NKUMU	2	12	33	109
NUMAKEI	2	11	25	87
OKOIRAGU	2	12	34	131
OKOMO	2	11	26	87
OMITARO	2	11	27	87
ORAVA	2	12	35	104
OREMUTSI	2	11	28	87
ORUROI	2	12	38	87
ORUMOI	2	12	39	87
PARERO	2	12	41	87
PARERONO	2	11	29	87
PARIRO	2	12	42	87
PAULOUKU	2	12	43	87
PIARINO	2	11	30	131
PIRIRARO	2	12	44	87
PIRURUINO	2	11	31	87
SADI	2	12	45	104
SIALAU	2	11	32	87
SIUL	2	12	46	131
SIURU	2	11	33	87
TABAGO	2	12	49	131
TAGURUAI	2	12	50	131
TANTAREKI	2	12	51	131
TOGULEGU	2	11	35	87
TOKUAKA	2	11	36	111
TSIMBO	2	11	37	87
TUARAGAI	2	11	38	87
TUBARO	2	12	52	131
TUBARU	2	11	39	87
TUBOBISOU	2	11	40	87
TUGIOGU NO. 1 & 2	2	11	41	131
TUGIU	2	11	42	87
TURIGAU	2	11	43	87
TURUTAI	2	12	53	131
UBANMOIUTO	2	11	44	87
UGUPAKOGU	2	12	54	100

APPENDIX A.1

NATIONAL POPULATION CENSUS PROVINCIAL CODES

Province	Abbreviation	Code
Western	WES	01
Gulf	GUL	02
Central	CEN	03
National Capital District	NCD	04
Milne Bay	MBP	05
Oro (Northern)	ORO	06
Southern Highlands	SHP	07
Enga	ENG	08
Western Highlands	WHP	09
Simbu (Chimbu)	SIM	10
Eastern Highlands	EHP	11
Morobe	MOR	12
Madang	MAD	13
East Sepik	ESP	14
West Sepik (Sandaun)	WSP	15
Manus	MAN	16
New Ireland	NIP	17
East New Britain	ENB	18
West New Britain	WNB	19
Bougainville	NSP	20

AGRICULTURAL SYSTEMS OF PAPUA NEW GUINEA

Working Paper No. 20

BOUGAINVILLE PROVINCE

TEXT SUMMARIES, MAPS, CODE LISTS AND VILLAGE IDENTIFICATION

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Cover Photograph:
The late Gore Gabriel clearing undergrowth from a pandanus nut grove in the Sinasina area, Simbu Province (R.L. Hide).

PREFACE

Acknowledgements

The following organisations have contributed financial support to this project: The Research School of Pacific and Asian Studies, The Australian National University; The Australian Agency for International Development; the Papua New Guinea-Australia Colloquium through the International Development Program of Australian Universities and Colleges and the Papua New Guinea National Research Institute; the Papua New Guinea Department of Agriculture and Livestock; the University of Papua New Guinea; and the National Geographic Society, Washington DC.

Technical advice and encouragement have been provided throughout the project by John McAlpine, Gael Keig and Sue Cuddy, Australian Commonwealth Scientific and Industrial Research Organization.

Support and advice have been received from Geoff Humphreys and Harold Brookfield of the Land Management Project, and Gerard Ward (formerly Director), Research School of Pacific and Asian Studies, The Australian National University. Brookfield's (1971) study of Melanesian agricultural systems has been particularly influential.

The Papua New Guinea Agricultural Systems Project was developed from two previous studies. Michael Bourke began mapping Papua New Guinea agricultural systems in the 1970s while a Senior Horticulturalist with the PNG Department of Primary Industry (Bourke 1976). Robin Hide created an annotated bibliography of information on Papua New Guinea agricultural systems while working with the CSIRO PNGRIS group (Hide and Cuddy 1988).

Participants

The following persons participated in the production of this paper:

Papua New Guinea Department of Agriculture and Livestock: Moses Woruba, Bill Humphrey (field mapping)

Papua New Guinea National Research Institute: Tony Regan (information on Care Centres)

North Solomons Province Administration: John Siau (formerly Provincial Secretary)

Australian National University: Bryant Allen, Michael Bourke (conceptualisation, field mapping, data preparation, writing); Robin Grau (GIS management, ARC/INFO, map preparation); Matthew Allen, Patricia Hobsbawn (literature review); Janine Conway (research assistance).

Field survey and interviews

Only a small part of the information reported here was gathered during fieldwork. Because of the Bougainville crisis, it was not possible to conduct fieldwork in central and southern Bougainville and no fieldwork was done as part of the Mapping Agricultural Systems of Papua New Guinea project by the ANU team. Instead, 23 persons were interviewed.

Some preliminary mapping was done briefly in the Kieta, Wakunai, Togarau and Panguna areas in December 1980. In September 1992, Moses Woruba and Bill Humphrey of LAES Keravat spent three days surveying agriculture on Nissan and Pinipel Islands. Moses Woruba briefly visited the

Nuguria group of coral atolls at this time. He also conducted extensive interviews with islanders from all atoll groups when a group were at Keravat on a training course.

Information for Buka and Bougainville came mainly from interviews conducted with 23 persons between June and December 1996. The persons interviewed described agriculture in their home areas or places where they had worked. Several people provided information on more than one location. The interviews were conducted in the Kokopo, East New Britain area (13); Keravat, East New Britain, area (5); Port Moresby (3) and Canberra (2). Thirteen men and ten women were interviewed. Their most recent visit ranged from eight years to three weeks prior to the interview. Sixteen of the interviewees had either resided or had had extended visits to the province in the early-mid 1990s (1992-1996). The other seven had been home for only short term visits or had not lived in the province since 1988.

The occupations of the persons interviewed were agriculturalist (5), teacher (5), administration/clerical (4), villager (3), housewife (2), Aid Post Orderly (1), medical doctor (1), policeman (1) and post-graduate student (1).

Each interview took one to three hours. All were conducted separately, except for two persons from Siwai who were interviewed together and the three informants from the Kanua area. Thus the information presented here comes from separate interviews of two to four persons for each agricultural system, except for the Kanua area where all three informants were together. The quality of the information obtained was remarkably good, although not as useful as fieldwork. Information was surprisingly consistent for each location. Several aspects of the database are likely to be less reliable than if fieldwork has been conducted. These are:

1. System boundaries. The system boundaries tend to coincide with cultural or administrative ones. Fieldwork may have suggested different boundaries. For example, fieldwork may have indicated that locations on Bougainville above 300 m altitude should be classed as a single agricultural system with longer fallow periods, shorter cropping periods, taro an important crop and sweet potato not planted in mounds.
2. Fallow periods. These were determined from informants' descriptions of fallow vegetation as well as the stated periods, as the latter are often underestimated in reality in Papua New Guinea.
3. Cropping periods. Information from informants was reasonably consistent, but not as accurate as would have been gained from numerous garden visits.

Nine agricultural systems have been identified for the province. Agriculture on Nissan and Pinipel Islands (System 2001), the smaller atolls (System 2002) and the small islands off the west coast of Buka Island (2004) is quite distinctive for each system. However, the systems for Buka Island (System 2003), the Tinputz-Wakunai area (System 2005), northwest Bougainville (System 2006) and southwest Bougainville (System 2008) are very similar. Only minor differences in sub-dominant staples, the number of plantings before fallow and cash cropping separate these four systems. Given the source of information, the differences may not be real (except for cash cropping where information appears reliable and consistent). The system in southeast Bougainville (System 2007) and south Bougainville (Buin area, System 2009) are similar to each other, but differ from the other four systems on Buka-Bougainville in that only one planting is made before land is fallowed in southeast and south Bougainville.

The civil war (known as the Bougainville crisis in PNG) has caused considerable disruption to the villagers in parts of the province, especially in central, south and southwest Bougainville. In early 1997, PNG government sources indicate that some 45,000 people in Bougainville Province were

living in Care Centres. The largest concentration was in the Buin area where about 17,000 people were still in Care Centres.

During the worst years of the crisis, in the early-mid 1990s, the PNG government was providing rice to many villagers in Care Centres throughout the province. The supply of rice was reported to be irregular and people still depended on food gardens to a greater or lesser degree. Most people who were still in Care Centres were growing most of their own food in their own gardens. However, some people were still mainly dependent on rice supplied by the government in early 1997. These people were located mainly in the Buin area (about 13,000 people) and in the Arawa area (about 4000 people).

Much material relevant to agricultural development is summarised in the North Solomons Provincial Development Study, particularly Section A of Volume 2 (Economic Consultants 1982). While the information on cash supply is now dated, it still provides a useful overview for the province.

Persons interviewed

The following were interviewed at Kokopo, Keravat, Port Moresby and Canberra: Evelyn Boxall, Katherine Billy, Ben Hulo, Cyril Imako, Mary Jal, Lugakei Joe, Linda Kamang, Louise Kurika, Michael Lugabai, Eris Memora, Ambrose Mopei, Murray Nahiana, Rachael Rake, Sam Rangai, Salome Silovo, Jerry Sipana, Joyce Sipana, Ruth Spriggs, Samual Tapets, Heather Timate, Daniel Tokapip, Thomasina Umue and Moses Woruba. Their assistance is greatly appreciated.

Revised and reprinted version

The Mapping Agricultural Systems Project database was revised in late 1998 (see Introduction to Working Paper Number 1). This working paper was reprinted in 2002. Karen Lummis, Tess McCarthy, Natalie Stuckings, Laura Vallee, Amber Pares and Veerle Vlassak were responsible for the production of the revised paper.

CONTENTS

1. INTRODUCTION

The major purpose of the Papua New Guinea Agricultural Systems Project is to produce information on small holder (subsistence) agriculture at provincial and national levels. Information is collected by field observation, interviews with villagers and reference to published and unpublished documents. The information is entered into a computer database (dBase IV), from where it is transferred to a mapping program (ARC/INFO). Methods are described by Bourke et al. (1993). This paper contains a written summary of the information on the Agricultural Systems in this Province, maps of selected agricultural features, a complete listing of all information in the database in coded form, and lists of villages with National Population Census codes, indexed by Agricultural Systems. This information will eventually be available on disk as a map-linked database suitable for use on a personal computer.

Identification of agricultural systems and subsystems

An Agricultural System is identified when a set of similar agricultural crops and practices occur within a defined area. Six criteria are used to distinguish one system from another:

1. Fallow type (the vegetation which is cleared from a garden site before cultivation).

2. Fallow period (the length of time a garden site is left unused between cultivations).

3. Cultivation intensity (the number of consecutive crops planted before fallow).

4. The staple, or most important, crops.

5. Garden and crop segregation (the extent to which crops are planted in separate gardens; in separate areas within a garden; or are planted sequentially).

6. Soil fertility maintenance techniques (other than natural regrowth fallows).

Where one or more of these factors differs significantly and the differences can be mapped, then a separate system is distinguished.

Where variation occurs, but is not able to be mapped at 1:500 000 scale because the areas in which the variation occurs are too small or are widely dispersed within the larger system, a subsystem is identified. Subsystems within an Agricultural System are allocated a separate record in the database, identified by the Agricultural System number and a subsystem number.

Sago is a widespread staple food in lowland Papua New Guinea. Sago is produced from palms which are not grown in gardens. Most of the criteria above cannot be applied. In this case, systems are differentiated on the basis of the staple crops only.

Relationship to PNGRIS

The Papua New Guinea Resource Information System (PNGRIS) contains information on the natural resources of PNG (Bellamy 1986). However PNGRIS contains no information on agricultural practices, other than an assessment of land use intensity based on air photograph interpretation by Saunders (1993), and ECOPHYS which is concerned with predicted crop performance in a specific environment (Hackett 1988). The Agricultural Systems Project is designed to provide detailed information on agricultural practices and cropping patterns as part of an upgraded PNGRIS geographical information system. For this reason the Agricultural Systems database contains almost no information on the environmental settings of the systems, except for altitude and slope. The layout of the text descriptions, the database code files and the village lists are modelled on PNGRIS formats (Cuddy 1987).

The mapping of Agricultural Systems has been carried out on the same map base and scale as PNGRIS (Tactical Pilotage Charts, 1:500 000). It is also done within the areas of agricultural land use established by Saunders (1993) from aerial photography. Except where specifically noted, Agricultural Systems boundaries have been mapped without reference to PNGRIS Resource Mapping Unit (RMU) boundaries. Agricultural Systems are defined at the level of the Province (following PNGRIS) but their wider distribution is recognised in the database by cross-referencing systems which cross provincial borders.

A preliminary view of the relationships between RMUs and the Agricultural Systems in this Province can be obtained from the listing of villages by Agricultural System, where RMU numbers are appended (Section 6.3).

Note for reprinted edition

Most of the fieldwork for this project was conducted over a six year period (late 1990 to late 1996). Over this period, a number of minor inconsistencies arose in data classification and presentation. As well, some changes occurred in conventions for the text fields and in the definitions of data fields, for example, for seasonality, fencing and burning. These changes were noted in the Preface of the Provincial Working Papers (first editions) as they occurred. One of the more important changes was that the cutoff points for the classification of cash earning activities were applied more consistently. Because of these inconsistencies and changes in definitions, it was necessary to revise the database so that it was consistent for all 19 provinces and to incorporate changes in agriculture systems since the original papers were produced.

Most changes, as distinct from definitional changes, relate to cash income. The revisions were done in late 1998. The largest number of changes occurred in the first four provincial working papers: East Sepik, West Sepik, Western and Gulf Provinces. Papers for the five Island Region provinces required the least number of changes. Agricultural systems that cross provincial boundaries have been adjusted so that the information is identical on both sides of the boundary, apart from some minor differences in some of the text fields. However the notes have not been updated to incorporate new publications since the Working Papers were completed.

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Smith, T., G. Keig, J. Marks and R. Grau 1992 Summary Results by Environmental Zone from the 1982-3 National Nutrition Survey of Papua New Guinea: Implications for Future Survey Design. Papua New Guinea Institute of Medical Research, Goroka.

2. DATABASE STRUCTURE, DEFINITIONS AND CODES

Information on agricultural systems is stored in a database, one record per agricultural system (or subsystem where identified) and 108 fields per record. This section lists the field ***names*** and their database abbreviations **[NAMES]**. Summary descriptions, explanatory notes and variable codes are given for each field.

LOCATION AND IDENTIFICATION

1. Provincial Identification **[PROVINCE]:** A two digit National Population Census code. Eg. code 14 = East Sepik Province. Provincial codes are listed in Appendix A.1.

2. System Identification **[SYSTIDNO]:** A two digit number identifying the agricultural system within this province. Eg. code 01 = System 01. Numbers are not assigned to systems within a province in any particular order.

3. Agricultural System **[AGSYST]:** Systems are also identified by a unique Papua New Guinea-wide four digit number. The first two digits are the National Population Census provincial code and the second two digits are the system identification number. Eg. 1401 = System 01 in the East Sepik Province.

4. Agricultural Subsystem **[SUBSYSIDNO]:** Subsystems are identified by a single digit. When referred to in the text they are preceded by the agricultural system number and a hyphen. Eg. 1418-1 is Subsystem 1 of System 1418.

5. Number of Subsystems **[NUMSUBSYS]:** A single digit specifying the number of subsystems that occur within this System.

6. District **[DISTRICT]:** The 1990 National Population Census code for the District within which the System is located. More than one District may be listed. District codes are listed in Appendix A.2.

7. Census Divisions **[CENSUSDIV]:** The 1980 National Population Census code for the Census Divisions that occur within the System. Census Division codes for this Province are listed in Appendix A.2.

ENVIRONMENTAL

8. Lowest Altitude **[ALTLOW]:** The lowest altitude, in metres (rounded), to which the System extends.

9. Highest Altitude **[ALTHIGH]:** The highest altitude, in metres (rounded), to which the System extends.

10. Garden Slope **[SLOPE]:** The average slope of gardens in the System.

1	Flat	(<2^{o})
2	Gentle	(2-10^{o})
3	Steep	(10-25^{o})
4	Very steep	(>25^{o})
5	Multiple classes	

***11. Survey Description* [SURVDESC]:** A text description of the areas visited or not visited within the system, the length of time spent in different areas, traverses undertaken, the mode of transport used, the month and year of the survey, and the sources of any documentary information used.

***12. Summary Description* [SYSSUMM]:** A concise text description of the agricultural system, and subsystems (if any), focussed on the occurrence of the major distinguishing criteria.

***13. System Boundary Definitions* [BOUNDDEF]:** A brief description of how the boundaries between systems were identified and mapped. The boundaries between agricultural and non-agricultural land use were taken from Saunders (1993).

***14. Systems Crossing Provincial Borders* [OTHPROV]:** A logical field (yes/no) which indicates whether the System crosses a provincial border.

***15. Same System in Adjacent Province* [PROVSYS]:** A listing of AGSYST numbers (see Field 3 above) of up to two systems in adjacent provinces which are identical to this system, for systems which cross provincial borders.

***16. Subsystem Extent* [SUBSYSEXT]:** An estimate of the proportion of the area of the total system occupied by a subsystem. In the case of there being no subsystems this field is listed as 100 per cent.

1	25 per cent
2	50 per cent
3	75 per cent
4	100 per cent

***17. Type of Fallow Vegetation Cleared* [FALLTYPE]:** The predominant type of vegetation cleared from garden sites at the beginning of a new period of cultivation. Where short fallows are used (see Field 18 below), fallow type refers to the vegetation cleared after a long fallow.

1	Short grass (*eg. kunai < 1.5 m tall*)
2	Tall grass (*eg. Miscanthus or Saccharum > 1.5 m tall*)
3	Grass and woody regrowth *(dense short or tall grass and short woody regrowth*)
4	Short woody regrowth (*shrubs/trees < 10 m tall*)
5	Tall woody regrowth (*trees > 10 m tall*)
6	Forest (*no indication of previous use*)
7	No long fallow
8	Savanna *(Scattered woody growth with grass ground cover)*

***18. Use of Short Fallows* [SHORTFALL]:** A presence and significance measure which indicates whether short fallows are used. Short fallows are brief periods of less than 12 months between plantings during which land is left fallow.

***19. The Long Fallow Period* [FALLPER]:** An estimate of the length of time (greater than 12 months) land is left to revert to regrowth, before it is cultivated again. Class 0 refers to situations where very long cropping intervals (40 plantings or more) make long fallows not significant.

0	Not significant
1	1 to 4 years
2	5 to 15 years
3	Greater than 15 years

20. Cropping Intensity **[**CROPINT**]:** The number of times staple crops are planted in the main gardens before those gardens are returned to a long fallow. Short fallows of less than 12 months (see Field 18 above) are excluded for this purpose: they may occur between plantings without affecting the classification. The class 'More than 40 plantings', refers to situations where land has been planted continuously without a long fallow since the Pacific War (1942-45) or longer. In such cases Field 19, Long Fallow Period, is classed as 'Long fallow period not significant'.

1	1 planting only
2	2 plantings
3	3 to 5 plantings
4	6 to 14 plantings
5	15 to 40 plantings
6	More than 40 plantings

CROP COMPONENTS

21. The Dominant Staple Crops **[DOMSTAP]:** The most important staple food crops grown in the subsystem. A major staple is defined as a crop estimated to cover more than one-third of staple garden area, and therefore no more than 3 dominant staples may be identified for a system. An important exception occurs when sago is the staple. Sago is extracted from palms which are not cultivated in gardens. In the text accounts (System Summaries and Notes), dominant staples are described as the '*most important crops*'.

22. The Subdominant Staple Crops **[SUBSTAP]:** Staple food crops of lesser importance grown in the subsystem. A subdominant staple is defined as a crop estimated to cover more than 10 per cent of a staple garden area; up to six crops may be listed. An important exception occurs when sago is the staple. Sago is extracted from palms which are not cultivated in gardens. In the text accounts (System Summaries and Notes), subdominant staples are described as '*important crops*'.

23. All Staple Crops **[ALLSTAP]:** A list of up to 10 staple crops including crops classed as dominant and subdominant, as well as other staple crops which occur commonly. In the text accounts (System Summaries and Notes), staple crops which are classified as neither dominant nor subdominant are described as '*other crops*'.

01	Mixed staple (no dominant staple: a mix of some or all of: banana, taro, sweet potato Chinese taro, yam, cassava and corn)		
02	Banana *(Musa* cvs*)*	13	Taro *(Colocasia esculenta*)
03	Breadfruit *(Artocarpus altilis)*	14	Yam *(Dioscorea alata*)
04	Cassava *(Manihot esculenta)*	15	Yam *(Dioscorea esculenta*)
05	Chinese taro *(Xanthosoma sagittifolium)*	16	Yam *(Dioscorea pentaphylla*)
06	Coconut *(Cocos nucifera)*	17	Other
07	Corn *(Zea mays)*	18	Queensland arrowroot (*Canna edulis)*
08	Potato *(Solanum tuberosum)*		
09	Sago *(Metroxylon sagu)*	19	Taro (Amorphophallus) *(Amorphophallus paeoniifolius)*
10	Swamp taro *(Cyrtosperma chamissonis)*	20	Yam *(Dioscorea bulbifera)*
11	Sweet potato *(Ipomoea batatas)*	21	Yam *(Dioscorea nummularia)*
12	Taro *(Alocasia macrorrhiza*)		

***24. Other Vegetable Crops* [VEG]:** A list of up to 10 important vegetable crops:

01 Aibika *(Abelmoschus manihot)*
02 Amaranthus *(Amaranthus* spp.*)*
03 Bean, common *(Phaseolus vulgaris)*
04 Bean, lablab *(Lablab purpureus)*
05 Bean, winged *(Psophocarpus tetragonolobus)*
06 Cabbage *(Brassica oleracea var. capitata)*
07 Chinese cabbage *(Brassica chinensis)*
08 Choko tips *(Sechium edule)*
09 Corn *(Zea mays)*
10 Cucumber *(Cucumis sativus)*
11 Ferns
12 Ginger *(Zingiber officinale)*
13 Highland pitpit *(Setaria palmifolia)*
14 Kangkong *(Ipomoea aquatica)*
15 Kumu musong *(Ficus copiosa)*
16 Lowland pitpit *(Saccharum edule)*
17 Nasturtium *(Nasturtium* spp.*)*
18 Oenanthe *(Oenanthe javanica)*
19 Peanuts *(Arachis hypogaea)*
20 Pumpkin fruit *(Cucurbita moschata)*
21 Pumpkin tips *(Cucurbita moschata)*
22 Rungia *(Rungia klossii)*
23 Tulip *(Gnetum gnemon)*
24 Valangur *(Polyscias* spp.*)*
25 Balbal *(Erythrina variegata)*
26 Bamboo shoots
27 Bean, snake *(Vigna unguiculata)*
28 Spring onion *(Allium cepa var. cepa)*
29 Sweet potato leaves *(Ipomoea batatas)*
30 Taro leaves *(Colocasia esculenta)*
31 Watercress *(Nasturtium officinale)*
32 Other
33 Bean, lima *(Phaseolus lunatus)*
34 Bottle gourd *(Lagenaria siceraria)*
35 Dicliptera *(Dicliptera papuana)*
36 Kalava *(Ormocarpum orientale)*
37 Karakap *(Solanum nodiflorum)*
38 Basil *(Ocimum basilicum)*
39 Bean leaves *(Phaseolus* spp.)
40 Cassava leaves *(Manihot esculenta)*
41 Chilli leaves *(Capsicum frutescens)*
42 Eggplant *(Solanum melongena)*
43 Pigeon pea *(Cajanus cajan)*
44 Tomato *(Lycopersicon esculentum)*

***25. Fruit Crops* [FRUIT]:** A list of up to 8 important fruits grown:

01 Avocado (*Persea americana)*
02 Banana *(Musa* cvs*)*
03 Bukabuk (*Burckella obovata)*
04 Coastal pandanus *(Pandanus tectorius)*
05 Malay apple *(Syzygium malaccense)*
06 Mandarin *(Citrus reticulata)*
07 Mango *(Mangifera indica)*
08 Marita pandanus *(Pandanus conoideus)*
09 Orange (*Citrus sinensis)*
10 Passionfruit, banana *(Passiflora mollissima)*
11 Passionfruit, other *(Passiflora* spp.*)*
12 Pawpaw *(Carica papaya)*
13 Pineapple *(Ananas comosus)*
14 Rambutan *(Nephelium lappaceum)*
15 Sugar *(Saccharum officinarum)*
16 Ton *(Pometia pinnata)*
17 Watermelon *(Citrullus lanatus)*
18 Other
19 Custard apple *(Annona squamosa)*
20 Golden apple *(Spondias cytherea)*
21 Granadilla (*Passiflora quadrangularis)*
22 Grapefruit (*Citrus paradisi)*
23 Guava (*Psidium guajava)*
24 Lemon (*Citrus limon)*
25 Lime *(Citrus aurantifolia)*
26 Parartocarpus *(Parartocarpus venenosa)*
27 Pomelo *(Citrus maxima)*
28 Pouteria *(Pouteria maclayana)*
29 Raspberry *(Rubus* spp.)
30 Soursop *(Annona muricata)*
31 Tree tomato *(Cyphomandra betacea)*
32 Watery rose apple *(Syzygium aqueum)*
33 Governor's plum *(Flacourtia indica)*
34 Lovi-lovi *(Flacourtia inermis)*
35 Mon *(Dracontomelon dao)*
36 Rukam *(Flacourtia rukam)*
37 Ficus *(Ficus* spp.)

***26. Nut Crops* [NUT]:** A list of up to 5 important nuts grown or collected:

01	Breadfruit *(Artocarpus altilis)*	09	Karuka, wild *(Pandanus brosimos)*
02	Candle nut *(Aleurites moluccana)*	10	Okari *(T. kaernbachii/ T. impediens*)
03	Castanopsis *(Castanopsis acuminatissima)*	11	Sis *(Pangium edule)*
		12	Pao *(Barringtonia* spp.)
04	Coconut *(Cocos nucifera)*	13	Tulip *(Gnetum gnemon)*
05	Finschia *(Finschia chloroxantha)*	14	Other
06	Galip *(Canarium indicum*)	15	Polynesian chestnut *(Inocarpus fagifer)*
07	Java almond *(Terminalia catappa*)		
08	Karuka, planted *(Pandanus julianettii)*	16	Cycad *(Cycas* spp.)
		17	Entada *(Entada scandens)*
		18	Dausia *(Terminalia megalocarpa)*

***27. Narcotic Crops* [NARC]:** A list of up to 5 important narcotics grown:

1	Betel nut, highland *(Areca macrocalyx)*
2	Betel nut, lowland *(Areca catechu)*
3	Betel pepper, highland (*Piper gibbilimbum*)
4	Betel pepper, lowland *(Piper betle)*
5	Tobacco *(Nicotiana tabacum)*
6	Kava *(Piper methysticum)*

FORMS OF GARDEN AND CROP SEGREGATION

***28. Garden Segregation* [GARDSEG]:** A presence and significance measure of whether individual staple food crops are planted in different gardens. A garden is a contiguous area of land planted with crops under the management of a social unit such as a family or a household. If some gardens are sited in different vegetation zones, and have different fallow periods, cultivation periods or other agronomic characteristics, then they are assigned to a separate subsystem.

All presence and significance measures are coded as follows:

0	None
1	Minor or insignificant
2	Significant
3	Very significant

***29. Crop Segregation* [CROPSEG]:** A presence and significance measure of whether individual staple food crops are planted separately in different parts of the same garden.

***30. Crop Sequences* [CROPSEQU]**: A presence and significance measure of whether the harvesting of one crop species is usually followed by the planting of another, eg. yams followed by sweet potato, or sweet potato followed by peanuts followed by sweet potato (see also Field 33 below).

***31. Mixed Vegetable Gardens* [MIXGARD]:** A presence and significance measure of whether mixed gardens are used. A mixed garden is typically a garden which is subsidiary to that containing the main staple(s). It is planted with a wide range of either subdominant staples and/or other vegetables. It may or may not be distinguished from the main garden types by different fallow and agronomic techniques.

***32. Household Gardens* [HOUSGARD]:** A presence and significance measure of whether house gardens are used. A house garden is typically a garden that is small relative to the main gardens, is located near houses, and which contains a variety of crops. Also known as door yard or kitchen gardens.

SOIL FERTILITY MAINTENANCE TECHNIQUES

33. Legume Rotation **[LEGUMROT]:** A presence and significance measure of whether a leguminous crop (eg. peanuts or winged bean) is grown between plantings of main food crops.

34. Planted Tree Fallow **[TREEFALL]:** A presence and significance measure of whether tree species (eg. *Casuarina oligodon* or *Parasponia* spp.) are planted into gardens or fallows for the stated purpose of improving soil quality during subsequent cultivations. This measure excludes the practice of planting fruit tree species into gardens and fallows, but does not exclude the planted trees being used for timber or firewood.

35. The Use of Compost **[COMPOST]:** A presence and significance measure of whether organic matter is placed beneath the surface of the soil.

36. The Use of Animal Manure **[MANURE]:** A presence and significance measure of whether animal manure is placed on or in the soil. The measure does not include the deposition of manure by the animals themselves, eg. pigs tethered in gardens.

37. The Use of Island Beds: **[ISLBED]:** A presence and significance measure of whether island beds are used. Island beds are beds of soil on which crops are planted and which are raised above the level of a surrounding area of standing or slowly moving water.

38. The Contribution of Silt from Flooding **[SILT]:** A presence and significance measure of whether silt from floods is deposited either regularly or sporadically on the soil surface in gardens. It is assumed the flooding is of natural causes, but the measure does not exclude deliberate manipulation of stream channels in order to enhance the delivery of silt or for the partial control of flood waters.

39. The Use of Inorganic Fertiliser **[FERT]:** A presence and significance measure of whether inorganic fertiliser is applied to gardens. This measure excludes the use of inorganic fertiliser on cash crops, such as coffee or vegetables.

OTHER AGRICULTURAL PRACTICES

40. The Placing of Pigs in Gardens **[PIGSIN]:** A presence and significance measure of whether pigs are placed in gardens between plantings. Pigs may be placed in gardens between plantings for a number of stated reasons, eg. to eat earthworms, to eat unharvested crops, or to till the soil. This measure excludes the deliberate breaking of fences to allow pigs to forage after the cropping phase.

41. Burning **[BURN]:** A presence and significance measure of whether fallow vegetation cleared and cut in a new garden site is burnt before the planting of the staple crops. The measure includes the burning of material which has been heaped. Significance takes into account the frequency of burning relative to the cropping intensity. So, for example, if the majority of the fallow material cleared from the site is burnt at the initial clearing of a garden, and only one or two plantings are made before fallowing, burning is Very Significant. If the same thing occurs at clearing, but a large number of plantings are made before the next long fallow, with little or no burning between plantings, burning is Minor.

***42. Soil Tillage* [TILL]:** A presence and significance measure of whether soil in the staple food gardens is tilled before planting. Tillage includes the breaking up, or turning over, of the whole or the major part of the soil on the garden surface. The measure includes tillage in either the first planting and/or subsequent plantings. The formation of soil mounds and beds (see Fields 53-58 below) involves working the soil into a tilth, but in order to distinguish clearly between these processes, mounds and beds are not automatically classified as soil tillage.

***43. The Use of Deep Holing* [HOLE]:** A presence and significance measure of whether deep holing is used. Deep holing is sometimes used in yam cultivation in order to influence the dimensions and shape of the tubers. Deep (> 50 cm) holes are dug, the soil is broken into a fine tilth and the hole re-filled before planting. The use of this technique is usually restricted to the cultivation of *Dioscorea alata.*

***44. Cutting Fallow Vegetation Onto the Crops* [FALLCUT]:** A presence and significance measure of whether crops are planted beneath standing fallow vegetation, and the vegetation is later cut down onto the growing crops.

***45. The Use of Fences* [FENCE]:** A presence and significance measure of whether gardens are fenced. Fences are linear barriers made of wood, bamboo, cane grass or stones, and may incorporate a ditch or a bank. The measure excludes low ridges which form between fields when stones are thrown to the perimeter during cultivation. In the assessment of the significance of fences, the occurrence of fences around every individual garden is given greater significance than one fence around a large number of gardens.

***46. The Use of Irrigation* [IRRIG]:** A presence and significance measure of whether water is applied to crops by the use of channels or aqueducts.

***47. The Use of Mulch* [MULCH]:** A presence and significance measure of whether a mulch is used to cultivate the staple crops. A mulch is organic material which is applied to the soil surface. If the material is placed beneath the soil surface it is defined as a compost (see Field 35 above).

***48. The Seasonality of Main Crops* [SEASMAJ]:** A presence and significance measure of whether the dominant staples (most important food crops) and the subdominant staples (important food crops) are planted at about the same time each year.

***49. The Seasonality of Other Crops* [SEASMIN]:** A presence and significance measure of whether other staple crops and vegetable crops are planted at about the same time each year.

***50. The Use of Drains* [DRAIN]:** A presence and significance measure of whether ditches are used in and around gardens to remove surface water or to lower the groundwater table.

***51. The Use of Soil Retention Barriers* [SOILRET]:** A presence and significance measure of whether structures (pegged logs, fences or hurdles, stone walls) are constructed along the contour or below individual plants, in order to prevent or reduce the down slope movement of soil.

***52. The Use of Staking* [STAKE]:** A presence and significance measure of whether crops are trained or tied up stakes, trellises or standing dead trees to lift them off the soil surface. The practice is usually applied to yams (*Dioscorea* spp.), beans, sugarcane, and sometimes gourds, cucumber and choko.

MOUNDING TECHNIQUES

In many parts of Papua New Guinea the soil is formed into circular mounds of varying dimensions and crops are planted on them. Mounding should not be confused with composting (see Field 35 above). Mounds may or may not contain compost and composting may take place in the absence of mounds. Mounds are usually re-formed at each new planting. Mound formation usually involves extensive soil disturbance. The effect can be similar to complete soil tillage (see Field 42 above).

The following fields contain presence and significance measures of whether mounds of the specified dimensions are used in the system.

53. Very Small Mounds **[VSMMOUND]:** Mounds up to 10 cm high.

54. Small Mounds **[SMMOUND]:** Mounds 10 to 40 cm high.

55. Medium Sized Mounds **[MOUND]:** Mounds 40-70 cm high and between 1 m and 2.5 m in diameter.

56. Large Mounds **[LRGEMOUND]:** Mounds > 70 cm high and > 2.5 m in diameter.

GARDEN BED TECHNIQUES

In some locations the soil is also raised into beds and crops planted on them. Bed formation usually involves extensive soil disturbance. The effect can be similar to complete soil tillage (see Field 42 above). Two shapes of beds are distinguishable:

57. Square Beds **[BEDSQ]:** Square beds are constructed by digging shallow ditches typically 2 to 4 metres apart on a grid layout, and throwing the soil removed onto the surface to form a bed. The outcome is a characteristic chequerboard or gridiron pattern in gardens.

58. Long Beds **[BEDLONG]:** Long beds are constructed by digging shallow ditches down slope typically 2 to 4 metres apart and over 10 metres in length, and throwing the soil removed to the centre to form a bed.

59. Mechanical Soil Tillage **[MECHAN]:** The use of tractors or hand-held cultivators in the preparation of a garden site for food crops. The measure includes the use of machinery in the cultivation of crops for sale.

CASH EARNING ACTIVITIES

A presence and significance measure of the importance of the following common rural cash income sources. The list includes sources related to agricultural or land based production from the farmers' own resources.

60. Animal Products **[ANSKIN]:** The sale of animal skins, furs and bird plumes, but not fresh meat.

61. Betel Nut **[BETEL]:** The sale of betel nuts (*Areca catechu* or *A. macrocalyx)* and associated items like pepper and lime.

62. Cardamom **[CARDAM]:** The sale of cardamom (*Elettaria cardamomum).*

63. Cattle **[CATTLE]:** The sale of cattle as live beasts or as fresh meat.

***64. Chillies* [CHILLIE]:** The sale of dried chillies (*Capsicum frutescens).*

***65. Cocoa* [COCOA]:** The sale of cocoa (*Theobroma cacao)* beans.

***66. Copra* [CNUT]:** The sale of copra and nuts from coconut palms (*Cocos nucifera).*

***67. Arabica Coffee* [COFFARAB]:** The sale of Arabica coffee (*Coffea arabica*).

***68. Robusta Coffee* [COFFROB]:** The sale of Robusta coffee (*Coffea canephora*).

***69. Crocodile Products* [CROC]:** The sale of freshwater and saltwater crocodile (*Crocodylus* spp.) skins or meat, from managed and wild animals.

***70. Firewood* [FIREWOOD]:** The sale of firewood.

***71. Fish* [FISH]:** The sale of fresh or smoked freshwater or saltwater fish, shellfish or crustacea.

***72. Fresh Food:* [FOOD]:** The sale of fresh vegetables, fruits, nuts and fresh or smoked meat from domesticated or wild animals.

***73. Oil Palm* [OILPALM]:** The sale of palm oil fruit (*Elaeis guineensis).*

***74. Potato* [POTATO]:** The sale of Irish potatoes (*Solanum tuberosum).*

***75. Pyrethrum* [PYRETH]:** The sale of dried pyrethrum flowers (*Chrysanthemum cinerariaefolium).*

***76. Rice* [RICE]:** The sale of rice (*Oryza sativa).*

***77. Rubber* [RUBB]**: The sale of latex from rubber trees (*Hevea brasiliensis).*

***78. Sheep and Wool* [SHEEP]:** The sale of sheep as live animals, or meat and the sale of wool.

***79. Tea* [TEA]:** The sale of unprocessed tea (*Camellia sinensis).*

***80. Tobacco* [TOBACCO]:** The sale of the dried tobacco leaf (*Nicotiana tabacum).*

***81-82. Other* [OTHER1] [OTHER2]:** Other unlisted sources of cash include the sale of copal gum (*Agathis* sp.), massoi bark (*Massoia aromatica*), tigasso oil (*Campnosperma* sp.), salt extracted from plants or natural springs and deposits, mineral oil, bêche-de-mer, insects and butterflies, live birds, marsupials, pigs and horses, house building materials including thatching and sheets of woven cane, canoe hulls, clothing, weapons, string bags, carvings and artefacts. This category excludes other sources of cash income such as wages and salaries, logging or mining royalties, gold mining, banditry, gambling and remittances. These are mentioned in Notes (Field 83) if they are important.

***83. Further Notes* [NOTES]:** Additional notes on particularly outstanding features of the system and further information drawn from published and unpublished documents.

SURVEY DETAILS

Fields ***84-101*** contain details of dates when observations were made of the system for the purposes of this project and the names of the persons who made the observations. Up to three survey visits can be accommodated. The field names are:

Month of a short visit [**SVDATMON**]: Eg. 01 = January.
Year of a short visit [**SVDATYR**]: Eg. 1992.
Period of a longer term study [**SVPERYRA**]: Eg. 1971-72.
Person making the visit [**SURVNAME**]: Initials of person(s). Full names are given in a Key on the relevant page in Section 5.

The type of survey [**SURVTYPE**]

1	Very brief visit to one place (less than an hour), or interviews
2	Short visit to a few places (less than 1 day)
3	Visits to several places (1 to 3 days)
4	Multiple visits to many places (4 to 15 days)
5	Multiple visits to many locations over several years (more than 15 days)

102. Information From the National Nutrition Survey 1982-83 **[NNS]:** The National Nutrition Survey 1982/83, selected families in villages across most of the country from a sampling frame based on environments drawn from PNGRIS classifications. Amongst other questions, people were asked what foods they had eaten during the previous day (NNS 1982/3). For systems in which more than 10 families were interviewed, responses for particular foods are presented as percentages of the total number of families interviewed. Results are presented only for staple foods, fresh fish and purchased rice. The entry includes the number of families and number of villages surveyed, and the month and year of survey.

This information is more than 10 years old and is independent of the information collected by the Agricultural Systems Project. It should be used carefully (Smith et al. 1992). In some Systems the sample size is small and villages sampled may be restricted to one part of the System. It is possible that Chinese taro (*Xanthosoma sagittifolium*) has been included in the general term 'taro', increasing the importance of taro (*Colocasia esculenta*) and decreasing the importance of Chinese taro. Where diets change seasonally, the results may also be unrepresentative.

103. Main References **[REF]:** References to published and unpublished documents that contain substantial information on agriculture in the System.

104. Other References **[REF2]:** References to published and unpublished documents that contain additional information directly relevant to the Agricultural System.

105. The Area of the System **[AREA]**: The area, in square kilometres, occupied by the System. The figure is calculated by the mapping program ARC/INFO.

106. Total Resident Population 1980 **[TOTPOP]:** The total population resident within the area covered by the System at the time of the 1980 National Population Census. The 1990 National Population Census figures are not used because of questions over their reliability, but the 1990 National Population Census maps are used to locate most Census Units.

***107. The Number of People Living Outside the System* [ABSPOPPER]:** An estimate of the proportion of the population absent from villages in the system in 1978-79, expressed as a percentage of the total population. The figure is the difference between the 'total' population and the 'resident' population listed in the 1978-79 Provincial Data System (PDS) Rural Community Register for the Province. The 'total' population is the total number of persons listed in the Village Book and the 'resident' population the number living in the village, or who have been absent for less than 6 months at the time of the census. In some cases 'total' and 'resident' populations in the PDS are the same.

***108. The Population Density* [POPDEN]:** The number of persons per square kilometre in 1980, calculated by dividing Field 106 (total population) by Field 105 (area). There are two situations where adjusted figures are given (indicated by "*"). In some systems sago is the staple food and there is little or no agriculture or subsistence is based completely on non-agricultural activities (eg. fishing or trading) and no agricultural land use can be identified. For these systems the area has been adjusted to include a 5 kilometre buffer strip around the system boundary, or centred on settlements where no land use is identified. The 5 kilometre buffer zone is assumed to be the area of non-agricultural land, usually forest, in which wild plants and animals are exploited. In the latter case, settlements are identified with point symbols. The second kind of adjustment occurs where the populations of two adjoining systems, both of which use both systems, are unequally distributed in the two system areas due to the locations of the census units. In such cases, adjusted population density figures are shown (for example, Milne Bay Province Systems 0501 and 0502), with explanations in Notes (Field 83).

***109. The Intensity of Land Use* [RVALUE]:** The R value (Ruthenberg 1980, 15) is an estimate of the intensity of land use, derived from the ratio of the Cropping Period in years to the length of the cultivation cycle in years. Cropping Period is estimated from the number of plantings of the staple crops before a long fallow (see Field 20 above). The cultivation cycle is the sum of the Cropping Period and the Long Fallow Period (see Field 19 above). The R value is thus:

$$\frac{\text{Cropping Period} \times 100}{\text{Cropping Period} + \text{Long Fallow Period}}$$

Because in this survey both the cropping period and the long fallow period are described as classes, conversion of the class ranges to single year values is necessary in order to calculate R values. The following conversions are used for most crops:

Cropping period	Years	Long fallow period	Years
1 planting only	1	Not used	0
2 plantings	2	1-4 years	3
3-5 plantings	4	5-15 years	10
6-14 plantings	10	>15 years	20
>14 plantings	20		

Triploid banana or Chinese taro may produce for several years from a single planting. In systems in which these crops are dominant staples or subdominant staples with significant land use, the cropping period is adjusted upwards. The adjustment is based on estimates of how long these crops produce from a single planting before a long fallow. Where there is evidence of a cropping period without a long fallow of longer than 20 years, the cropping period is adjusted upwards, to a maximum of 50 years.

3. AGRICULTURAL SYSTEMS: TEXT SUMMARIES

Text summaries take two forms: those for the first or only subsystem in an Agricultural System, and those for subsequent subsystems.

1. The headers on text summaries for the first or only subsystem in an Agricultural System are as follows:

PROVINCE 15 West Sepik	**AGRICULTURAL SYSTEM No**. 1	**Subsystem No** 1 **of** 1
Districts 4 Telefomin	**Subsystem Extent** 100%	**Area (sq km)** 1259
Population 8,530	**Population Density** 7 **persons/sq km**	**Population absent** 7%

This header contains information in the top right hand corner on the number of subsystems descriptions which follow.

This header also contains information for the *whole* Agricultural System on Districts, area, population, population density and absenteeism.

2. Headers on text summaries of subsequent subsystems are as follows:

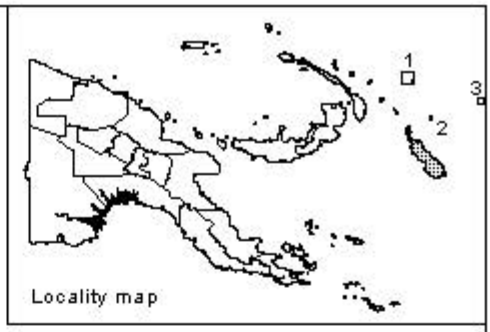
PROVINCE 15 West Sepik	**AGRICULTURAL SYSTEM No**. 3	**Subsystem No** 2 **of** 2
Districts 4 Telefomin	**Subsystem Extent** 25 %	

They contain information on Districts and subsystem extent only.

Headers on second and subsequent pages of summaries are as follows:

PROVINCE 15 West Sepik	**AGRICULTURAL SYSTEM No**. 1	**Subsystem No** 1 **of** 1

BOUGAINVILLE PROVINCE
Agricultural systems

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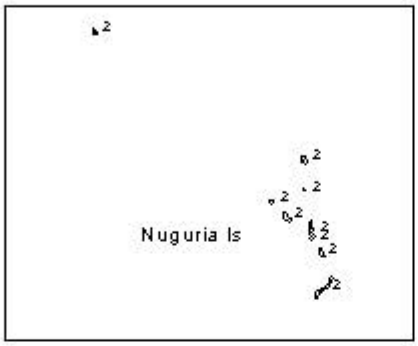

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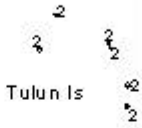

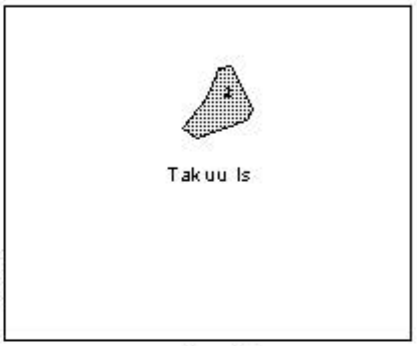

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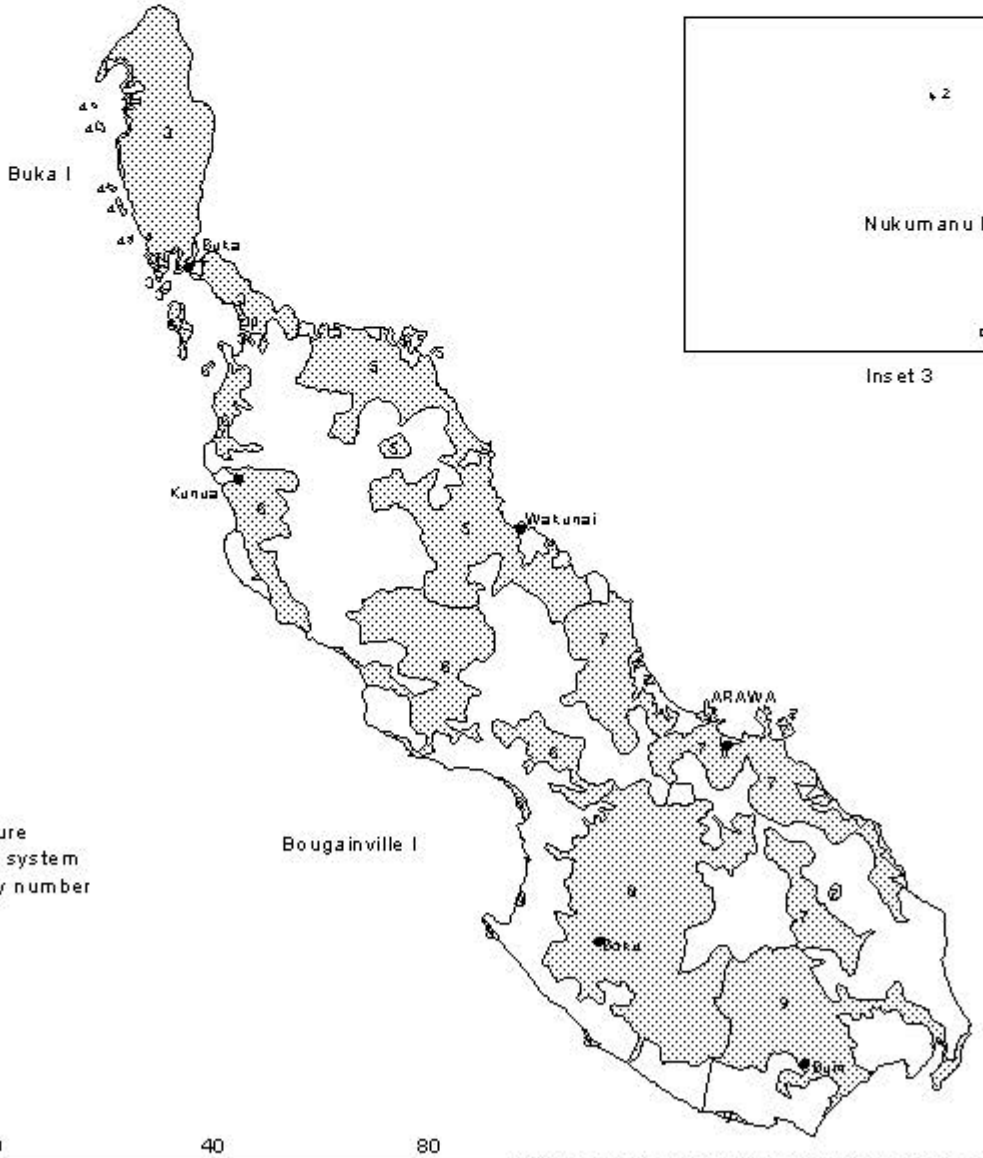

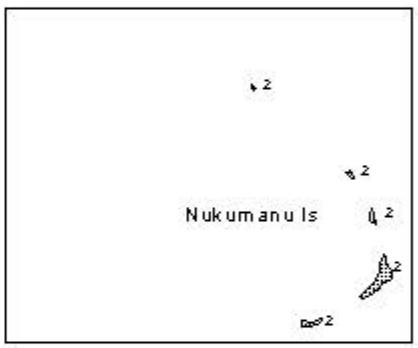

Inset 3

No agriculture
Agricultural system identified by number

40 0 40 80
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 1	**Subsystem No.** 1 **of** 1
Districts 1 Buka	**Subsystem Extent** 100 %	**Area (sq km)** 38
Population 2,991	**Population density** 79 **persons/sq km**	**Population absent** 13 **%**

System Summary

Located on Nissan and Pinipel Islands (Green Islands). The fallow vegetation is short woody regrowth, three years or younger for sweet potato and cassava gardens and a little older for other crops. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; taro, banana and coconut are important crops; other crops are Chinese taro, cassava, yam (D. alata and D. esculenta) and Alocasia taro. Mangrove seeds are an important food on Pinipel Island. Sweet potato is planted in separate gardens or sometimes in a separate section of a garden. Yams, interplanted with taro, are planted in separate sections. Usually only one planting is made before fallowing, but a second planting of sweet potato may be made. Household gardens are common.

Extends across provincial border to System(s) None

Altitude range (m) 0-20 **Slope** Gentle (2-10 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Coconut, Taro (Colocasia)
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Alocasia), Taro (Colocasia), Yam (D. alata), Yam (D. esculenta)
OTHER VEGETABLES	Aibika, Chinese cabbage, Corn, Kumu musong, Pumpkin tips, Valangur, Bean (snake)
FRUITS	Bukabuk, Coastal pandanus, Mango, Pawpaw, Sugarcane, Ton, Guava, Mon
NUTS	Breadfruit, Galip, Java almond, Pao, Polynesian chestnut
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Short woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	1-4 years
CROPPING PERIOD	1 planting
R VALUE	25 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Significant
CROP SEGREGATION	Minor
CROP SEQUENCES	None
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	Significant

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Fish	Significant
2 Coconuts	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	Significant
SMALL MOUNDS	None
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Very significant
STAKING OF CROPS	Minor
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	Minor
SEASONAL SEC'DARY CROPS	Minor

OTHER DOCUMENTATION

Survey description

In September 1992, agricultural systems on Nissan and Pinipel Islands were surveyed (3 days).

Boundary definition

Nissan and Pinipel Islands were allocated to a separate system after visits to these islands and to other atolls.

Notes

This system is distinguished from the atoll system (System 2002) where continuous cultivation of coconut, swamp taro and sweet potato is the main agricultural activity. Land is very limited on Pinipel Island and each family has only small gardens. Family plots are typically 5-10 m wide. Woruba and Humphrey (1993) noted that sweet potato growth appeared to be poor on Pinipel. In contrast, gardens on Nissan Island appeared to produce well and land availability was not a serious problem. Soils are shallow and overlie limestone, and hence food production is vulnerable to drought.

Woruba and Humphrey (1993) reported that the farming systems on both atolls were characterised by the use of stone piles in the gardens which seperated pockets of deeper soil for planting. After the fallow period, vegetation was cut and removed from the site for burning. However there were some important differences between the farming systems of the two islands. On Nissan Island sweet potato was grown with other crops, on a mixed cropping basis, whilst on Pinipel crops were grown in separate sections of the garden. On Pinipel two consecutive sweet potato plantings were made before the garden was left to fallow, and whilst the first crop was usually successful, the second was unreliable. Gardeners on Pinipel felt that the current varieties of sweet potato were inferior to those used in the past. On Pinipel, stone fences are extensively used for keeping pigs out of gardens.

The food crops grown also varied somewhat between the two atolls. Cassava, banana, aibika, sweet potato and taro were grown on both atolls, but corn, yam (both D. alata and D. esculenta), snake bean and pawpaw were grown only on Nissan. Moreover, on Pinipel, fruit trees, including breadfruit and mangroves, were planted near the gardens. Mangroves (Burguiera eriopetala) were eaten daily on Pinipel and were a major staple, together with sweet potato and banana. There are three stages of preparation of mangrove fruit prior to consumption. Fruit and nut trees are very important on both atolls, particularly galip and pao nuts. Some sago (M. salomense) is eaten. Golden apple is another fruit that is eaten.

Yams are planted seasonally in July-August. Taro is planted between yam plants some months later at the beginning of the wet season. Sweet potato and vegetables tend to be planted at the start of the wetter months (October-December). Yams are grown on stakes. Sweet potato and yams are planted in very small mounds.

Archaeological evidence from Nissan indicates that humans have been exploiting coconuts and galip nuts since the Takaroi phase (c. 4850 BP) (Spriggs 1991, 230). These nuts were found to still be important on Nissan (note that pao nut had also become important). However, on Pinipel, coconut trees were in short supply due to space limitations (Woruba and Humphrey 1993). Sale of fish and copra are the main income sources. Other income comes from the sale of betel nut, cocoa and fresh food.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

Woruba, M. and W. Humphrey 1993 A survey report of cropping practices on atolls in Papua New Guinea. Sustainable Agriculture Series Workshop Paper 1/93, Lowlands Agricultural Experiment Station, Department of Agriculture and Livestock, Keravat.

Other References

Spriggs, M. 1991 Nissan, the island in the middle. Summary report on excavations at the north end of the Solomons and the south end of the Bismarcks. In Allen, J. and C. Gosden (eds), Report of the Lapita Homeland Project. Canberra, Department of Prehistory, Research School of Pacific Studies, Australian National University, 222-243.

PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 2	**Subsystem No.** 1 **of** 1
Districts 1 Buka	**Subsystem Extent** 100 %	**Area (sq km)** 16
Population 1,607	**Population density** 100 **persons/sq km**	**Population absent** 26 **%**

System Summary

Located on the Tulun (Carteret), Takuu (Mortlock), Nukumanu (Tasman) and Nuguria (Fead) atolls. Food sources are purchased food, coconut, swamp taro, fish, fruit, nuts and some garden food. The most important garden food is swamp taro; sweet potato and cassava are important garden foods; other crops include banana, taro, Chinese taro and Alocasia taro. Cultivation of coconuts, swamp taro and banana is permanent. Sweet potato tends to be planted continuously. Other crops follow short woody regrowth fallows, and 2-3 plantings are made before land is fallowed for short periods. Occasionally, a cassava planting follows sweet potato. Swamp taro is planted in separate plots where soil fertility is maintained by mulching with coconut fronds. Within gardens, sweet potato and cassava are planted in separate sections. Sweet potato is planted in mounds about 20 cm high. Household gardens are common.

Extends across provincial border to System(s) None

Altitude range (m) 0-3 **Slope** Flat (<2 degrees)

CROPS

STAPLES DOMINANT	Coconut, Swamp taro
STAPLES SUBDOMINANT	Cassava, Sweet potato
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Swamp taro, Sweet potato, Taro (Alocasia), Taro (Colocasia)
OTHER VEGETABLES	Aibika, Pumpkin tips, Valangur, Bean (snake), Taro leaves, Other
FRUITS	Bukabuk, Coastal pandanus, Malay apple, Pawpaw, Sugarcane
NUTS	Breadfruit, Java almond, Pao, Polynesian chestnut
NARCOTICS	None

FALLOW & CROPPING PERIOD

FALLOW TYPE	No long fallow
SHORT FALLOW	Minor
LONG FALLOW PERIOD	Not significant
CROPPING PERIOD	>40 plantings
R VALUE	100 (high)

GARDEN SEGREGATION

GARDEN SEGREGATION	Very significant
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	Significant

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Coconuts	Minor
2 Fish	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Minor
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	Significant
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	None
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In September 1992, a visit to the Nuguria group (1 day). In October 1992, extensive interviews of Takuu, Nukumanu and Tulun Islanders at Keravat, East New Britain, during training courses.

Boundary definition

The atolls were allocated to a separate system after visits to Nissan and Pinipel Islands, interviews with islanders and a literature review.

Notes

This system is distinguished from System 2001 where sweet potato is the most important crop and, together with other crops, follow short woody regrowth fallows about three years long.

People eat a lot of purchased food, including rice, flour and biscuits. Fish are an important food on all island groups. There is considerable land pressure on these tiny atolls. There is no land available for making food gardens on some inhabited atolls, for example, in the Takuu group. Food production comes from permanent stands of coconut and swamp taro and mostly continuous plantings of sweet potato. Triploid banana stands are also permanent. Swamp taro is planted in pits that go down to the water lens in the centre of the atoll. It is mulched with coconut fronds and other vegetation. On Nukumanu Island, birds feed on fish and their droppings fertilise the soil.

Food gardens are commonly made among coconut palms. In the Nuguria gardens, Woruba and Humphrey (1993) noted that sweet potato, cassava, pawpaw and pumpkin are grown under coconut. Where garden land is fallowed, the fallow vegetation is short woody regrowth. For crops other than sweet potato, two or three plantings are made before land is fallowed.

Breadfruit is an important food seasonally and the flesh is eaten; bukabuk fruit is common and grows well. Polynesian chestnut is a common tree, especially in the Tulun Islands. On all islands, a coconut variety with a soft edible fibre is grown. The fibre is cooked in stone ovens before consumption. Household gardens containing aibika, Chinese taro, banana and other crops are common.

The literature is somewhat divided with regard to the nature of the subsistence economies of these atolls prior to European contact. Bayliss-Smith (1974) argued that of the three main staples, taro, coconut and fish, the last named was the least important. Parkinson (1907), on the other hand, claimed that fishing was the main occupation of the islanders, but said little of the relative importance of fish as a dietary staple. The latter issue was, however, raised by Feinberg (1986), who argued that the subsistence sector of the economy of the Tasman Islands (Nukumanu) was, and always had been, dominated by fish and other marine products (such as trochus and bêche-de-mer). These provided the primary source of dietary protein. Wankowski (1979) described fishing methods on Nuguria, Nukumanu and Takuu atolls.

The literature does, however, agree on the nature of the quite unique system of agriculture which is practised on these atolls. Parkinson (1907) provided the earliest description of this system, a description which was subsequently enriched by other authors including Boag and Curtis (1959), Bayliss-Smith (1974), Lefroy (1981), O'Collins (1990), and Woruba and Humphrey (1993).

The most important crop which is cultivated in this system is the swamp taro. Pits are dug down to the fresh water lens in the centre of the larger islands. The pits are then filled with leaf litter which composts to produce a rich dark soil in the bottom of the pits. The main pit area is divided into three or four channels, each of which is two to three feet deep, and planting is carried out along the edges of these channels. When a new plant commences to grow, leaf mulch is regularly applied to its base, which has the dual function of protecting the young plant from the heat of the sun and fertilising the soil. (Note that Boag and Curtis (1959) reported that, in the Mortlock Islands (Takuu) the latter benefit of fertilisation was not apparently appreciated by farmers). The material which is removed in the construction of the pits is heaped-up to form protective banks (up to 3 m high) around each pit. These banks also serve as access tracks, as clan and family plot boundaries, and as areas upon which to cultivate coconut, breadfruit, pao nut and various other tree crops.

Boag and Curtis (1959) reported that most of the swamp taro pits which were in use in the Mortlock (Takuu) Islands were in fact constructed by the ancestors of the islanders when the atoll group was first settled, and have been in constant use since that time. It is, however, important to note that it was still customary in some families to constuct a new pit to celebrate the birth of a boy.

Notes continued
Feinberg (1986, 273) reported that, in the Tasman (Nakumanu) Islands, the islanders claimed that Colocasia taro 'used to grow' on their atoll, but has all died. Colocasia taro is, however, regarded as an important secondary crop in the Mortlock (Takuu) Islands where five varieties are cultivated (Lefroy 1981, 11). In the late 1950s, the Mortlock islanders came to the realisation that Colocasia taro is better suited to dry conditions (until then it had been grown in the swamp taro pits, with unsatisfactory results) and commenced cultivating Colocasia taro on the raised intervals between the swamp taro pits and channels (Boag and Curtis 1959, 24). They also observed that the islanders had commenced cultivating Colocasia taro in the dry soils of the coconut fringe.

It is important to note that coconut is widely regarded as the most plentiful and important species on all the atolls (Lefroy 1981, 10; Feinberg 1986, 272). Coconuts are used as a source of food, fuel, constructon material, and perhaps most importantly, dietary liquid. Coconut was originally introduced to the islands in ancient times (Lefroy 1981, 10). However it seems that the German colonial administration was instrumental in encouraging the planting of coconut, resulting in the high concentrations of coconut trees which now characterise the islands (Boag and Curtis 1959, 25; Feinberg 1986, 274).

Thus, the literature indicates that the most important subsistence staples are coconut, swamp taro and fish (and other marine products). Other crops of minor importance include: breadfruit, pao nut, banana, pandanus, sugarcane, giant (Alocasia) taro, pawpaw, pumpkin, cassava, Polynesian arrowroot, bukabuk [misidentified by Lefroy as Pouteria], Chinese taro, Amorphophallus taro, sago, mango, guava, oranges, valangur, golden apple, watery rose apple and Java almond (Terminalia). Yam (D. esculenta) was found to be an important standby crop in the Mortlock and Carteret Islands (Boag and Curtis 1959, 24; Lefroy 1981, 12). Moreover, kangkong (Ipomoea aquatica) which is ideally suited to the swamp taro pits, Polynesian chestnut and sago palm are minor crops in the Carteret Islands; and sweet potato, purslane, mangrove and Malay apple are minor crops in the Nuguria (Fead) Islands (Lefroy 1981, 12-13).

With the developement of income generating activities and modern trade, imported food products are becoming increasingly important. Lefroy (1981, 10) pointed out that more rice was being eaten on some of the atolls. Indeed, in the Nukumanu (Tasman) Islands, Feinberg (1986, 275-6) claimed that, next to coconut, the atoll's major staples had become wheat flour and rice. He also reported that cash generating activities in the Tasman Islands were, in descending order of importance: collecting and preparing bêche-de-mer; trochus shell; and copra production (Feinberg 1986, 276). O'Collins (1990, 250) observed that in the Carteret Islands cash income levels were extremely unreliable and inconsistent due to the fact that sales of copra, shells, bêche-de-mer and other fish products depended on regular sea transport to Kieta on Bougainville Island.

The case of the Tulun (Carteret) Islands is particularly significant because the resources of the island have been widely regarded as being over-exploited (Kukang et al. 1987; O'Collins 1990). Indeed, the island has periodically experienced food shortages of varying severity since the 1960s. As a consequence an 'Atolls Resettlement Scheme' has been in operation since late 1984, and has seen the resettlement of Tulun Islanders in an area of Bougainville known as Kuveria, which is 30 km from Arawa, along the Kieta-Buka Highway (Kukang et al. 1987; O'Collins 1990). All of the settlers reportedly had left the scheme in the late 1980s, prior to the Bougainville crisis.

Some copra is made in Tulun, Nukumanu and Nugaria groups. Small quantities of smoked fish are sold at Buka, Kokopo and Honiara markets. Other minor cash income sources include sale of bêche-de-mer and trochus shell.

National Nutrition Survey 1982/83
In this province, the survey was conducted during 1980 and no dietary recall information was collected.

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Other References continued

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Parkinson, R. 1907 Dreissig Jahre in der Südsee. Land und Leute, Sitten und Gebräuche im Bismarckarchipel und auf den Deutschen Salomoinseln. (Thirty Years in the South Seas. The Bismarck Archipelago: Land, Natives and Customs - English translation by N.C. Barry). Stuttgart, Berlag von Strecker and Schröder.
Wankowski, J.W.J. 1979 Subsistence fishing methods on Nuguria, Nukumanu and Takuu atolls. Harvest 5, 3, 179-185.
Woruba, M. and W. Humphrey 1993 A survey report of cropping practices on atolls in Papua New Guinea. Sustainable Agriculture Series Workshop Paper 1/93, Lowlands Agricultural Experiment Station, Department of Agriculture and Livestock, Keravat.

PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 3	**Subsystem No.** 1 **of** 1
Districts 1 Buka	**Subsystem Extent** 100 %	**Area (sq km)** 678
Population 17,739	**Population density** 26 **persons/sq km**	**Population absent** 18 **%**

System Summary

Located on Buka Island and the northern tip of Bougainville Island. Fallow vegetation is tall woody regrowth, typically 5-6 years old, with a range of 2-10 years. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, taro and coconut are important crops; other crops are cassava and Chinese taro. Sweet potato and taro are grown in separate gardens. Banana, cassava and Chinese taro are planted on the edge of gardens. Generally, two or three plantings are made before fallowing, but up to five plantings may be made. Sweet potato is planted in mounds about 30 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-80 **Slope** Flat (<2 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Coconut, Taro (Colocasia)
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Colocasia)
OTHER VEGETABLES	Aibika, Choko tips, Corn, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Tulip, Bean (snake), Other
FRUITS	Bukabuk, Malay apple, Mango, Pawpaw, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	3-5 plantings
R VALUE	29 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Significant
CROP SEGREGATION	Minor
CROP SEQUENCES	None
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Coconuts	Very significant
2 Cocoa	Significant
3 Fresh food	Significant
4 Betel nut	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Minor
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In June and October 1996, interviews with five people from north, east and south Buka Island. No field visits were made.

Boundary definition

Buka Island was allocated to a separate system after interviewing five people from Buka Island; two people from small islands west of Buka (System 2004); and field visits and interviews with people from the atolls (Systems 2001 and 2002). The boundaries with Systems 2005 and 2006 between Baniu and Soraken Harbour on northern Bougainville are based on the extent of the flat raised coral reefs. This estimate is confirmed by interviews with people from Buka and the Tinputz area.

Notes

This system is distinguished from Nissan and Pinipel atolls (System 2001) where fallows are short woody regrowth fallows about three years old. It is distinguished from the small atolls (System 2002) where coconut, swamp taro, fish, fruit, nuts and some sweet potato and cassava are the main foods. It is distinguished from System 2004 on the small islands west of Buka where land use is more intensive with fallow periods of only about one year. This system is almost identical to System 2005 to the south on Bougainville, but garden segregation is less important there and there is a weak tendency for more plantings to be made before land is fallowed in that system. The system is also very similar to System 2006 on the west coast of Bougainville, but in that system cassava is somewhat more important and taro less important than in this system.

Fallow vegetation is mostly tall woody regrowth, but some short woody regrowth is used where land pressure is most intensive on the east coast. Fallow periods on the east coast are estimated at about 5-6 years, but two of the five informants indicated that fallow periods were only 2-4 years. Two or three plantings are usually made before fallowing, with a range of 1-5 plantings.

Significant quantities of imported rice are eaten. Some fish is eaten in coastal villages. In south Buka, villagers obtain a lot of seafood, such as mud crabs and shell fish, from mangrove stands. The pith of a self-sown plant that is similar to a banana, but with thin stems, is commonly eaten as a vegetable. It is known as 'tsip' in south Buka. The mangos eaten come from wild trees, not the cultivated species. Nuts of Pangium edule ('sel') are eaten in inland Buka. Tobacco is more common in inland and north Buka. Some peanuts are grown in inland Buka.

An archaeological survey (Wickler 1990, 140) found evidence suggesting that Colocasia taro had been used in this region in the Pliestocene and Holocene eras. Evidence was also discovered suggesting the use of Canarium spp., particularly C. indicum and C. solomonese, from about 9000 BP.

Blackwood (1935, 271-312) conducted field work in the north of Bougainville in the late 1920s and observed that taro was the most important staple crop. Many different varieties of taro were known; one woman identified twelve varieties in her garden, and claimed that there were many more. Coconut was also identified as an important staple, and it was certainly the most important of the nut species.

Blackwood provided an exhaustive list of the other vegetables, nuts and fruits which were eaten, including: sweet potato, yam, breadfruit, pumpkin, squash, sugarcane, several varieties of mushrooms, leaves of taro and other plants, coconut, galip, Java almond, pao, banana, wild passion fruit, mango, pawpaw, orange and lime. In addition to these foodstuffs, various animals were hunted including wild pig, opossum, flying fox, bats, birds, lizards, frogs and insects. Taro was frequently traded for fish. Breadfruit was identified as particularly important when in season, during which time people reduced their consumption of taro. Moreover, people indicated that sago was eaten in times of scarcity, when the taro crop had failed. Importantly, Blackwood noted that, compared to other parts of Bougainville, sweet potato and yam were relatively unimportant in this region.

According to Blackwood, taro was predominantly cultivated on its own, although pumpkins, bananas, and other fruit and nut trees were sometimes planted in taro gardens. Taro was cultivated using a form of shifting agriculture. Plots of bush were cleared and burnt, and taro ‘stalks’ were planted in holes which had been made with the sharpened end of a pole. The gardens were fenced in order to prevent pigs from damaging the crops. Only one planting of taro was made before the garden returned to fallow (Blackwood 1935, 298).

With regard to narcotic crops, Blackwood (1935, 292-295) reported the cultivation of tobacco, betel nut and betel pepper, all of which were produced for local consumption.

Notes continued

Rimoldi and Rimoldi (1992, 56-59) reported that food gardens on Buka were destroyed during the World War II, leading to a severe food shortage. During this period people survived by eating pigs, dogs, sago, banana, and especially pawpaw. Moreover, following on from the destruction of the gardens, the fungus Phytophthora colocasiae became established and wiped out taro, which never regained its former position as the most important staple on Buka. In 1948, the agricultural office noticed that people were planting more cassava and yams, and that village pig populations were starting to build up again. It was also noticed that sweet potato had become the new dominant staple.

Dearden and Freyne (n.d.) conducted field work in the region in 1980 and reported that sweet potato was by far the most important staple crop, whilst taro, banana and yam were the other important staples. Other food crops grown were: corn, coconut, beans, aibika, peanuts and pineapple. Crops were planted in the following sequence before the garden was left to fallow: firstly, sweet potato was interplanted with corn and other crops; then for the second planting, sweet potato was interplanted with other crops, but not corn; and finally, a third planting of sweet potato was made on its own. Moreover, it was found that sugarcane, banana and pawpaw were normally planted in newly cleared gardens, and continued growing until the abandonment of the garden. Dearden and Freyne (n.d.) found that pigs were not fenced in many villages on Buka, and subsequently caused crop damage. Furthermore, crop failure due to droughts was found to occur quite commonly, especially on north Buka.

With regard to cash cropping, Dearden and Freyne (n.d.) reported that the vast majority of families had at least a small area of cash crops, and due to the low price of copra at the time, it was discovered that more cocoa than coconut was being planted. It was common practice for crops of sweet potato to be interplanted with cocoa, so that the gardens would be transformed into cocoa blocks after the sweet potato cropping sequence had run it course. It was also reported that the large increase in cash cropping in the coastal areas of Buka and northern Bougainville had pushed gardens inland a long way from the villages.

Copra is now the main source of cash income for most villagers. Cocoa is less important, but is still a significant income source. Production has increased as copra prices have fallen. Using Cocoa Board figures, the main annual income from cocoa sales for 1991-95 is estimated as about K250 per household per year. Significant quantities of fresh food are sold in Buka Passage market, including sweet potato, coconuts, fruit and vegetables. Food is also sold or exchanged with people from the islands west of Buka at the Kessa barter market. Buka Island people sell sweet potato, taro, banana and other garden food. They receive fish and other seafood from the small island people (System 2004). Betel nut provides some cash income. Some tobacco is sold by people from north Buka and inland locations.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

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PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 4	**Subsystem No.** 1 **of** 1
Districts 1 Buka	**Subsystem Extent** 100 %	**Area (sq km)** 6
Population 1,423	**Population density** 237 **persons/sq km**	**Population absent** 35 **%**

System Summary

Located on Matsungan, Petats, Yame, Pororan and Hitau Islands, off the west coast of Buka Island. Fallow vegetation is short regrowth, typically about one year old. Fallow vegetation is cut, dried and burnt. Three plantings of sweet potato and cassava are made before fallowing, but more plantings may be made. Sweet potato is the most important crop; cassava, banana and coconut are important crops; other crops are taro and Chinese taro. Cassava is planted on the edge of sweet potato plots, but it is sometimes planted after a number of sweet potato plantings. Sweet potato is planted in mounds about 30 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-20 **Slope** Flat (<2 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Cassava, Coconut
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Colocasia)
OTHER VEGETABLES	Aibika, Choko tips, Corn, Ferns, Kumu musong, Lowland pitpit, Peanuts, Pumpkin tips, Other
FRUITS	Bukabuk, Malay apple, Mandarin, Mango, Pawpaw, Sugarcane, Watermelon
NUTS	Breadfruit, Galip, Java almond, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland)

FALLOW & CROPPING PERIOD

FALLOW TYPE	Short woody regrowth
SHORT FALLOW	Minor
LONG FALLOW PERIOD	1-4 years
CROPPING PERIOD	3-5 plantings
R VALUE	57 (medium)

GARDEN SEGREGATION

GARDEN SEGREGATION	None
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	Minor

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Coconuts	Very significant
2 Fish	Significant

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	None
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In September and October 1996, interviews with two persons from Petats and Matsungan Islands respectively. No field visits were made.

Boundary definition

The islands off the west coast of Buka Island were assigned to a separate system after interviews with two people from the islands and five informants from Buka.

Notes

This system is distinguished from that on Buka Island (System 2003) where fallow periods are longer and fallow vegetation is tall woody regrowth.

There is very high population pressure on these islands and much land is devoted to coconut plots. Fallow vegetation is short regrowth, probably consisting of a mix of herbaceous plants and a few woody plants. Soil fertility is reported to be poor because of the intensity of land use. Few green vegetables grow well apart from aibika and pumpkin. These two crops are sometimes planted in small household gardens.

Informants indicated that several plantings of sweet potato may be followed by plantings of cassava. In some places, planting of sweet potato is more-or-less continuous with little fallowing. Plantings of peanuts are sometimes made between sweet potato plantings.

Specht (1974, 229) reported that, because of population presure, there is insufficient land to support the islands' population. Considerable amounts of taro were imported from western Buka. This situation continues with people eating a lot of rice and other imported food, and garden food purchased from Buka people.

Island people sell or barter seafood at the Kessa market and sell it at Buka Passage market. People from the northern islands (Pororan and Hitau) probably travel more to Kessa while those from the southern islands (Matsungan, Petats and Yame) go more to Buka Passage.

There is little literature available on this agricultural system. Blackwood (1935, 273, 439-441) reported that Petats Island was unsuitable for taro growing, but was well situated with respect to fishing activities. Consequently, regular exchange meetings took place between people from Petats and people from the hill villages in the interior of Buka Island. Fish was exchanged for taro at these meetings.

Copra is the main source of cash income. Sale of seafood including fresh fish, smoked fish, mudcrab and shellfish is also important. Some cocoa is grown on blocks on the west coast of Buka.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

None.

Other References

Blackwood, B. 1935 Both Sides of Buka Passage: An Ethnographic Study of Social, Sexual, and Economic Questions in the North-western Solomon Islands. Oxford, Clarendon Press.
Scott, R.M., P.B. Heyligers, J.R. McAlpine, J.C. Saunders and J.G. Speight 1967 Lands of Bougainville and Buka Islands, Territory of Papua and New Guinea. Land Research Series No. 20, Commonwealth Scientific and Industrial Research Organization, Melbourne.
Specht, J. 1974 Of Menak and men: trade and the distribution of resources on Buka Island, Papua New Guinea. Ethnology 13, 3, 225-237.

PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 5	**Subsystem No.** 1 **of** 1
Districts 1 Buka, 3 Kieta	**Subsystem Extent** 100 %	**Area (sq km)** 846
Population 12,500	**Population density** 15 **persons/sq km**	**Population absent** 4 **%**

System Summary

Located on the northeast coast and inland area of Bougainville Island in the Tinputz, Wakunai and Togarau areas. Fallow vegetation is tall woody regrowth, about 5-6 years old. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, coconut and taro are important crops; other crops are cassava and Chinese taro. The number of plantings made before fallowing range from 1-5, with 2-4 the most comon range. Sweet potato is planted in mounds 30-50 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-700 **Slope** Multiple classes

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Coconut, Taro (Colocasia)
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Colocasia)
OTHER VEGETABLES	Aibika, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Tulip, Taro leaves, Other
FRUITS	Malay apple, Mango, Orange, Pawpaw, Pineapple, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	3-5 plantings
R VALUE	29 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Minor
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Very significant
2 Betel nut	Minor
3 Coconuts	Minor
4 Fish	Minor
5 Fresh food	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	None
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	Minor

OTHER DOCUMENTATION

Survey description

In December 1980, a road traverse and garden visits from Kieta to Wakunai and Togarau (1 day). In August-October 1996, interviews with three informants from the Tinputz-Teop and Wakunai areas.

Boundary definition

The boundary with System 2003 near Baniu is based on the extent of flat raised coral reefs. This estimate was confirmed by interviews with people from Buka Island and the Tinputz area. The southern boundary with System 2007 was taken as the Pukarobi River and is an estimate only. This system was distinguished from System 2006 to the west after interviews with three people from the east coast and a group of people from the west coast. The boundary with System 2006 was taken as the 600 m contour and is an estimate only.

Notes

This system is almost identical to that used to the north and on Buka Island (System 2003), but garden segregation is more important there and there is a weak tendency for more plantings to be made in this system before fallowing. It is also very similar to the system on the west coast (System 2006) where cassava is an important food, but taro is less important. This system is distinguished from that to the south (System 2007) where generally only one planting is made before fallowing and Chinese taro is an important crop.

Fallow vegetation is tall woody regrowth, about 10-15 m high. Fallow periods are probably 4-8 years, but this is uncertain. The number of plantings made before fallowing varies between locations. In the Teop area, two plantings are said to be the most common practice; two or three plantings are made in the Ruruvu area; and three or four plantings on the volcanic ash soil in the Baniu area. In the inland areas where population pressure is less, one or two plantings only are made before fallowing. Occasionally, a planting of taro will be followed with one or more sweet potato plantings.

Sweet potato is the most important food. It had become dominant after taro was devastated by taro blight. There is some resurgence in taro planting and more is said to be eaten in the 1990s than during the 1970s and 1980s. The relative importance of the staple foods varies between locations. Taro and Chinese taro are more important in inland locations. A little rice was grown during the crisis years of the early 1990s, but production had ceased by 1996. Cassava is used to prepare puddings. A little sago is eaten. When food was scarce during the crisis period, some wild yam were gathered and eaten. Fish is a reasonably important food in coastal locations.

Page et al. (1987) surveyed foods eaten in a number of different communities in North Solomons. On Bougainville, the areas chosen for the study were Nasioi, Nagovisi and Aita. Aita, located inland on the northern end of the island in this system and away from the money of the Bougainville Copper Mine stood out in the comparison. People in the Aita area ate substantially more taro and yam than did those living in Nagovisi and Nasioi. For example, 78 per cent claimed they ate 'plenty' of taro compared with 12 per cent in Nasioi and 4 per cent in Nagovisi. People in Nagovisi and Nasioi ate substantially more introduced (or purchased) foods. For example, 86 per cent of people in Nasioi and 90 per cent in Nagovisi claimed they ate 'plenty' of rice compared with only 21 per cent in Aita.

Minor vegetable crops include amaranthus, Chinese cabbage, snake bean, karakap, peanuts, kangkong, Chinese taro leaves, sweet potato leaves, ginger, spring onion, watercress, winged bean, tomato, eggplant and capsicum. Choko tips are a more important vegetable in inland locations. Minor fruits include golden apple, mandarin, pomelo, soursop, custard apple, ton, avocado and rambutan. Galip and pao are common nut trees with Java almond eaten on the coast. Polynesian chestnut is a minor nut tree. Both the flesh and fruit of breadfruit are eaten. Tobacco is mainly grown by Sepik settlers. Fences are rarely made, except in the Tinputz area. Corn, cucumber and watermelon are planted in the middle of the year and harvested in October-December. Other crops are not planted seasonally.

There is quite a lot of variation in agricultural practices employed in this system, and this variation is largely dependent on soil type and altitude. Monsen (1975, 12-13) reported that the mountain and hill peoples grew the best taro. Similarly, Dearden and Freyne (n.d.) found that the people of Iuan village only grew taro on higher ground, whilst sweet potato was grown on the lower slopes and in the low flat areas. Furthermore, Monsen (1975, 7) argued that the people of Tearaka have always traded with the inland people, exchanging fish for taro. This indicates that variation in agricultural practices may have existed in this agricultural system for quite some time.

A fungal disease of taro (taro blight) arrived on Bougainville immediately prior to the Japanese invasion in 1942. The disease spread throughout all of Buka and Bougainville, and devastated taro production. Villagers switched to sweet potato as their staple food everywhere on Bougainville and Buka (Packard 1975).

Notes continued

At Iaun, it was found that two crops of taro were generally grown before the taro gardens were left to fallow (Dearden and Freyne n.d.). In the low lying areas, three plantings of sweet potato were usually made before fallowing. Sweet potato was always interplanted with other crops including: taro, Chinese taro, yam, cassava, banana, corn, pitpit, coconut, pawpaw, sugarcane, watermelon, beans, peanuts, pumpkin, aibika, European cabbage, cucumber, onion, spring onion, tomato and tobacco (Dearden and Freyne n.d.; Monsen 1975, 11-12). Upon completion of the cropping sequence, the sweet potato gardens were often turned over to coconut or cocoa.

At Tearaka, new gardens were made by cutting the bush, allowing it to dry, and then burning it (Monsen 1975, 11). Taro was planted in holes made with digging sticks, whilst sweet potato was planted in mounds constructed with hoes and spades. At Togarau village, Dearden and Freyne (n.d.) found that it was common practice to allow the cut bush to rot for up to six years before burning it and establishing a new garden. Moreover, it was also reported that some farmers in Togarau had established 'permanent' gardens (Dearden and Freyne n.d.). One such garden, from which six consecutive crops had successfully been cultivated, was examined, and the crops were found to be in good health. Importantly, Dearden and Freyne (n.d.) found that Iaun village was susceptible to periodic food shortages as a result of crop damage caused by pigs and heavy rainfall.

Cash cropping has been carried out throughout this agricultural system since the 1950s (Rutherford 1977; Dearden and Freyne n.d.). Copra and cocoa have been the primary cash crops, although coffee and garden vegetables have also been important in some areas (Rutherford 1977). Dearden and Freyne (n.d.) and Monsen (1975, 13) reported that the sale of garden vegetables was an important secondary source of cash income in Togarau and Tearaka respectively. In some areas, most of the land close to villages has been put under coconut and cocoa, with the result that subsistence gardens have been pushed further away from the villages (Dearden and Freyne n.d.; Monsen 1975, 16-17, 27-29).

This region was, and remains, the main cocoa producing area in North Solomons Province. Cocoa is the main source of cash income. Village production has continued throughout the crisis, although it collapsed in 1994-95 because of transport and marketing problems. Between 1991 and 1994, cocoa sales were worth about K800 per household per year (estimates derived from Cocoa Board figures). Some copra is produced and sold, but production has declined in recent years because of poor returns. There has been considerable damage to the plantations in this region and most infrastructure on them have been destroyed. Some harvesting is occurring by villagers, but all plantations have been abandoned by management.

Some betel nut is sold at Buka Passage. A little is taken to Lae and Port Moresby for sale, and this continued even during the crisis period of the early 1990s. Some fresh food is sold locally. Prior to the crisis, potatoes and temperate fruit and vegetables, such as cabbage, carrot and strawberry, were grown in the Togarau area, but this production has probably ceased because of lack of demand. Fish also provides some cash income, especially for Teop Island people. The traditional exchange of fish and garden food between coastal and inland people was revived during the crisis years. A little tobacco provides some cash income, particularly for those few remaining people of Sepik origin. Cardamom was trialled in the mountainous areas and some sold prior to the crisis, but it is no longer being produced.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

None.

Other References

Dearden, P.N. and D.F. Freyne n.d. Land use: a rapid rural appraisal, North Solomons Province. Unpublished paper, Land Use Section, Department of Primary Industry, Port Moresby.

Monsen, J. 1975 Tearaka - a case study of village change on Bougainville. Student Research Papers No. 2, Department of Geography, University of Papua New Guinea, Port Moresby.

Packard, J.C. 1975 The Bougainville taro blight. Miscellaneous Working Papers 1975: 1, Pacific Islands Program, University of Hawaii.

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PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 6	**Subsystem No.** 1 **of** 1
Districts 1 Buka, 2 Buin	**Subsystem Extent** 100 %	**Area (sq km)** 849
Population 7,834	**Population density** 9 **persons/sq km**	**Population absent** 8 **%**

System Summary

Located on the west coast of Bougainville Island between Soraken Harbour/Taiof Island and Empress Augusta Bay, and centred on Kunua station. Fallow vegetation is tall woody regrowth, probably about 4-6 years old. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, cassava and coconut are important crops; other crops are Chinese taro, taro and yam (D. alata). Separate gardens are made for taro. A typical planting sequence is three plantings of sweet potato followed by a planting of cassava, Chinese taro and banana. Only one planting of taro is made before fallowing in taro gardens. Sweet potato is planted in mounds 30-40 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-500 **Slope** Multiple classes

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Cassava, Coconut
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sweet potato, Taro (Colocasia), Yam (D. alata)
OTHER VEGETABLES	Aibika, Choko tips, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Bean (snake), Other
FRUITS	Malay apple, Mandarin, Mango, Orange, Pawpaw, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	3-5 plantings
R VALUE	29 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Minor
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Significant
2 Betel nut	Minor
3 Coconuts	Minor
4 Fish	Minor
5 Fresh food	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	None
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In October 1996, interviews with three informants as a group from the Kunua area. Information was provided on the region from Soraken Harbour and Taiof Island to Korepovi village (Cape Moltke). No information is available for the Soraken Harbour to Empress Augusta Bay area. No field visits were made.

Boundary definition

The boundary with System 2003 between Baniu and Soraken Harbour is based on the extent of the flat raised coral reefs of Buka Island and Buka Passage, and was confirmed by interviews. This system was distinguished from System 2005 to the east after interviews with three people from the east coast and a group of people from the west coast. The boundary was taken as the 600 m contour and is an estimate only. The boundary with System 2007 was taken as the Crown Prince Range. The southern boundary with System 2008 is an estimate only as agriculture in the Cape Moltke-Empress Augusta Bay area is presumed to be similar to that between Soraken Harbour and Cape Moltke.

Notes

This system is very similar to nearby ones on Buka and Bougainville. It is distinguished from Systems 2003, 2005 and 2008 where cassava is not an important crop. The system is very different from that used on the small islands west of Buka (System 2004) where land use is more intensive and fallow periods are only about one year long. This system is distinguished from those used in southeast and south Bougainville (Systems 2007 and 2009) where usually only one planting is made before land is fallowed.

People are reported to shift village sites from time to time. Hence they clear land after very long fallows of several decades and then gardens are moved within this area for some years. Fallow periods are unknown but informants' descriptions of fallow vegetation suggest about 4-6 years. A typical sequence is said to be three plantings of sweet potato followed by a planting of cassava, banana and Chinese taro. Coconut cream is used to cook food daily, but they are reported to be used less in the southern part of the system.

River fish, reef fish and prawns are commonly eaten. On Taiof Island, cassava is said to be a more important food than sweet potato. Not a lot of taro is grown in this system now. It was the most important staple prior to 1941, as it was for all Bougainville. Minor vegetables include the young shoots and leaves of Chinese taro, taro and sweet potato; and amaranthus, watercress, kangkong, karakap and mushrooms. Minor fruits and nuts include soursop, pomelo and Polynesian chestnut.

Little literature exists on the agricultural activities in this system. Oliver (n.d., 7), after fieldwork on Bougainville Island in 1938-39, described the ‘Bougainville cultures’ as appearing ‘remarkably uniform’. Basically, they relied primarily on gardening for subsistence, with taro as the dominant staple and sweet potato next in importance in most areas; yams were grown and some sago was collected. Hunting, fishing, wild-plant collecting and pig raising were of secondary importance. When in season, galip (canarium) and breadfruit were eaten. Gardens were cleared, planted and fallowed on a rotation basis, with taro planting and harvesting a year-round activity.

Three significant events since that time have seen this uniformity altered. These events were: taro blight during World War II, after which sweet potato replaced taro as the dominant staple crop in most places; the introduction of cash cropping; and the development of the Bougainville Copper Mine.

Ward (1975, 26) gives a brief description of crops grown in the Buin subdistrict, part of which forms the southern half of this system. Sweet potato and yams replaced taro as the dominant staples after taro blight killed off taro during World War II; other crops grown were banana, sugarcane, pawpaw, pitpit, breadfruit, coconut, cassava, corn, tomato, pineapple, bean and tobacco. Sago was also eaten.

Several attempts were made to introduce various crops for income purposes but were unsuccessful. By far the most successful introduction was that of cacao in about 1959 (Ward 1975, 27). Cocoa and, to a lesser degree, copra are now the main sources of cash income. Since the Bougainville crisis, less cocoa and copra has been produced because of transport constraints. The plantations in this region have been abandoned because of the crisis and are overgrown. Other sources of cash income are fresh food which is sold locally; fish and betel nut which are sold locally and in Buka Passage market; and bêche-de-mer. There is likely to be less cash cropping in the Cape Moltke-Empress Augusta Bay region because of transport constraints and lack of road access to Buka Passage.

National Nutrition Survey 1982/83
In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References
None.

Other References
Oliver, D.L. n.d. Somatic Variability and Human Ecology on Bougainville, Solomon Islands. Cambridge, MA, Harvard University.
Packard, J.C. 1975 The Bougainville taro blight. Miscellaneous Working Papers 1975: 1, Pacific Islands Program, University of Hawaii.
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Ward, M.W. 1975 Road and development in southwest Bougainville. New Guinea Research Bulletin No. 62, New Guinea Research Unit, Australian National University, Port Moresby and Canberra.

PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 7	**Subsystem No.** 1 **of** 1
Districts 3 Kieta	**Subsystem Extent** 100 %	**Area (sq km)** 858
Population 16,557	**Population density** 19 **persons/sq km**	**Population absent** 5 **%**

System Summary

Located on the east coast of Bougainville Island between the Pukarobi River and the Laluai River, inland to the Crown Prince Range, and centred on Arawa. Fallow vegetation is tall woody regrowth, probably 5-10 years old. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, Chinese taro and coconut are important crops; other crops are taro and yam (D. alata). Taro is more important in inland locations at higher altitude. Generally, only one planting is made before fallowing, but up to three plantings may be made. Sweet potato is planted in very small mounds on steep land and in small mounds on flatter land.

Extends across provincial border to System(s) None

Altitude range (m) 0-1100 **Slope** Steep (10-25 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Chinese taro, Coconut
STAPLES PRESENT	Banana, Chinese taro, Coconut, Sweet potato, Taro (Colocasia), Yam (D. alata)
OTHER VEGETABLES	Aibika, Choko tips, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Watercress
FRUITS	Malay apple, Mandarin, Mango, Orange, Pawpaw, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	1 planting
R VALUE	9 (very low)

GARDEN SEGREGATION

GARDEN SEGREGATION	Minor
CROP SEGREGATION	Minor
CROP SEQUENCES	None
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Significant
2 Fresh food	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	Significant
SMALL MOUNDS	Minor
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Minor
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In December 1980, a road traverse between Kieta and Panguna with garden visits (1 day). In August and October 1996, interviews with three people from the Kieta, Arawa ad Panguna areas.

Boundary definition

The northern boundary with System 2005 is taken as the Pukarobi River; that with System 2009 is near the Laluai River; that with Systems 2006 and 2008 is the Crown Prince Range. All boundaries are estimates based on interviews, not field traverses, and are not precise.

Notes

This system is distinguished from those to the north (System 2005) and to the west (Systems 2006 and 2008) where 2-4 plantings are made before fallowing and Chinese taro is not an important crop. It is similar to that used in South Bougainville (System 2009) except that fallow periods seem to be shorter there (2-5 years) and fallow vegetation is shorter. The Bougainville crisis has had a major impact on the economy in this system. The most important known effect on agriculture has been the collapse of cash cropping.

Fallow periods were reported as 1-4 years, but from descriptions of vegetation are probably in the range of 5-10 years. Generally, only one planting is made before fallowing, but two or three plantings may be made. In inland areas, separate gardens may be made for taro and sweet potato. Elsewhere, Chinese taro, taro and sweet potato tend to be planted in separate sections of gardens.

Taro is more common in the inland mountainous part of the system than near the coast. Some cassava and rice are also grown and occasionally sago is produced and eaten. Minor vegetables reported include tulip, taro leaves, snake bean, peanuts, Chinese cabbage, capsicum, spring onion and tomato. Minor fruits are pineapple, rambutan, granadilla and avocado.

On steeper land, sweet potato is planted with a digging stick without mounding. Small mounds are made with spades on flat land. Sticks are laid around the contour to delineate plots within gardens, but they do not seem to serve a soil erosion control purpose.

Some river fish and reef fish are eaten. Barter occurs between inland and coastal villagers. The coastal people provide coconuts while the inland people give taro and choko tips. Prior to the Bougainville crisis, coastal people provided store food and clothing.

The main language group lying within this system is the Nasioi language group. A brief description of the agricultural practices of the Nasioi is given by Ogan (1972). He reported four main stages of garden establishment: heavy clearing of fallow vegetation, including felling of trees; clearing shrubs and vines and placing the cut material into heaps around the garden site; final clearing of the garden site and burning of the heaps; and, the final stage, planting. Fences were constructed around gardens to keep pigs out. Fence building took place before the burning stage in garden establishment (Ogan 1972, 24-26). In the 1990s, informants reported that gardens are not usually fenced as pigs are kept in areas separate from food gardens.

Prior to World War II, taro was the dominant staple. Only one planting was made before fallowing land, deterioration of fencing played as big a role in garden abandonment as did the decline in soil fertility (Ogan 1972, 25-26). Bananas, which were planted in taro gardens, continued to be harvested for 1-2 years after garden abandonment (Ogan 1972, 25). At the time of Ogan's fieldwork, the most important crops grown were sweet potato, yam and banana; other crops grown were tomato, pineapple, cucumber, scallions and other green vegetables (Ogan 1972, 118).

The introduction of cash crops also involved changes in the subsistence gardening practices. Firstly, the size and distribution of gardens changed. A larger area of land was required for growing coconut and cacao trees than for a subsistence garden. Therefore, several subsistence gardens were made in a single area of cleared land, before the land was left to the cash crops. Secondly, the larger garden areas required also made fencing a more difficult task and the Nasioi chose to give up pigs until the trees were large enough, rather than fence the gardens (Ogan 1972, 118). Unlike the Nagovisi, the Nasioi did not choose to fence the pigs in (Ogan 1972, 119). One other change from traditional practices was the introduction of metal tools. As an example, women occasionally used iron rods instead of the traditional wooden digging stick (Ogan 1972, 116).

Notes continued

Galip nut and betel nut are consumed by the Nasioi, however the plants were apparently not cultivated (Ogan 1972, 25). Fishing and hunting (for birds, possums and pigs) were carried out on a casual basis (Ogan 1972, 129). Foods purchased with money included rice, tinned fish, tinned meat, and sweet and salted biscuits (Ogan 1972, 148).

Connell and Hamnett (1978) reviewed sago production on Bougainville. They reported that it was produced regularly as part of the normal diet in the Siwai (System 2008) and Eivo (this system) language areas and, to a lesser extent, in other parts of Bougainville.

The average garden size over all of Bougainville was estimated as 2 acres per annum under cultivation (Moulik 1977, 29). However, garden sizes tended to be smaller in the Kieta District (this system) that in the Buin District (System 2009). In the Kieta area, gardens tended to be located on gentle upper slopes of hills, broad ridge tops and stream terraces (Moulik 1977, 29).

Development of the Bougainville Copper Mine also brought about changes during the 1970s and 1980s. The mine had a policy that as much as possible of the fresh food requirements of the workforce be purchased from local sources (Moulik 1977, 28). This policy had a number of substantial impacts on agricultural activities in the Kieta District. Firstly, new crops were introduced to cater for the tastes of the mine's workforce. These new crops included: tomato, onions, pumpkin, pineapple, maize, eggplant, beans, potato, cabbage, watermelon, mandarin and oranges (Moulik 1977, 29). Traditional gardening methods, however, continued to be used. Secondly, the loss of man-power as more men gained wage employment, meant that less attention was paid to cash crops and production decreased (Moulik 1977, 37). Pig raising also became less important, for a variety of reasons, and many households no longer kept pigs.

Construction of the Bougainville Copper Mine resulted in the relocation of some villages. Applied Geology Associates (1989) undertook a study of these villages and their gardens. It was found that a greater incidence of disease and poor production of certain crops occurred in these relocated village when compared with villages located further away from the mine. Applied Geology Associates (1989, 5.36-5.37) suggested two main reasons for this: firstly, reduced access to land meant that gardens could not be moved as frequently; and secondly, with the increased flow of cash, less attention was paid to gardens.

An Atolls Resettlement Scheme operated from 1984. Carteret Islanders resettled at Kuveria, 30 km from Arawa along the Kieta-Buka Highway (Kukang et al. 1987; O'Collins 1990). All the settlers reportedly had left the scheme in the late 1980s, prior to the Bougainville crisis.

Page et al. (1987) conducted a study of foods eaten by a number of different communities in North Solomons. On Bougainville, the areas chosen for the study were Nasioi (this system), Nagovisi (System 2008) and Aita (System 2005). Aita, located inland on the northern end of the island and away from the money of the Bougainville Copper Mine certainly stood out in the comparison. People in the Aita area ate substantially more taro and yam than did those living in Nagovisi and Nasioi. For example, 78 per cent claimed they ate 'plenty' of taro compared with 12 per cent in Nasioi and 4 per cent in Nagovisi. People in Nagovisi and Nasioi ate substantially more introduced (or purchased) foods. For example, 86 per cent of people in Nasioi and 90 per cent in Nagovisi claimed they ate 'plenty' of rice compared with only 21 per cent in Aita.

The main cash crop grown in the Nasioi area in the early 1970s was coconut, for the production of copra, though it was not cultivated until during the German administration (Ogan 1972, 25). There was some cacao grown in the area, but it was not so widely nor so uniformly distributed as coconut. This was mainly because of the greater care required to grow cacao trees, due to their need for shading, and because they produced for fewer years than coconut trees (Ogan 1972, 125).

Lea (1970) conducted a study of activities in a number of villages in Papua New Guinea, including Pavaese near Kieta. He reported that it was the most cash-oriented village in the study and that considerable areas of the village were planted with cocoa and coconuts.

Prior to the Bougainville crisis, cocoa, copra and marketed food provided signficant cash income. Some temperate climate vegetables were also grown for sale in Arawa. The cash economy largely collapsed as a result of the Bougainville crisis. In 1996, some fresh food, seafood and fish were being marketed in Arawa and in the nearby government controlled area. Pig meat, chickens and ducks also provided a little income. By late 1998, production and sale of cocoa had commenced again. Minor quantities of bêche-de-mer were sold occasionally. Villagers were bartering garden produce for manufactured household needs such as soap, sugar and kerocene.

National Nutrition Survey 1982/83
In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References
None.

Other References
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PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 8	**Subsystem No.** 1 **of** 1
Districts 2 Buin	**Subsystem Extent** 100 %	**Area (sq km)** 1179
Population 23,122	**Population density** 20 **persons/sq km**	**Population absent** 4 **%**

System Summary

Located in southwest Bougainville, bounded by Empress Augusta Bay, the Crown Prince Range and the Mivo River, and centered on Boku station. Fallow vegetation is tall woody regrowth, typically 4-8 years old. Some previous unused forest has been cleared during the Bougainville crisis. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana and coconut are important crops; other crops are Chinese taro, cassava, sago, yam (D. alata), taro and rice. Two to four plantings are made before land is fallowed. Sweet potato is usually planted in mounds about 30-40 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-950 **Slope** Gentle (2-10 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Coconut
STAPLES PRESENT	Banana, Cassava, Chinese taro, Coconut, Sago, Sweet potato, Taro (Colocasia), Yam (D. alata), Other
OTHER VEGETABLES	Aibika, Choko tips, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Pumpkin tips, Tulip, Bean (snake)
FRUITS	Malay apple, Mango, Pawpaw, Pineapple, Sugarcane, Watermelon, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Tall woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	5-15 years
CROPPING PERIOD	3-5 plantings
R VALUE	29 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	None
CROP SEGREGATION	Minor
CROP SEQUENCES	None
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Significant
2 Fresh food	Minor
3 Pig meat	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	Minor
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Minor
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	Minor
SEASONAL SEC'DARY CROPS	Minor

OTHER DOCUMENTATION

Survey description

In June-October 1996, interviews with four people from the Nagovisi and Siwai areas. No field visits were made.

Boundary definition

The boundary with System 2006 is in the Empress Augusta Bay area; that with System 2007 is the Crown Prince Range; and that with System 2009 is the Mivo River. All boundaries are based on interviews and are not precise.

Notes

This system is very similar to System 2006 to the northwest but cassava is an important food there. It is distinguished from the systems to the east and southeast (Systems 2007 and 2009) where generally only one planting is made before fallowing and Chinese taro is an important crop.

The Bougainville crisis (1989-1997) has had a major impact on southwest Bougainville. However, conditions were becoming more normal by late 1996. Many people in the Siwai language area had been living in national government controlled care centres and some were dependent on rice for food supplied by the government. By late 1996, it was reported that virtually all villages in this system were producing their own food. The crisis has resulted in the collapse of the cash economy, particularly cocoa production. Many villagers have moved into forested areas to avoid fighting. Food gardens are reported to be larger now because of the unavailablity of imported food. People were growing some rice for subsistence; growing more tobacco than pre-crisis; and eating more self sown foods, including ferns, ficus leaves, wild yams and the basal portion of a wild banana-type plant.

Fallow periods are typically 4-8 years long. Because of the crisis situation, many people have moved further from villages and roads and are making food gardens in previously unused forest. It is not known what proportion of gardens are being cleared from previously unused forest. Fallow periods have become much shorter since the late 1960s-early 1970s when Mitchell (1976, 24-25) reported that some gardens followed fallows 20 or more years in length. Three persons interviewed reported that two or three plantings were made before fallowing and a fourth informant stated that three or four plantings were made. Hence the range is reported here as 2-4 plantings.

Some river fish are eaten, but only people living on the coast eat sea fish. Sago is eaten when garden food is scarce, particularly in the wettest months of June and July. Connell (1978) reported that sago was produced regularly as part of the normal diet in the Siwai (this system) and Eivo (System 2007) language areas and, to a lesser extent, in other parts of Bougainville. A semi-permanent type of yam is planted in non-garden areas. The tubers are harvested and vines persist for up to three years. It is used as an emergency food. Pigs are generally kept in separate locations away from food gardens and they are fenced in. Hence gardens are rarely fenced. Sweet potato is usually planted in mounds 30-40 cm high, but the first planting after a fallow may not be grown in mounds.

Taro is now only a minor food crop and and is planted in plots on the edge of sweet potato gardens. Very occasionally, a planting of sweet potato will be followed by a planting of Chinese taro. Occasionally, a crop of peanuts is planted as the first planting after a fallow. This is followed by a sweet potato crop. Minor vegetables eaten include Chinese cabbage, ginger, mushrooms, spring onion and tomato. Galip was a very important seasonal food previously and is still a significant seasonal food. Connell's (1977) review of hunting and gathering among the Siwai has an extensive review of galip (canarium) nut collection (p. 11-13), as well as sago production (p. 14-21), hunting and fishing. More tobacco has been planted since the crisis because people cannot purchase tobacco or cigarettes.

There are three main language groups which fall within the boundaries of this system: the Nagovisi, the Siwai and the Banoni. Detailed accounts of the agricultural practices are given by Mitchell (1976) for the Nagovisi and by Oliver (n.d., 1955; 1973; 1991) for the Siwai.

Oliver (1955) described the agricultural practices of the Siwai in 1938. Taro dominated as the most important crop with sweet potato, then a recent introduction, increasing in importance (Oliver 1955, 27). Progressive cultivation of gardens was used. This involved different plots within each garden containing taro at different stages of maturity. Using Mitchell's (1976, 50) terminology, the 'leading edge' of the garden was cleared of fallow vegetation and then planted with taro as the 'trailing edge' was abandoned following a harvest. Only one planting of taro was made before fallowing, with planting and harvesting being continuous processes (Oliver 1955, 22-23). This procedure was followed, not only for plots within gardens, but also for rotation of gardens. The 'ideal' technique was to have three gardens used in a rotation with each garden containing different stages of the cropping/fallow cycle. This would ensure a garden was under fallow for the appropriate time required for restoration of soil fertility (Oliver 1955, 24).

Notes continued

Gardens were almost always made in secondary forest after fallow periods of approximately 6 years, by which time trees were of an appropriate size for use in fence building (Oliver 1955, 23). All gardens were fenced to keep pigs out (Oliver 1955, 22). Mitchell (1976, 59-60) suggested that this had also been the case for the Nagovisi but that the fences had since been moved from around gardens to around the pigs.

Taro and sweet potato were planted in separate gardens. Other crops grown in taro gardens included: tobacco, banana, yam, gourd; and occasionally maize, tomatoes and tiny red peppers (Oliver 1955, 26-27). Coconut palms were grown around dwellings and coconuts were consumed daily (Oliver 1955, 27). Breadfruit was eaten in early May-mid June. Galip nuts were eaten in July-August. Galip trees were not planted, however special care was taken not to damage these trees during the clearing of fallow for a new garden, and fences were erected around seedling to protect them. Sago was eaten as a substitute staple, often when gardens had been left unattended for long periods.

Nuts, edible leaves, ferns, mushroom and fungi were collected from the forest; 'wild' sago, wild yam and wild taro were eaten during food shortages which very rarely occurred; hunting, mainly for pigs and possums, was important and fishing was an occasional activity (Oliver 1955, 30-31).

During his 1938-39 fieldwork, Oliver (n.d., 42) observed some differences in the diets of 'mountain tribes' as compared with those of the 'plainsmen', and between 'coast dwellers' and 'inlanders'. Mountain tribes tended to rely more heavily on yams and sweet potato than did the plainsmen; they ate less coconut flesh and oil because they had fewer stands; and they ate less pork because their pigs tended to be smaller. Coast dwellers ate substantially more fish than did inlanders.

Sweet potato became dominant after taro blight devastated taro during World War II (Mitchell 1976, Nash 1974, 13). Mitchell (1976) described these sweet potato gardens. He gave a detailed description of what he referred to as 'the ideal garden' (Mitchell 1976, 50-52). Whilst it is 'idealised', it is representative of the general procedure used by the Nagovisi in garden management. The general concept is that there are three main areas or plots within the garden; each with either a first, second or third (and final) planting. These were, of course, not strictly adhered to since some mixing of plantings occurred (for example, second plantings in first planting plots) and there were sometimes more than three plantings (Mitchell 1976, 68). The 'leading edge' of the garden was cleared for first plantings as the 'trailing edge' was abandoned and left to fallow after the third, or final, planting. This was a fairly continuous process as new plantings were made within four days of a harvest (Mitchell 1976, 58). Ideally, a garden would 'drift' in this manner until there was no more bush to clear at the leading edge. This progressive cultivation continuing for more than five years was not uncommon (Mitchell 1976, 50). He gives sweet potato yields for plantings 1-5, with highest yield in the first planting (p. 72).

In a typical Nagovisi garden, 85-90 per cent of the area was planted with sweet potato; yams were planted along the edges of the garden; Xanthosoma or Colocasia taro were planted between sweet potato plots; and cassava planted in plots which were being abandoned. Other crops grown included banana, pawpaw, cucumber, watermelon, pumpkin, tomato, green onion, peanuts, edible pitpit, sugarcane, beans, various leafy greens, tobacco and, only immediately after clearing fallows, corn (Mitchell 1976, 54).

Sweet potato was grown on mounds, called 'gan', which averaged 1 m in diameter, but ranged between 0.75-1.5 sq m in area, and between 25-35 cm in height. In general, these mounds tended to be larger for second and third plantings and smaller, and more widely spaced, on slopes (Mitchell 1976, 57). The main tool used in the garden was a large hoe, called a 'baila' and was used to form mounds. The traditional dibble stick was used occasionally to plant taro but a spade was never used in the garden (Mitchell, 1976, 56-57).

Approximately 0.1 ha of fallow vegetation was cleared at the leading edge of the garden at any one time and such 'heavy clearing' was done 5-6 times a year (Mitchell 1976, 58). In some sites, the fallow period was 20 years or more and in other sites the period was shorter (p. 24-25). Mitchell (1976, 56) described the procedure used to clear fallow vegetation. The first step was the clearing of small trees (up to 10 cm in diameter) and underbrush using a bush knife. Then, some time up to a month or more later, scaffolding would be erected around the larger trees to assist with felling. Where possible, these trees were felled to form boundaries either between different gardens or between different sections within a garden. Some palms of the Areca family were left standing, their slender trunks later acting as stakes for yams. The cleared areas were then left for 2-4 months, during which time herbaceous and shrubby vegetation, called 'lakena', grew. The 'lakena' would then gradually be cut away as the area was prepared for first plantings. All cut vegetation was left to dry then heaped against stumps or fallen trees and carefully set alight; staying alight for several

days as more material was heaped onto the fire. The ash produced was rarely spread around the garden. It was usually left where it was and tobacco or tomato would later be planted in the ash heap.

Notes continued

According to Nash (1981, 122), Buin and Siwai farming practices had always tended to produce a greater output than those of the Nagovisi. She suggested that more efficient work organisation and longer working hours may have explained this.

Page et al. (1987) conducted a study of foods eaten by a number of different communities in North Solomons. On Bougainville, the areas chosen for the study were Nasioi (System 2007), Nagovisi (this system) and Aita (System 2005). Aita, located inland on the northern end of the island and away from the money of the Bougainville Copper Mine certainly stood out in the comparison. People in the Aita area ate substantially more taro and yam than did those living in Nagovisi and Nasioi. For example, 78 per cent claimed they ate 'plenty' of taro compared with 12 per cent in Nasioi and 4 per cent in Nagovisi. People in Nagovisi and Nasioi ate substantially more introduced (or purchased) foods. For example, 86 per cent of people in Nasioi and 90 per cent in Nagovisi claimed they ate 'plenty' of rice compared with only 21 per cent in Aita.

Connell (1978) described the search for a successful cash crop among the Siwai, beginning with rice in the 1950s, coffee, copra, cattle and finally, the widespread adoption of cocoa. The introduction of cacao as a cash crop had two major impacts on the Nagovisi agricultural practices (Mitchell 1976, 81). Cacao is a relatively permanent crop. This meant that the flexibility of the subsistence agriculture decreased. Thus, areas planted with permanent crops could not then be used again for subsistence purposes. The second impact was a disruption to the fallow cycle. Cacao was usually planted in the areas of the garden which were being abandoned after the final planting of subsistence crops and thus inhibited the return of fallow vegetation. Poor growth of coconut palms and associated low yields in southwest Bougainville were attributed by Sumbak (1970) to insufficient solar radiation.

Prior to the Bougainville crisis, cocoa was the main source of cash income and significant areas of land were devoted to cocoa. Production collapsed during the crisis, but cocoa was again becoming important by late 1998. During the crisis years, cash income was restricted to sale of fresh food, pigs, chickens, ducks and a little locally grown rice. Very small quantities of copra were sent out to Buka Passage from Marau (near the Joba River) on the west coast during the crisis.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

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PROVINCE 20 Bougainville	**AGRICULTURAL SYSTEM No.** 9	**Subsystem No.** 1 **of** 1
Districts 2 Buin	**Subsystem Extent** 100 %	**Area (sq km)** 574
Population 13,528	**Population density** 24 **persons/sq km**	**Population absent** 5 **%**

System Summary

Located in southern Bougainville between the Laluai and Mivo Rivers, and centred on Buin station. Fallow vegetation is short woody regrowth, typically 2-5 years old. Fallow vegetation is cut, dried and burnt. Sweet potato is the most important crop; banana, Chinese taro and coconut are important crops; other crops are taro, yam (D. alata) and rice. Chinese taro and taro are planted in plots on the edge of sweet potato gardens. Usually only one planting is made before fallowing. Sweet potato is usually, but not always, planted in mounds 30-40 cm high.

Extends across provincial border to System(s) None

Altitude range (m) 0-800 **Slope** Multiple classes

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	Banana, Chinese taro, Coconut
STAPLES PRESENT	Banana, Chinese taro, Coconut, Sweet potato, Taro (Colocasia), Yam (D. alata), Other
OTHER VEGETABLES	Aibika, Choko tips, Corn, Cucumber, Ferns, Kumu musong, Lowland pitpit, Peanuts, Pumpkin tips, Tulip
FRUITS	Malay apple, Mango, Pawpaw, Pineapple, Sugarcane, Watermelon, Golden apple, Guava
NUTS	Breadfruit, Galip, Pao
NARCOTICS	Betel nut (lowland), Betel pepper (lowland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Short woody regrowth
SHORT FALLOW	None
LONG FALLOW PERIOD	1-4 years
CROPPING PERIOD	1 planting
R VALUE	25 (low)

GARDEN SEGREGATION

GARDEN SEGREGATION	None
CROP SEGREGATION	Minor
CROP SEQUENCES	Minor
MIXED VEGETABLE GARDENS	None
HOUSEHOLD GARDENS	None

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	None
PLANTED TREE FALLOW	None
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Cocoa	Significant
2 Fresh food	Minor
3 Pig meat	Minor

OTHER AGRONOMIC PRACTICES

Water Management:	
DRAINAGE	None
IRRIGATION	None
Soil Management:	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Significant
TILLAGE	None
MECHANIZATION	None
DEEP HOLING	None
MULCHING	None
SOIL RETENTION BARRIERS	None
Mounding Techniques:	
VERY SMALL MOUNDS	None
SMALL MOUNDS	Significant
MOUNDS	None
LARGE MOUNDS	None
Garden Bed Techniques:	
BEDS SQUARE	None
BEDS LONG	None
Other Features:	
FENCES	Minor
STAKING OF CROPS	None
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	None

OTHER DOCUMENTATION

Survey description

In August and October 1996, interviews with four people from the Buin area. No field visits were made.

Boundary definition

The boundary with System 2007 is near the Laluai River; that with System 2008 is near the Mivo River. These boundaries are based on interviews, not field traverses, and are not precise.

Notes

This system is similar to that to the north (System 2007), except that fallow periods there are somewhat longer (5-10 years) and fallow vegetation is consequently taller. It differs from that to the west (System 2008) where fallow periods are longer, fallow vegetation is taller, 2-4 plantings are made before land is fallowed and Chinese taro is not an important crop.

The Bougainville crisis (1989-1997) has had a major impact on the economy and lives of people in this system. Many villagers have been living in national government controlled care centres and have been dependent on imported rice for their subsistence. Even in early 1997, there were an estimated 13,000 people still subsisting on rice. The crisis has resulted in the collapse of the cash economy, particularly cocoa production.

Fallow periods were reported by the four informants as ranging from 2-5 years in the flat lowlands. In inland mountainous locations, fallow periods were reported as 10-15 years and sometimes more than 20 years. The crisis situation has resulted in the concentration of people in care centres with food gardens located near these centres. This has resulted in even shorter fallow periods over the past eight years. Usually only one planting is made before fallowing, except where a crop of peanuts follows sweet potato. Occasionally, a second planting of sweet potato is made.

Taro is uncommon in the lowlands but more is grown at higher elevations in inland locations. Some subsistence rice is now being grown because people cannot purchase imported rice as a result of the crisis. A little cassava is grown and sago is eaten very occasionally. The main green vegetables are aibika and pumpkin tips. Choko tips are more significant at higher altitude locations. Tulip leaves and the young tips are gathered from self-sown trees. Galip trees are very common.

Chinese taro and taro are planted in plots on the edge of sweet potato gardens. Banana is interplanted with sweet potato. Fallow vegetation is usually cut, dried and burnt, but sometimes tree trunks and other material are thrown onto the edge of the garden. Chinese taro is planted in these sites.

Sweet potato is usually planted in mounds 30-40 cm high, but sometimes it is grown without mounding, especially on hilly land. The soil is usually not tilled completely, except for peanut crops. Pigs are kept in locations separate from food gardens and hence garden fences are uncommon.

In 1973-74, Moulik (1977) conducted a study of the effects of the Bougainville Copper Mine in both the Buin and Kieta subdistricts. However, he does not differentiate within these boundaries. Throughout the Buin subdistrict, sweet potato was the most important crop with taro and yam also important. Other crops grown were sugarcane, pawpaw, banana, breadfruit, sago, some nuts and leafy vegetables. Gardens were located 10-140 minutes walk from the village (average of 55 minutes) on inland plains and plateaux. The average garden size over all of Bougainville was estimated at two acres per annum under cultivation. However, garden sizes tended to be smaller in the Kieta subdistrict than in the Buin subdistrict (Moulik 1977, 29). Fishing was an almost non-existent activity, but pig raising remained important (p. 31).

Moulik (1977, 28) suggested that road access was one explanation for differences in the changes in agricultural practices which occurred between these two regions. In the Buin subdistrict, lack of road access to Bougainville Copper Mine, and therefore to its employees, meant that sale of fresh food was not an appealing source of cash income, so the new crops which were introduced into the Kieta subdistrict were not adopted in the Buin subdistrict. That is, more traditional subsistence activities were continued in the Buin subdistrict than in the Kieta subdistrict (Moulik 1977, 29).

According to Nash (1981, 122), Buin and Siwai farming practices had always tended to produce a greater output than those of the Nagovisi. She suggested that more efficient work organisation and longer working hours may explain this.

Notes continued

Moulik (1977, 36) stated that cash cropping activities were more important in the Buin subdistrict (this system) than in the Kieta subdistrict (System 2007). In contrast to Kieta, all Buin households included in the study had some land under cash crops. Cocoa and copra sales contributed over 80 per cent of total cash income in the Buin area (Moulik 1977, 35). Moulik suggested that in the Kieta subdistrict, having paid employment at the Bougainville Copper Mine meant less time was available for tending crops. Poor growth of coconut palms and associated low yields in southwest Bougainville were attributed by Sumbak (1970) to insufficient solar radiation.

Prior to the Bougainville crisis, cocoa was the main source of cash income and most households were involved in cocoa production. A little copra was also produced and sold. During the crisis years, export cash cropping collapsed. Cocoa production had resumed by late 1998. There is some sale of fresh food, such as sweet potato and peanuts, pig meat, chickens and ducks. The market at Tokaino is said to be well supplied.

National Nutrition Survey 1982/83

In this province, the survey was conducted during 1980 and no dietary recall information was collected.

Main References

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Other References

Nash, J. 1981 Sex, money, and the status of women in aboriginal south Bougainville. American Ethnologist 8, 1, 107-126.

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4. AGRICULTURAL SYSTEMS: MAPS

The maps show the location of the Agricultural Systems identified in the Province and selected important characteristics of the systems. Where subsystems exist within an Agricultural System, the maps display information from the first subsystem only. Subsequent subsystem information is not displayed, but it is available in the text summaries. For crop combinations, cash income activities, population density and population absent, the maps show information for the entire system. A note in the key on the Agricultural Systems map lists the systems in which subsystems occur. Maps can be produced from computer files at any scale down to 1:500 000.

The following notes explain the classes used on the maps.

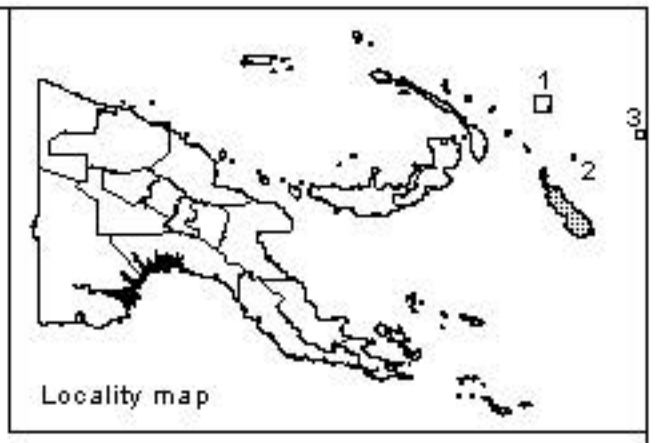
Map title	Notes
1. Agricultural Systems	Boundaries and identification numbers (eg. 1 = System 1401). See key for subsystem occurrences.
2. Fallow vegetation	The vegetation cleared from garden sites at the beginning of a new period of cultivation (8 classes).
3. Long fallow period	An estimate of the length of time land is left fallow before it is cultivated again (4 classes).
4. Number of plantings before fallow	The number of times staple crops are planted in the main gardens before those gardens are returned to a long fallow (5 classes).
5. Intensity of land use	Ratio of the cropping period (estimated from the number of plantings) to the length of the complete cultivation cycle, ie. cropping period plus fallow period (4 classes based on Ruthenberg's R factor)[1]. Very low: (R < 10) Low: (R = 10 - 32) Medium: (R = 33 - 66) High: (R > 66).
6. Crop combinations	Combinations of the most important (dominant staple) and important (subdominant staple) crops in this Province.

[1] R = (Number of years of cultivation x 100) / (Number of years of cultivation + Number of years of long fallow), (Ruthenberg 1980, 15)

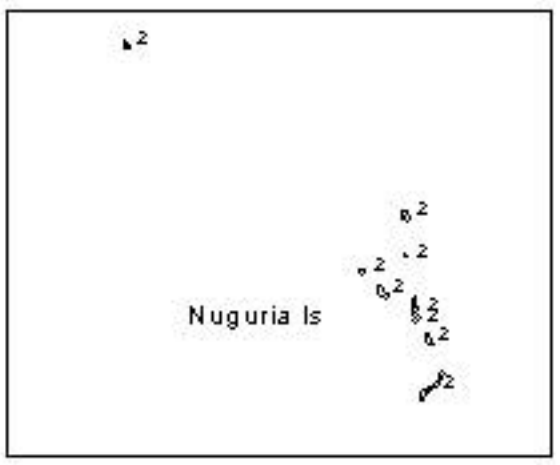
Map title	Notes
7. Garden and crop segregation	Separation of crops into different gardens or into different plots within a garden (4 classes). A combination of Fields 28 and 29. For both fields, 'nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present'. Classes are: both absent = 'No segregation'; garden segregation present only = 'Garden segregation'; crop segregation present only = 'Crop segregation'; both present = 'Garden and crop segregation'.
8. Soil fertility maintenance	The presence or absence of the following: legume rotation, planted tree fallow, composting and mulching. For all features, 'nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present'.
9. Soil tillage	The use of tillage in the preparation of land for cultivation (4 classes).
10. Fallow clearing practices	A combination of the practices of burning fallow vegetation before planting, and cutting down fallows onto crops after planting. For both features, 'none' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present' (3 classes).
11. Soil mounds and beds	A combination of measures of significance for mounds and beds: Medium and large mounds are classed together as 'large mounds'. Square and long beds are classed together as 'beds'. Very small mounds are excluded. Absent = 'none' and 'minor or insignificant' for all mounds and beds. Present = 'significant' and 'very significant' for all mounds and beds (6 classes).
12. Water management techniques	The presence or absence of the following: drainage, irrigation and soil retention barriers. For all features, 'nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present' (4 classes).

Map title	Notes
13. Cash income activities	Combinations of cash earning activities specific to this province. For all activities, 'nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present'.
14. Seasonality of the main food crops	Whether the dominant staple (most important) crops and the subdominant staple (important) are planted at about the same time each year. 'Nil' and 'minor or insignificant' are defined as 'absent'; and 'significant' and 'very significant' as 'present' (2 classes).
15. Population density	Persons per square kilometre, based on the 1980 National Population Census and the area occupied by the System (6 classes). 'Not applicable' refers to Systems where there are no census points.
16. Population absent	The proportion of the 'total' population listed in the 1979 Provincial Data System Rural Community Register as being 'absent 6 months or more' from the Census Unit (5 classes). 'Not applicable' refers to Systems where either there are no census points, or where the PDS data do not distinguish between the 'total' and 'resident' populations.

BOUGAINVILLE PROVINCE
Agricultural systems




Nissan Is



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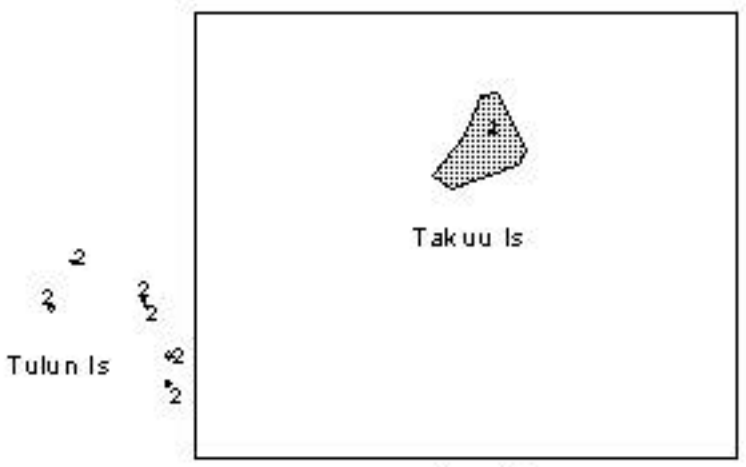

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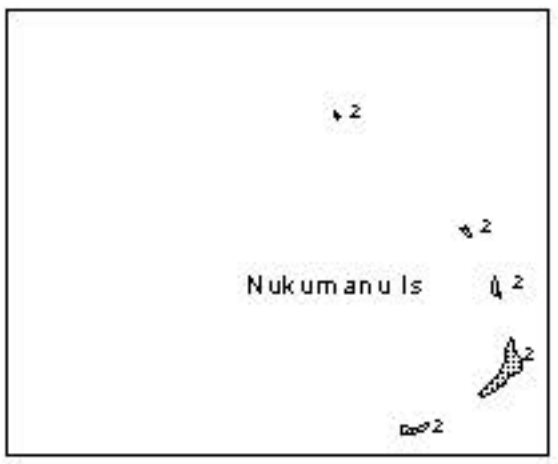
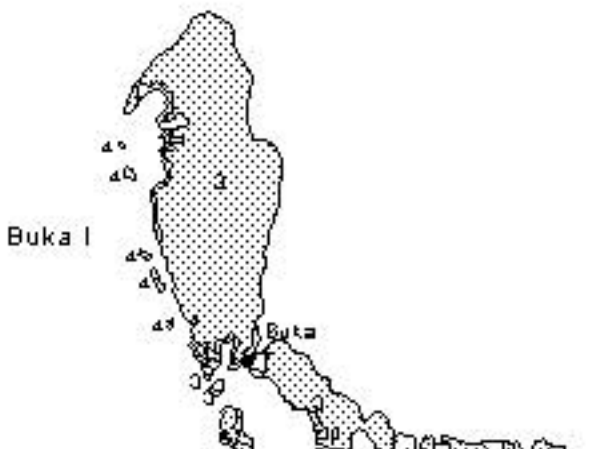
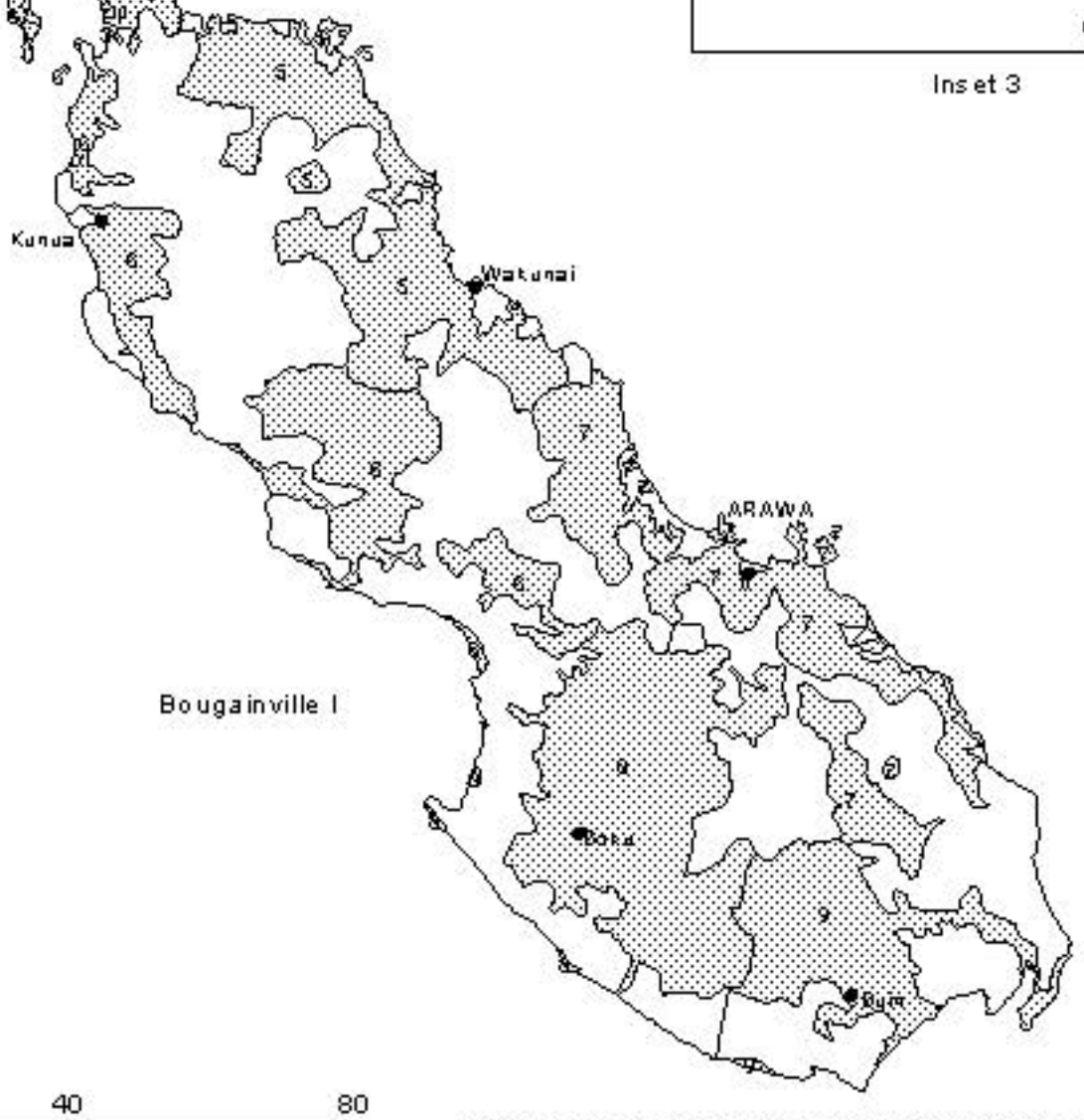


Inset 3





No agriculture
Agricultural system identified by number

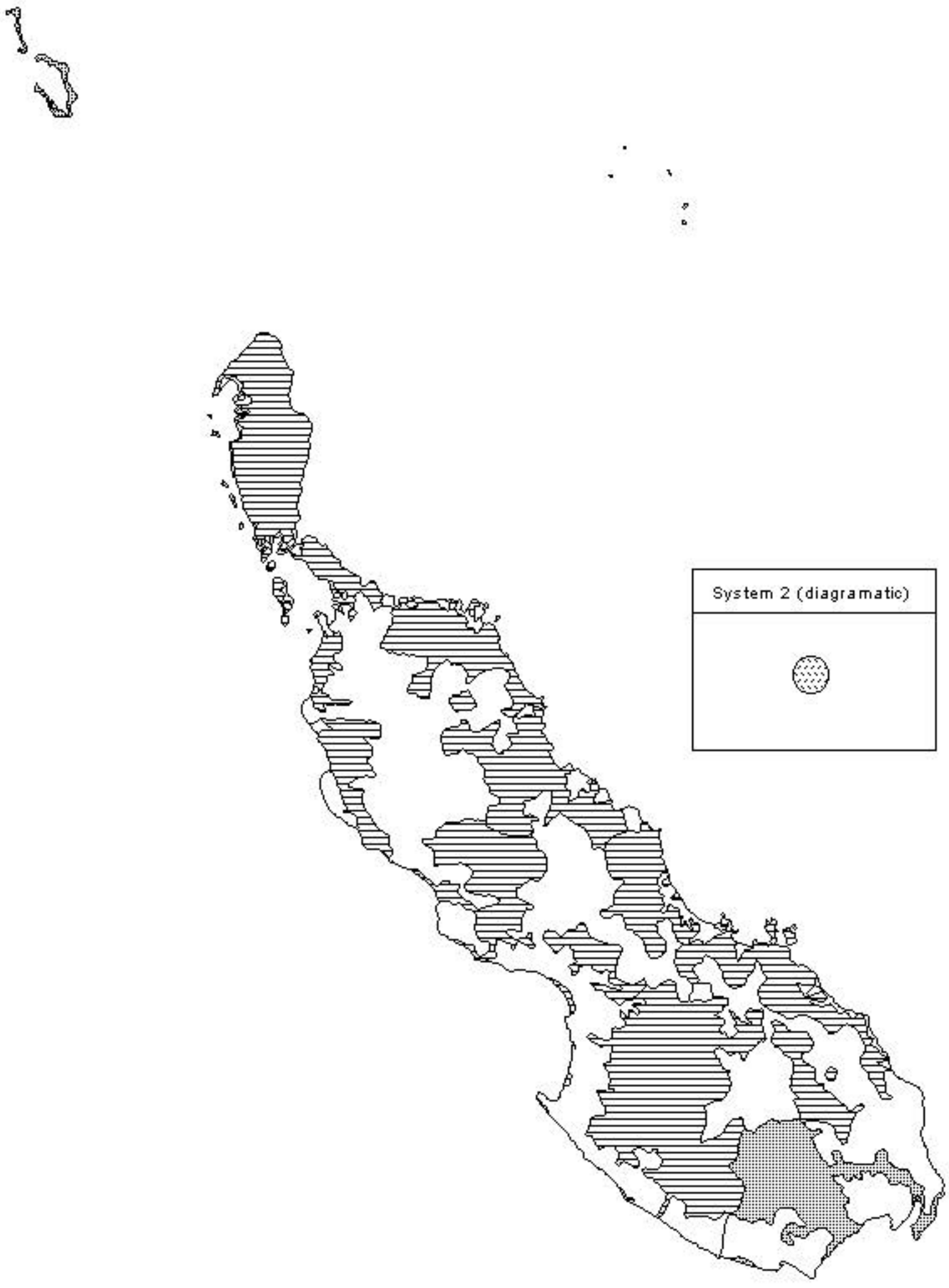
40 0 40 80
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Fallow vegetation

- Short woody regrowth
- Tall woody regrowth
- No long fallow



System 2 (diagramatic)

40 0 40 80

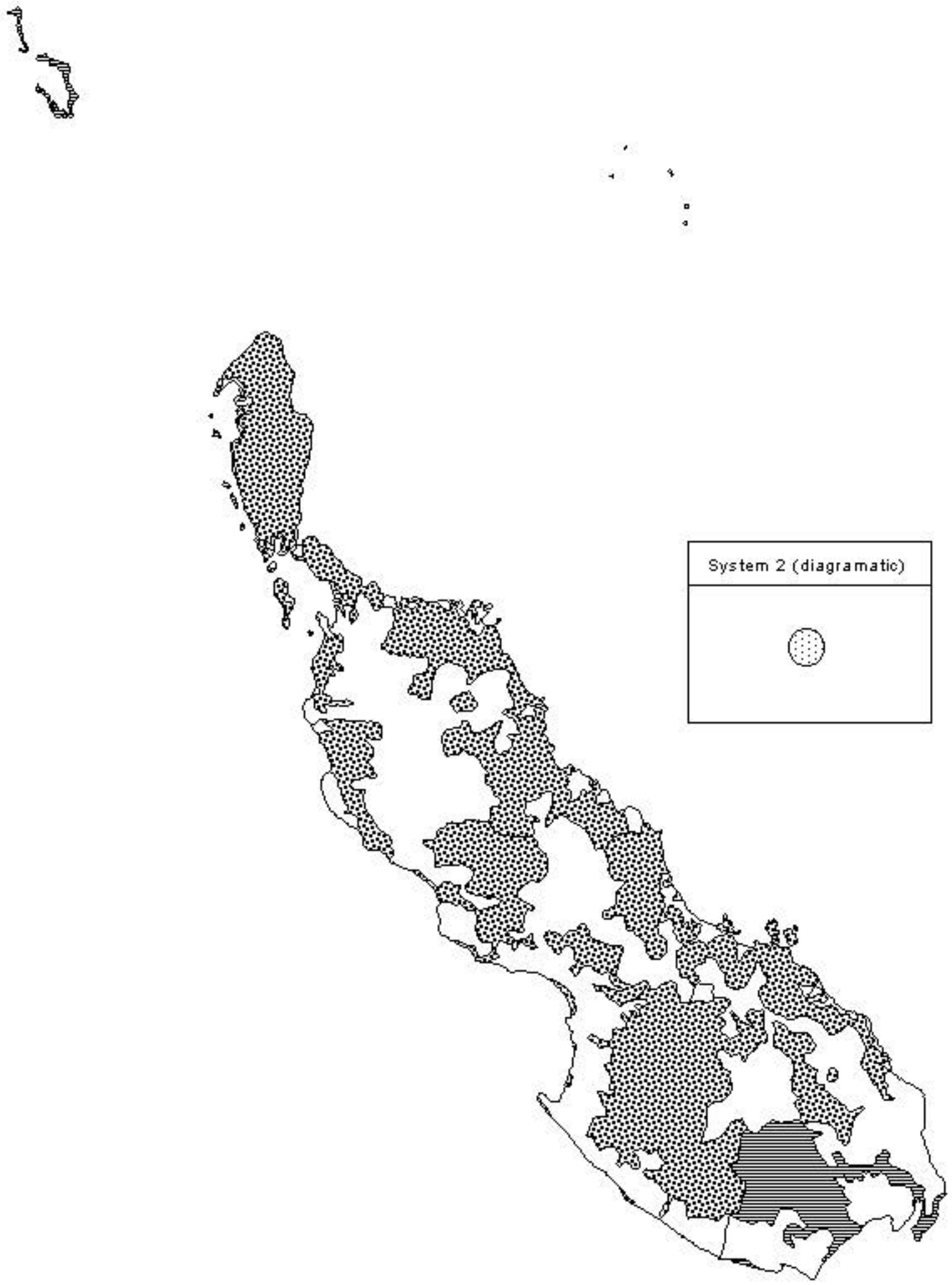
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Long fallow period

- No long fallow
- 1 to 4 years
- 5 to 15 years



System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Number of plantings before fallow

- 1 planting only
- 3 to 5 plantings
- More than 40 plantings

System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

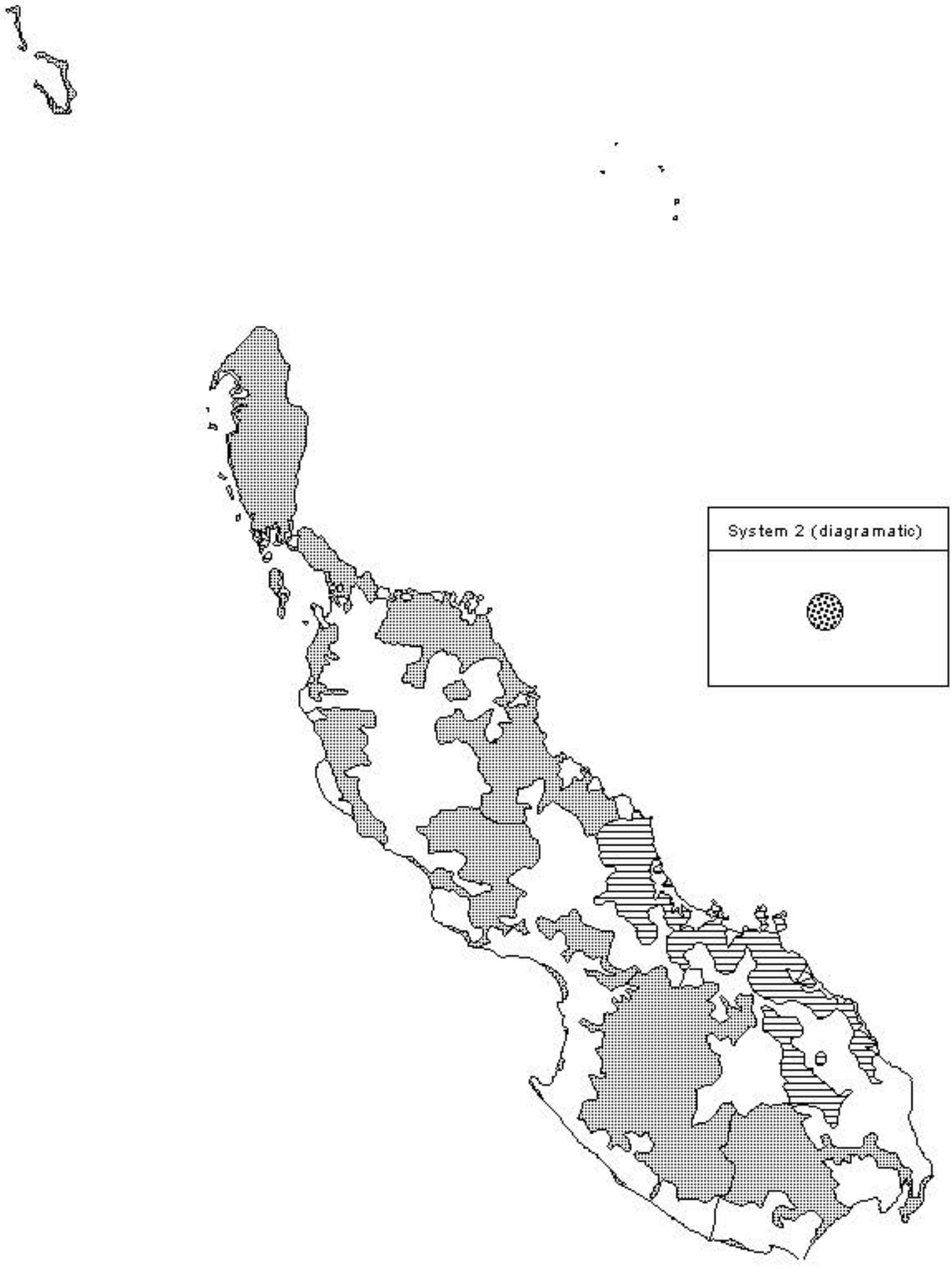
BOUGAINVILLE PROVINCE

Intensity of land use

Ratio of cropping period to fallow period

- Very low
- Low
- High

System 2 (diagramatic)



40 0 40 80

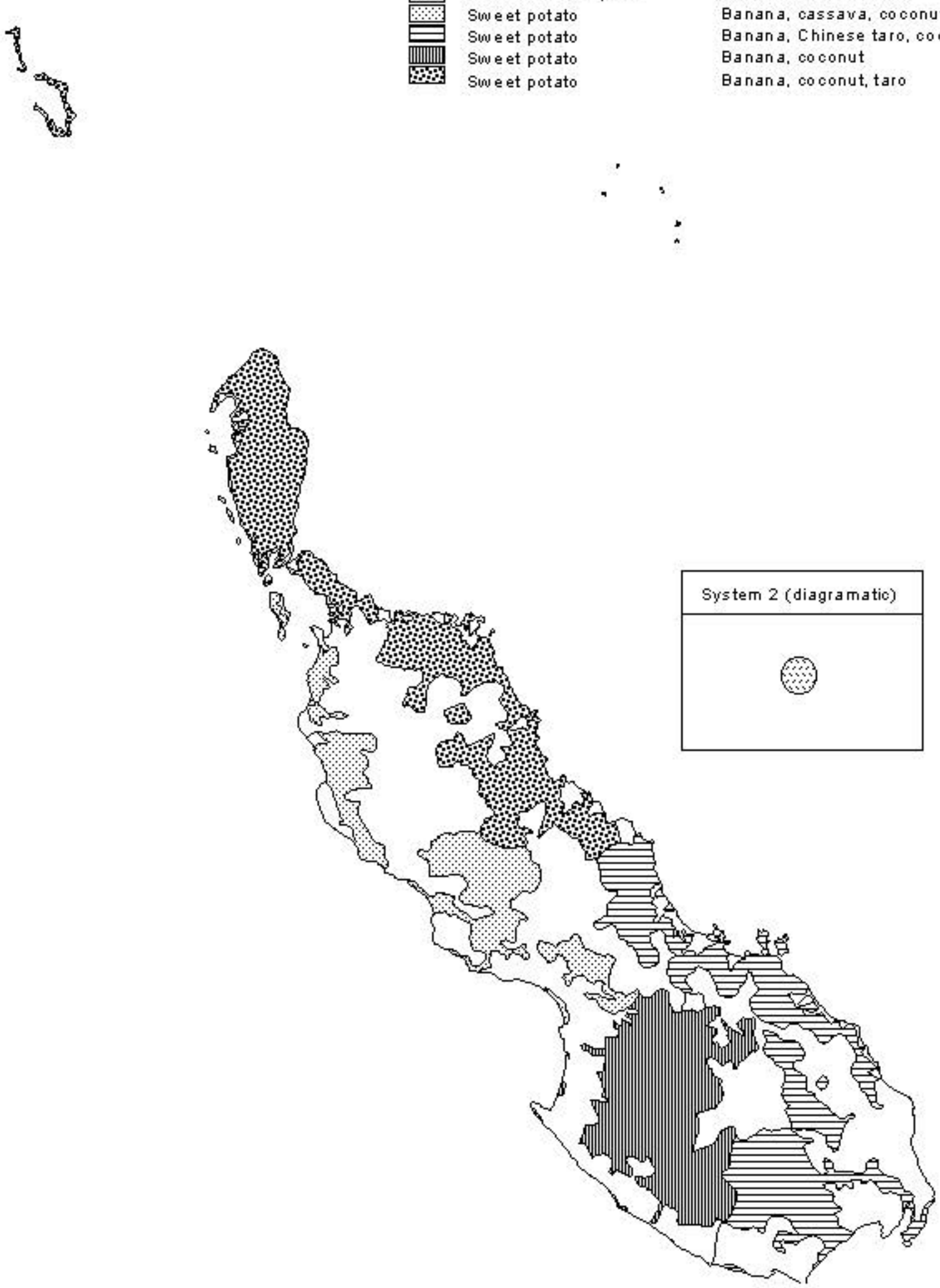
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Crop combinations

Most important crops	Important crops
Coconut, swamp taro	Cassava, sweet potato
Sweet potato	Banana, cassava, coconut
Sweet potato	Banana, Chinese taro, coconut
Sweet potato	Banana, coconut
Sweet potato	Banana, coconut, taro



40 0 40 80

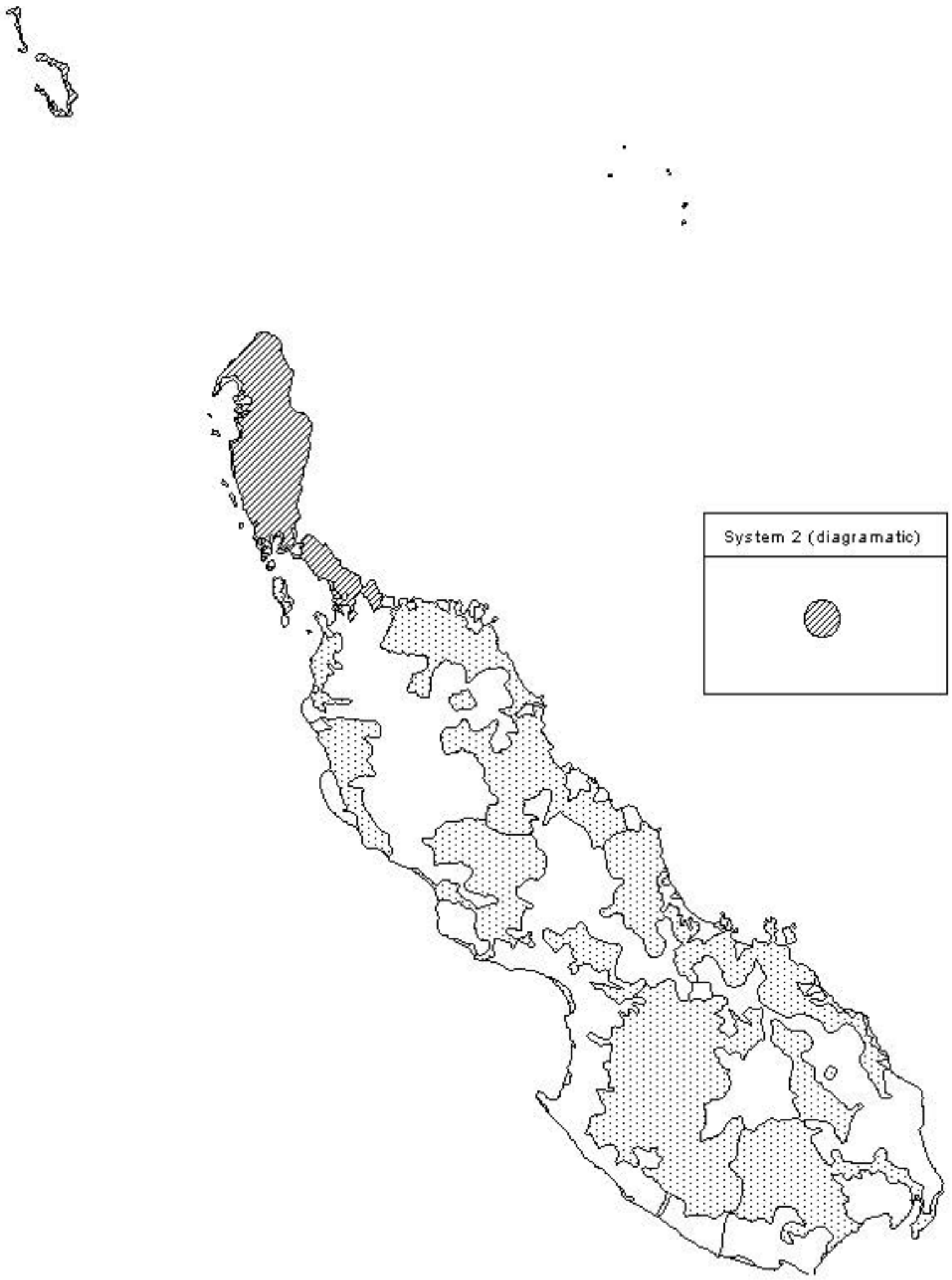
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Garden and crop segregation

- No segregation
- Garden segregation



System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Soil fertility maintenance

Long fallow only
Mulch

System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Soil tillage

None

System 2 (diagramatic)

40 0 40 80

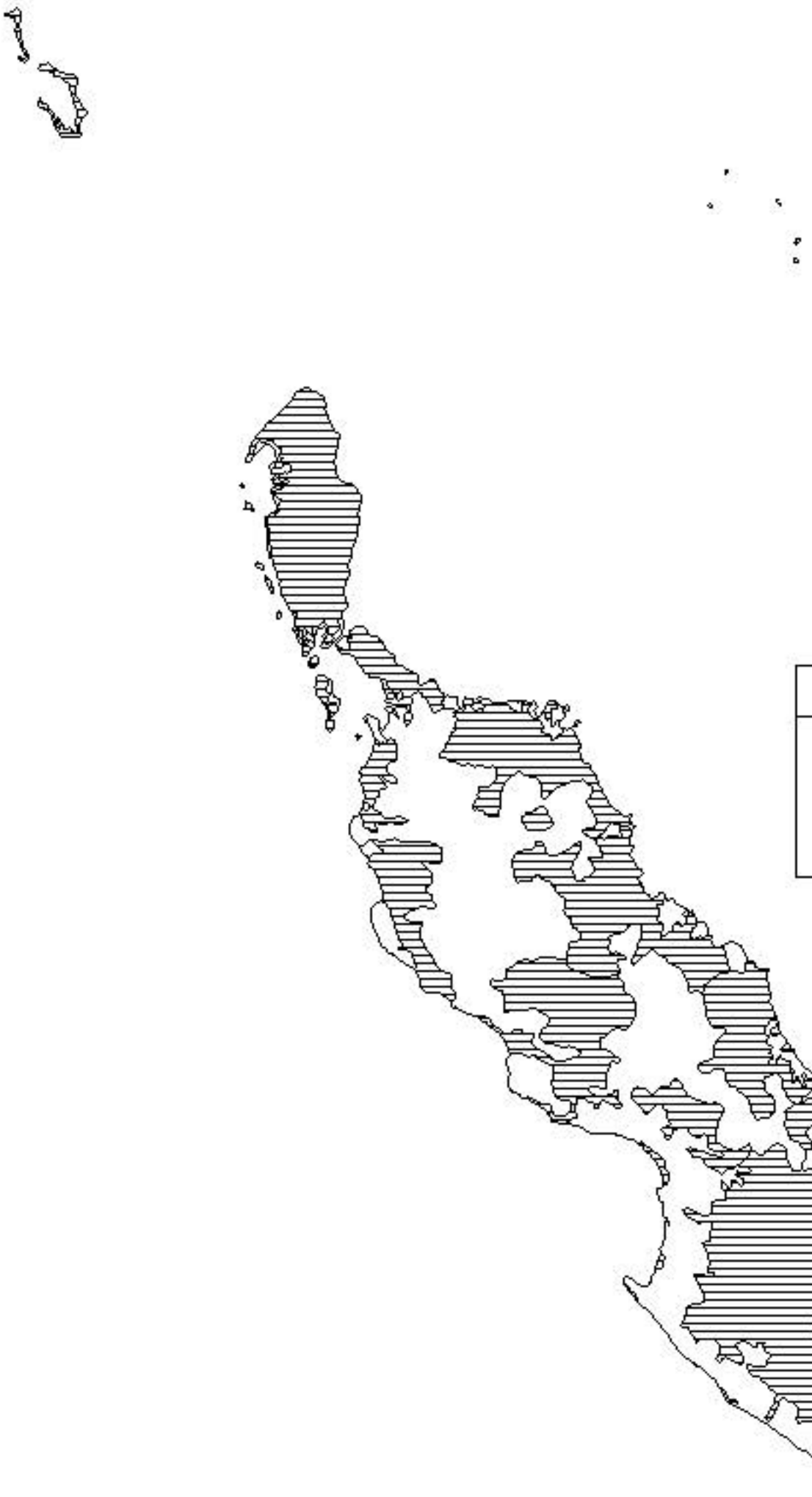
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Fallow clearing practices

- Fallow cut and not burnt
- Fallow cut and burnt



System 2 (diagramatic)

40 0 40 80

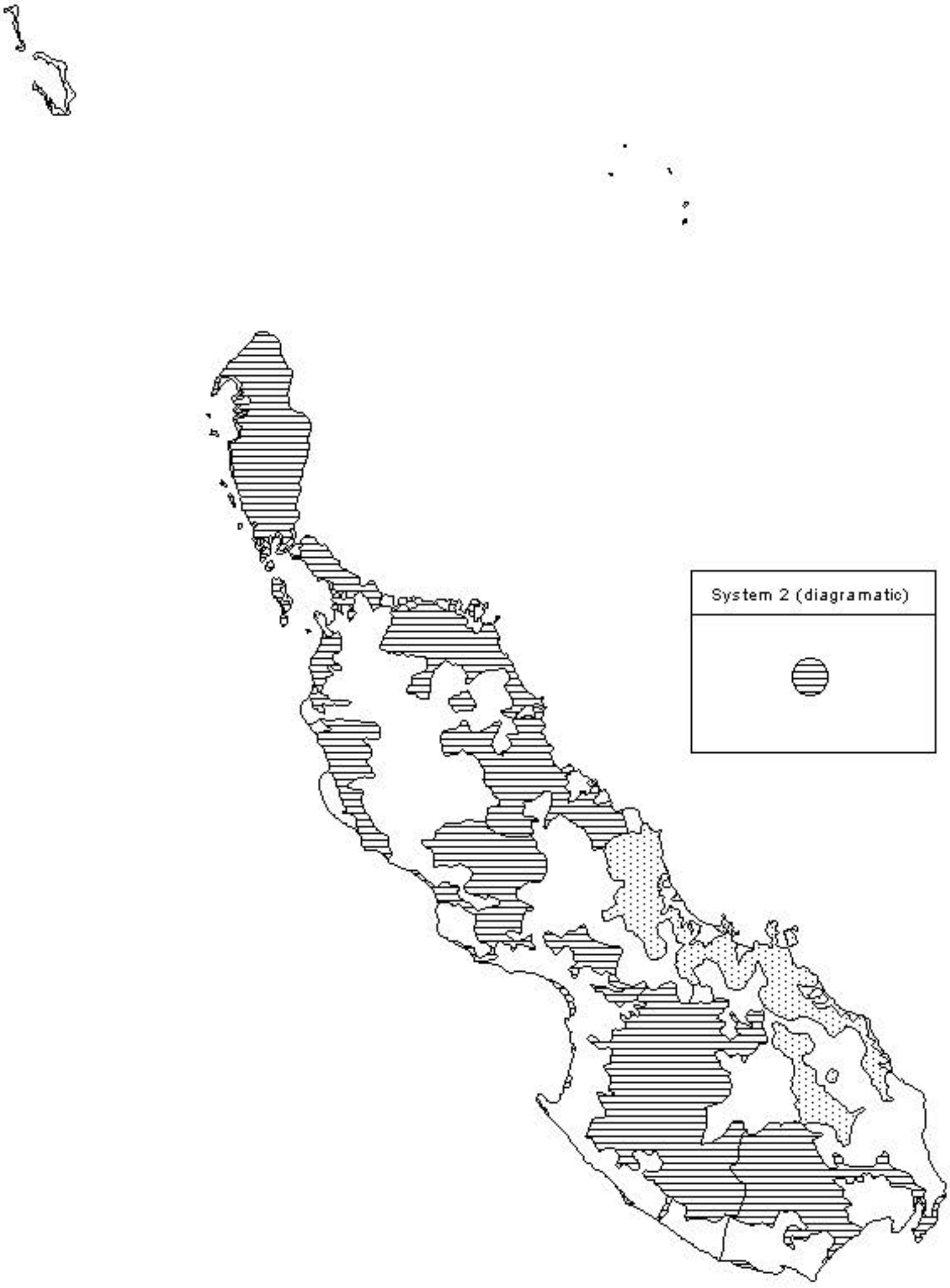
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Soil mounds and beds

- Mounds and beds absent
- Small mounds present and beds absent



40 0 40 80

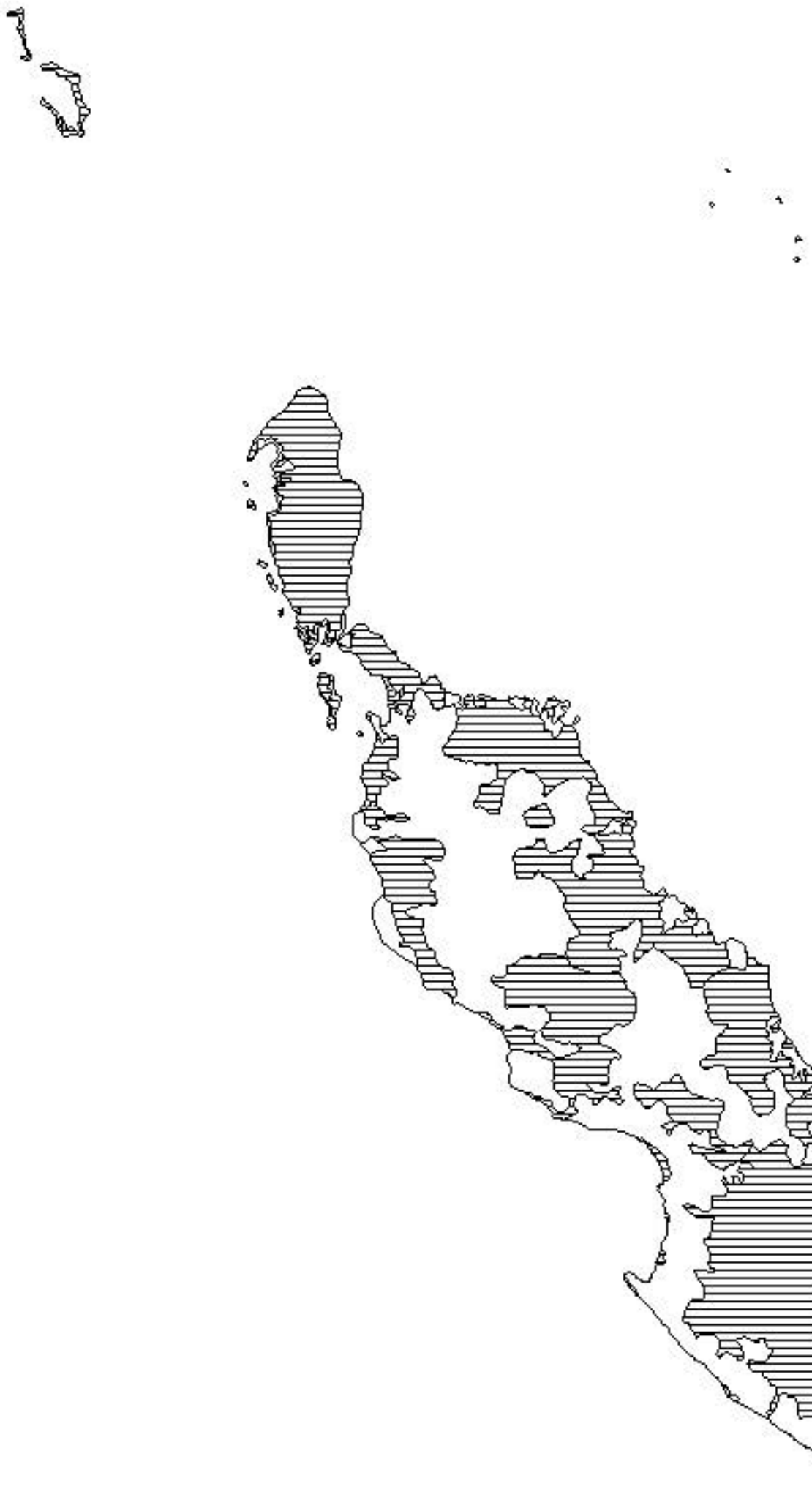
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Water management techniques

No water control



System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Cash income activities

- No significant cash income
- Cocoa
- Cocoa, coconut, fresh food
- Coconut, fish
- Fish

System 2 (diagramatic)

40 0 40 80

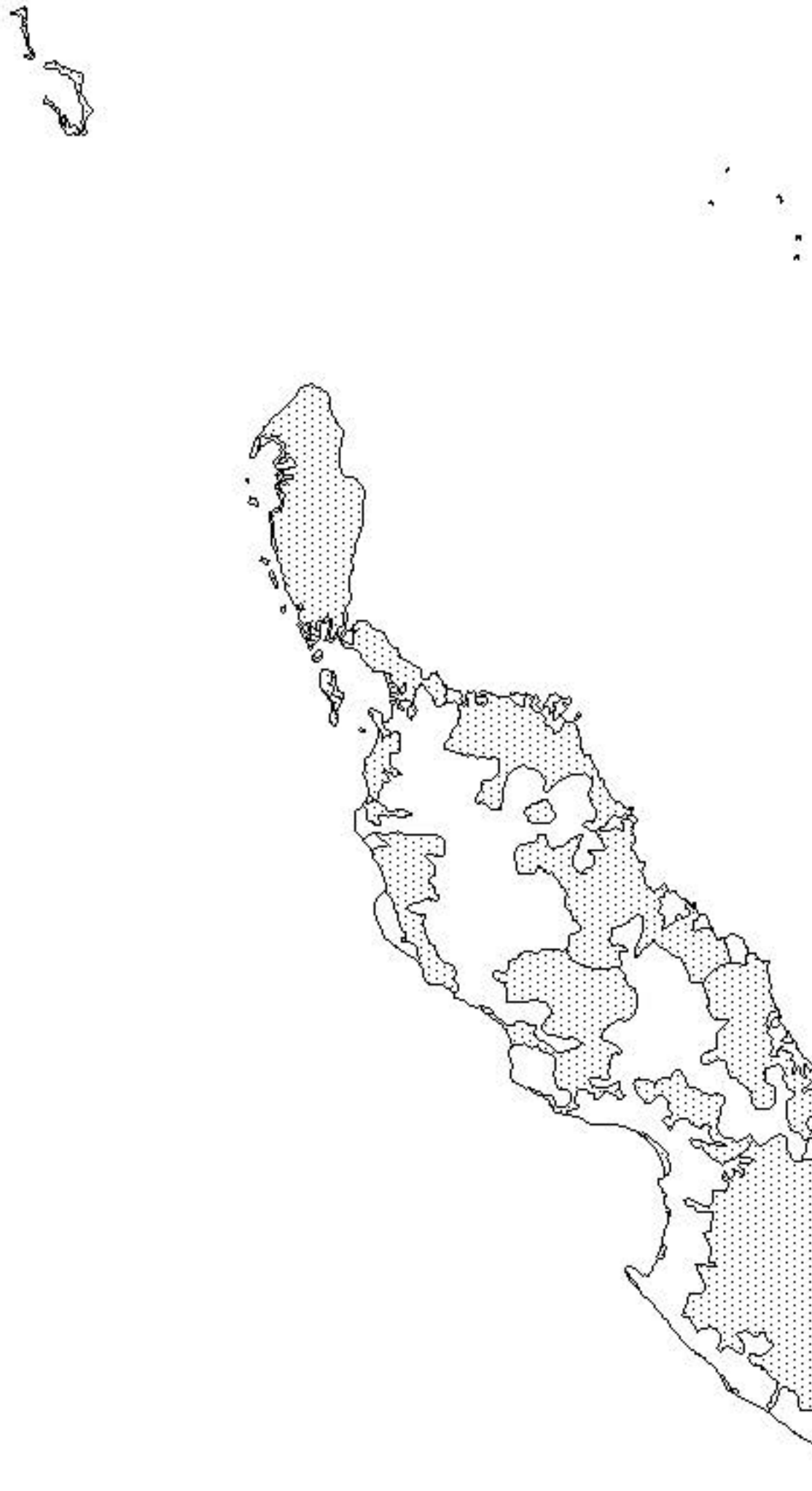
Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Seasonality of main food crops

No seasonal planting



System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

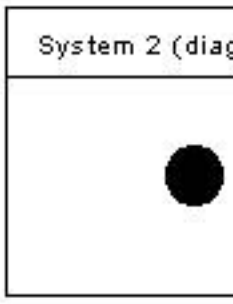
BOUGAINVILLE PROVINCE

Population density

Persons per square kilometre

- below 10
- 10 - 24
- 25 - 49
- 50 - 74
- 75 - 99
- above 99

System 2 (diagramatic)



40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

BOUGAINVILLE PROVINCE

Population absent

Percentage

- below 5
- 5 - 9
- 10 - 14
- 15 - 19
- above 19

System 2 (diagramatic)

40 0 40 80

Kilometers

Mapping Agricultural Systems Project, Human Geography, ANU; PNG DAL; Geography, UPNG, 1999

5. AGRICULTURAL SYSTEMS: DATA LISTING BY CODES

The following tables list all of the information contained within the database in coded form. The codes are contained in Section 2, Database Structure, Definitions and Codes.

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub sys	No. of subsys	Subsys extent	Same sys oth prov	Districts	Census Divisions
2001	1	1	4		1	01
2002	1	1	4		1	01
2003	1	1	4		1	02-03-04
2004	1	1	4		1	03
2005	1	1	4		1-3	06-16
2006	1	1	4		1-2	05-07
2007	1	1	4		3	13-14-15
2008	1	1	4		2	07-08-09-10
2009	1	1	4		2	11-12

KEY

Subsys	Subsystem
Same sys oth prov	Same system in other province

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub sys	Area km^2	Population			Altitude range m		Slope	Fallows		
			Total	Abs	Den	Low	High		Veg	Sht	Per
2001	1	38	2991	13	79	0	20	2	4	0	1
2002	1	16	1607	26	100	0	3	1	7	1	0
2003	1	678	17739	18	26	0	80	1	5	0	2
2004	1	6	1423	35	237	0	20	1	4	1	1
2005	1	846	12500	4	15	0	700	5	5	0	2
2006	1	849	7834	8	9	0	500	5	5	0	2
2007	1	858	16557	5	19	0	1100	3	5	0	2
2008	1	1179	23122	4	20	0	950	2	5	0	2
2009	1	574	13528	5	24	0	800	5	4	0	1

KEY

Subsys	Subsystem		
Area km^2	Area of System		
Population		**Fallows**	
Total	Resident population 1980	Veg	Type of Fallow vegetation
Abs	Absent population (%)	Sht	Short fallows
Den	Population density (persons/km^2)	Per	Long fallow period

AGRICULTURAL SYSTEM DATA LISTING - CODES Province: 20 Bougainville

System	Sub sys	Staple crops			Narcotic crops
		Most import	Important	Present	
2001	1	11	02-06-13	02-04-05-06-11-12-13-14-15	2-4-5
2002	1	06-10	04-11	02-04-05-06-10-11-12-13	
2003	1	11	02-06-13	02-04-05-06-11-13	2-4-5
2004	1	11	02-04-06	02-04-05-06-11-13	2-4
2005	1	11	02-06-13	02-04-05-06-11-13	2-4-5
2006	1	11	02-04-06	02-04-05-06-11-13-14	2-4-5
2007	1	11	02-05-06	02-05-06-11-13-14	2-4-5
2008	1	11	02-06	02-04-05-06-09-11-13-14-17	2-4-5
2009	1	11	02-05-06	02-05-06-11-13-14-17	2-4-5

KEY

Subsys Subsystem

AGRICULTURAL SYSTEM DATA LISTING - CODES Province: 20 Bougainville

System	Sub sys	Vegetable crops	Fruit crops	Nut crops
2001	1	01-07-09-15-21-24-27	03-04-07-12-15-16-23-35	01-06-07-12-15
2002	1	01-21-24-27-30-32	03-04-05-12-15	01-07-12-15
2003	1	01-08-09-11-15-16-21-23-27-32	03-05-07-12-15-17-23	01-06-12
2004	1	01-08-09-11-15-16-19-21-32	03-05-06-07-12-15-17	01-06-07-12
2005	1	01-09-10-11-15-16-21-23-30-32	05-07-09-12-13-15-17-23	01-06-12
2006	1	01-08-09-10-11-15-16-21-27-32	05-06-07-09-12-15-17-23	01-06-12
2007	1	01-08-09-10-11-15-16-21-31	05-06-07-09-12-15-17-23	01-06-12
2008	1	01-08-09-10-11-15-16-21-23-27	05-07-12-13-15-17-23	01-06-12
2009	1	01-08-09-10-11-15-16-19-21-23	05-07-12-13-15-17-20-23	01-06-12

KEY

Subsys Subsystem

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub	Segregation		Crop	Gard types		Soil fertility maintenance techniques						
	Sys	Gar	Crp	Seq	Mix	H'ld	Leg	Tre	Com	Man	Isl	Sil	Fer
2001	1	2	1	0	0	2	0	0	0	0	0	0	0
2002	1	3	1	1	0	2	0	0	0	0	0	0	0
2003	1	2	1	0	0	0	0	0	0	0	0	0	0
2004	1	0	1	1	0	1	0	0	0	0	0	0	0
2005	1	1	1	1	0	0	0	0	0	0	0	0	0
2006	1	1	1	1	0	0	0	0	0	0	0	0	0
2007	1	1	1	0	0	0	0	0	0	0	0	0	0
2008	1	0	1	0	0	0	0	0	0	0	0	0	0
2009	1	0	1	1	0	0	0	0	0	0	0	0	0

KEY

Subsys Subsystem

Segregation

Gar Garden

Crp Crop

Crop seq Crop sequences

Gard types **Garden types**

Mix Mixed vegetable gardens

H'ld Household gardens

Soil fertility maintenance techniques

Leg Legume rotation

Tre Planted tree fallow

Com Compost

Man Animal manure

Isl Island bed

Sil Silt from floods

Fer Inorganic fertilizer

AGRICULTURAL SYSTEM DATA LISTING - CODES Province: 20 Bougainville

System	Sub sys	Management techniques											
		Water		Soil						Fallow		Other	
		Irr	Drn	Pig	Till	Hol	Bar	Mul	Mec	Brn	Cut	Fen	Stk
2001	1	0	0	0	0	0	0	0	0	2	0	3	1
2002	1	0	0	0	0	0	0	2	0	1	0	0	0
2003	1	0	0	0	0	0	0	0	0	3	0	1	0
2004	1	0	0	0	0	0	0	0	0	2	0	0	0
2005	1	0	0	0	0	0	0	0	0	3	0	0	0
2006	1	0	0	0	0	0	0	0	0	3	0	0	0
2007	1	0	0	0	0	0	0	0	0	3	0	1	0
2008	1	0	0	0	0	0	0	0	0	3	0	1	0
2009	1	0	0	0	0	0	0	0	0	2	0	1	0

KEY

Subsys Subsystem

Management techniques

Water management

Irr Irrigation

Drn Drainage

Soil management

Pig Pigs placed in gardens

Till Tillage

Hol Deep holing (for yams)

Bar Soil retention

Mul Mulching

Mec Mechanized soil tillage

Fallow management

Brn Burning of cut vegetation

Cut Fallow cut onto crops

Other

Fen Fencing

Stk Staking of crops

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub sys	Management techniques						Crop planting seasonality		Cropping intensity	R value
		Soil mounds				Garden beds					
		Vsm	Sm	Md	Lge	Sq	Lg	Maj	Min		
2001	1	2	0	0	0	0	0	1	1	1	25
2002	1	0	2	0	0	0	0	0	0	6	100
2003	1	0	3	0	0	0	0	0	0	3	29
2004	1	0	3	0	0	0	0	0	0	3	57
2005	1	0	3	0	0	0	0	0	1	3	29
2006	1	0	3	0	0	0	0	0	0	3	29
2007	1	2	1	0	0	0	0	0	0	1	9
2008	1	1	3	0	0	0	0	1	1	3	29
2009	1	0	2	0	0	0	0	0	0	1	25

KEY

Subsys Subsystem

Management techniques

Soil mounds

Vsm Very small
Sm Small
Md Medium
Lge Large

Garden beds

Sq Square
Lg Long

Crop planting seasonality

Maj Dominant
Min Other crops

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub	Cash income sources											
	sys	An	Bet	Crd	Cat	Chi	Coc	Cnt	CfA	CfR	Crc	Fwd	Fsh
2001	1	0	0	0	0	0	0	1	0	0	0	0	2
2002	1	0	0	0	0	0	0	1	0	0	0	0	1
2003	1	0	1	0	0	0	2	3	0	0	0	0	0
2004	1	0	0	0	0	0	0	3	0	0	0	0	2
2005	1	0	1	0	0	0	3	1	0	0	0	0	1
2006	1	0	1	0	0	0	2	1	0	0	0	0	1
2007	1	0	0	0	0	0	2	0	0	0	0	0	0
2008	1	0	0	0	0	0	2	0	0	0	0	0	0
2009	1	0	0	0	0	0	2	0	0	0	0	0	0

KEY

Subsys Subsystem

Cash Income Sources

An	Animal skins	Chi	Chillie	CfR	Coffee Robusta
Bet	Betel nut	Coc	Cocoa	Crc	Crocodile
Crd	Cardamom	Cnt	Coconut	Fwd	Firewood
Cat	Cattle	CfA	Coffee Arabica	Fsh	Fish

AGRICULTURAL SYSTEM DATA LISTING - CODES
Province: 20 Bougainville

System	Sub	Cash income sources										
	sys	Fod	Op	Pot	Pyr	Ric	Rub	Shp	Tea	Tob	Ot1	Ot2
2001	1	0	0	0	0	0	0	0	0	0	0	0
2002	1	0	0	0	0	0	0	0	0	0	0	0
2003	1	2	0	0	0	0	0	0	0	0	0	0
2004	1	0	0	0	0	0	0	0	0	0	0	0
2005	1	1	0	0	0	0	0	0	0	0	0	0
2006	1	1	0	0	0	0	0	0	0	0	0	0
2007	1	1	0	0	0	0	0	0	0	0	0	0
2008	1	1	0	0	0	0	0	0	0	0	1	0
2009	1	1	0	0	0	0	0	0	0	0	1	0

KEY

Subsys Subsystem

Cash Income Sources

Fod	Fresh food	Ric	Rice	Tob	Tobacco
Op	Oil Palm	Rub	Rubber	Ot1	Other 1
Pot	Potato	Shp	Sheep	Ot2	Other 2
Pyr	Pyrethrum	Tea	Tea		

AGRICULTURAL SYSTEM DATA LISTING - CODES **Province: 20 Bougainville**

System	Sub sys	Survey 1				Survey 2				Survey 3			
		Date mth yr	Period yrs	Sv tp	Sv in	Date mth yr	Period yrs	Sv tp	Sv in	Date mth yr	Period yrs	Sv tp	Sv in
2001	1	09 92	-	3	H/W	- -	-	-		- -	-	-	
2002	1	09 92	-	2	MW	01 92	-	-	MW	- -	-	-	
2003	1	06 96	-	-	RMB	- -	-	-		- -	-	-	
2004	1	09 96	-	-	RMB	- -	-	-		- -	-	-	
2005	1	12 80	-	2	RMB	08 96	-	-	RMB	- -	-	-	
2006	1	10 96	-	-	RMB	- -	-	-		- -	-	-	
2007	1	12 80	-	2	RMB	08 96	-	-	RMB	- -	-	-	
2008	1	06 96	-	-	RMB	- -	-	-		- -	-	-	
2009	1	08 96	-	-	RMB	- -	-	-		- -	-	-	

KEY

Subsys	Subsystem	H/W	W. Humphrey/M. Woruba
Sv tp	Survey type	MW	M. Woruba
Sv in	Surveyor initials	RMB	R.M. Bourke

6. LISTINGS OF RURAL VILLAGES (CENSUS UNITS) INDEXED TO AGRICULTURAL SYSTEMS

All rural village Census Units in the 1980 National Population Census which are locatable on either the 1980 or 1990 Census Maps are assigned to an Agricultural System. The village name, National Population Census identification codes (Province, District, Census Division, Census Unit), population and Agricultural System number for each village is held as a single record in a population database (AGPOP). District and Census Division codes for this Province are listed in Appendix A.2.

This section provides three different listings from that database of rural villages indexed by Agricultural Systems:

6.1 Rural villages listed in census order (District, Census Division).

6.2 Rural villages listed in alphabetical order.

6.3 Rural villages listed by Agricultural System number (alphabetically within agricultural systems) with PNGRIS Resource Mapping Unit (RMU) numbers.

Abbreviations used are:

Dist	District name and number (see Appendix A.2)
Div	Census Division number (see Appendix A.2)
Population	1980 National Population Census count of population in a Unit
RMU	Provincial Resource Mapping Unit number (PNGRIS)
System	Agricultural System number
Village	Census Unit name
Unit	Census Unit number

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
DISTRICT	1 Buka		
Division	1 Islands		
1	AMOTU	241	2002
2	BALIL	335	2001
3	IANGAIN	121	2002
4	IESILA	86	2002
5	ILOSA	64	2002
6	IOLOHANAN	348	2002
7	KULIS	113	2001
8	LIHON	234	2001
9	MAPIRI	308	2001
10	MONTONIA	198	2001
11	NUGURIA	240	2002
12	NUKUTOA	507	2002
13	PIUL	143	2003
14	PORIWON	159	2001
15	ROGOS	124	2001
16	SALEPEN	128	2001
17	SIAKEN	128	2001
18	SIAR	136	2001
19	SIROT	69	2001
20	TANAHERAN	131	2001
21	TANAMALIT	205	2001
22	TARONGAL	157	2001
23	TEAH	199	2001
24	TERAUTUP	184	2001
25	YOTCHIBOL	183	2001
Division	2 Haku-Halia		
1	ELUTUPAN	446	2003
2	HAGUS	326	2003
3	HAHALIS	677	2003
4	HANAHAN	642	2003
5	HANPAN	179	2003
6	IELELINA	321	2003
7	KETSKETS	338	2003
8	KOTOPAN	283	2003
9	LEMANKOA	1096	2003
10	LEMANMANU	869	2003
11	LONTIS	941	2003
12	TANDEKI	373	2003
13	TOHATSI	406	2003
Division	3 Punen		
1	BARIKUA	337	2003
2	BEI	257	2003
3	BEIKUT	334	2003
4	GAGAN	585	2003
5	HAPAN	359	2003
6	HITAU	90	2004
7	KAHULE	162	2003
8	KOHINO	265	2003
9	KOHISO	410	2003
10	MATSUNGAN	214	2004
11	NOPAN	201	2003
12	NOVAH	335	2003
13	PETATS	588	2004
14	POKA	173	2003
15	PORORAN	357	2004
16	SAPANI	151	2003
17	TELATU	188	2003
18	TUNG	178	2003
19	YAPARU	174	2004
20	YEGITS	196	2003
Division	4 Buka Passage		
1	ANAKEI	135	2003
2	CHUNDAWAN	152	2003
3	GOGOHEI NO.1	322	2003
4	GOGOHEI NO.2	266	2003
5	GOHI	238	2003
6	HANGAN	230	2003
7	IETA	368	2003
8	KATSUNKOVERI	174	2003
9	LONAHAN	670	2003
10	MALASANG	886	2003
11	MANOB	231	2003
12	PORAPORA	61	2003
13	RAMUNDATA	100	2003
14	RATSUA	72	2003
15	RURI	192	2003
16	SIARA	244	2003
17	SING	537	2003
18	SOROM	156	2003
19	SUHIN	215	2003
20	TAHAITAHAI	608	2003
21	TAPSANWARA	215	2003
22	TARBUT	289	2003
23	TOROTEI	149	2003
24	UMUM	58	2003
Division	5 Konua		
1	AKOPAI	271	2006
2	AMUM	92	2006
3	ASTAPAI	212	2006
4	ATSILIMA	217	2006
5	AUKEI	127	2006
6	BETERAIO	269	2006
7	BOBOASI	54	2006
8	GOTON	94	2006
9	KAKAPARA	140	2006
10	KARARITU	73	2006
11	KAUBATEI	165	2006
12	KAUNA	332	2006
13	KAVIKI	249	2006
14	KEPUI	102	2006
15	KIAKARA	111	2006
16	KOATOROI	88	2006
17	KOPAI	123	2006
18	KOREPOVI	213	2006
19	KOSIPAI	79	2006
20	KUNAPOPO	114	2006
21	KUNOKOMOK	160	2006
22	KURUR	56	2006
23	LALUM	98	2006
24	LONKOGARI	96	2006
25	MAPISI	136	2006
26	MATITSORA	49	2006
27	MOSILAIE	68	2006
28	NAMBAROSI	89	2006

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
29	PETSPETS	77	2006
30	POKUITO	87	2006
31	POPOHERAI	133	2006
32	PUTO	92	2006
33	RUKUSSIA	71	2006
34	SAPOSA	381	2006
35	SISIAPAI	173	2006
36	MUIRE	179	2006
37	TAIOF	445	2006
38	TOHEI	185	2006
39	TOSIAVI	109	2006
40	TOTOKI	146	2006
Division	6 Teop		
1	ARAVIA	134	2005
2	DEOS	105	2005
3	HANTOBIN	120	2005
4	IAUN NO.1	44	2005
5	IAUN NO.2	151	2005
7	IRUE	90	2005
10	KOTOITA	179	2005
11	KOVANIS	160	2005
12	KUKURINA	91	2005
13	MELELUP	289	2005
14	MUTAHI	288	2005
15	NAMAKERIO	152	2005
16	NAMASIORA	186	2005
17	NAMATOA	320	2005
18	NEBLAHIU	156	2005
19	PATEAVEAVE	235	2005
20	POKAPA NO.1	279	2005
21	POKAPA NO.2	166	2005
22	PUSKOMBU	124	2005
24	RARIE	158	2005
25	ROMSIS	265	2005
26	SUANGU	80	2005
27	SUNVAHORA	282	2005
30	TEABES	52	2005
31	TEANANA	149	2005
32	TENDU	45	2005
33	TEOBUHIN NO.1	202	2005
34	TEOBUHIN NO.2	267	2005
35	TEOP	233	2005
36	TETAKUTS	48	2005
37	TOROBAI	62	2005
38	TOROKOKAPIA	265	2005
39	TSIKOT	75	2005
40	TSISIKO	290	2005
41	TSUNPETS	82	2005
42	TUMURI	110	2005
44	VAINANA	220	2005
45	VAROPA	203	2005
46	VASPOS	173	2005
47	WAUWANGINUVA	162	2005
DISTRICT	2 Buin		
Division	7 Bagana		
1	AGABAI	131	2008
2	ATANGATO	60	2006
3	BEREREKI	117	2008
4	JABA	148	2008
5	KABANAMI	53	2008
6	KARATO	137	2006
7	KAREKOPA	107	2006
8	KASIPEKE	50	2008
9	KAVAKAKATSU	67	2006
10	KENAIA	197	2006
11	KOIARE	156	2006
12	KORO	293	2008
13	KOROMAKETO	120	2006
14	KOROVI	165	2006
15	KUNIKA	149	2008
16	KUPON	201	2008
17	LABALAM	240	2008
18	LABONAMI	181	2008
19	LARUMA	92	2006
20	MAROWA	160	2006
21	MITSIKORI	91	2006
22	MOKOKOREU	190	2008
23	MOM	38	2006
24	MOMOGANARI	150	2008
25	NARINAI	107	2008
26	PANAM	258	2008
27	PIVA	99	2006
28	POLANAVIA	179	2008
29	RELA	230	2008
30	SIANEKI	203	2008
31	SIKOREWA	154	2008
32	TARUBA	193	2008
33	TSITO	80	2006
34	WARARIU	247	2008
35	WARUWARU	255	2008
36	WIWIARO	128	2008
Division	8 Basina		
1	AGAWA	111	2008
2	AUMARI	93	2008
3	BAKORAM NO.1	312	2008
4	BAKORAM NO.2	92	2008
5	BERETEMBA	35	2008
6	BIROI	111	2008
7	BIROS	237	2008
8	BOKU	170	2008
9	KONAWA	34	2008
10	KONGARA	86	2008
11	LARENAI	211	2008
12	LAVORO	123	2008
13	LOPERE	135	2008
14	MABES	129	2008
15	MARIGA	90	2008
16	MASIWAKORE	135	2008
17	MASUNKE	36	2008
18	MATONA	67	2008
19	MAWERE	138	2008
20	MENDAI	169	2008
21	MEWA	137	2008
22	MEWARAKA	30	2008
23	MINGETA	43	2008

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
24	MOAINO	120	2008
25	MOSIGETA	228	2008
26	MOSINO	202	2008
27	NAIRONA	31	2008
28	NUKUI	134	2008
29	OKARU	307	2008
30	ORORO	205	2008
31	OSIAGE	181	2008
32	OSILADA	64	2008
33	PERE	47	2008
34	PIKEI	280	2008
35	POMARATE	273	2008
36	LORO	325	2008
37	ROMARI	109	2008
38	ROTARE NO.1	115	2008
39	ROTARE NO.2	156	2008
40	SINSIRUAI	75	2008
41	SIPI	190	2008
42	TAGURI	149	2008
43	TAIDORIMA	75	2008
44	TAKEMARI	164	2008
45	WAITAWUNA	124	2008
46	WAKUPA	171	2008
Division	9 Rino		
1	AITARA	56	2008
2	AMEO	178	2008
3	ARAI	32	2008
4	DOMONINO	84	2008
5	HARI	190	2008
6	HARI KAKU	52	2008
7	HIRE	191	2008
8	HIRUHIRU	97	2008
9	HORINO	283	2008
10	HUKOHAH	158	2008
11	IRU	90	2008
12	KAKOTOKORI	147	2008
13	KAPARO	270	2008
14	KIMMAKU	94	2008
15	KOROPO	61	2008
16	KOTU	52	2008
17	KUMUKI	124	2008
18	KUPINKU	55	2008
19	LAKEMBA	63	2008
20	MAINOIATA	68	2008
21	MAMAGOTA	84	2008
22	MATUKORI	209	2008
23	MIHERO	134	2008
24	MOIBINEI	70	2008
25	MUWOKU	104	2008
26	NUKUI	94	2008
27	OSOKOLI	81	2008
28	PININAI	140	2008
29	PURIKORI	68	2008
30	RABAULU	179	2008
31	RUUNAI	49	2008
32	SININNAI	62	2008
33	SIRARUHO	80	2008
34	SIROI	176	2008
35	TOHU	79	2008
36	TOIRA	48	2008
37	TOITOI	94	2008
38	TOKUNUTU	133	2008
39	TONNUI	121	2008
40	TONU	91	2008
41	UNUNAI	130	2008
42	USO	118	2008
43	MANNAKE	34	2008
44	RUPUMMO	56	2008
Division	10 Pongo		
1	HANONG	78	2008
2	HINO	100	2008
3	IEGU	83	2008
4	KAPANA	121	2008
5	KINIRUI	176	2008
6	KOKUI	184	2008
7	KUHINO	54	2008
8	KUNU	210	2008
9	KUTIN	94	2008
10	LAKU	90	2008
11	MAISUA	97	2008
12	MATERAS	103	2008
13	MOKOLINO.1	88	2008
14	MOKOLINO.2	103	2008
15	MOROKAIMORO	149	2008
16	MORONEI	210	2008
17	MUNU	196	2008
18	MUSIMINOI	232	2008
19	NARONAI	72	2008
20	PANAKE	171	2008
21	ROKUSEI	21	2008
22	RUSEI	366	2008
23	SIKUMONE	72	2008
24	SIKURAI	56	2008
25	SIURUHINO	154	2008
26	TURUGUM	172	2008
Division	11 Rerebere		
1	AKU	204	2009
2	BORUPI	102	2009
3	BURUBURUNNO	106	2009
4	IBIRO	96	2009
5	KANNAURO	309	2009
6	KIKIMOGU	189	2009
7	KOGISAGANO	102	2009
8	KOKOPO	239	2009
9	KONIGURU	229	2009
10	KUGUGAI	63	2009
11	KUKUMARU	259	2009
12	KUMIROGU	39	2009
13	LAGUAI	539	2009
14	LEROTU	174	2009
15	LOBIGOU	82	2009
16	LUKARARO	345	2009
17	MARAMUKU	83	2009
18	MATSIOUGU	138	2009
19	MOROU	309	2009
20	MORULA	138	2009

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
21	MOUAKEI	111	2009
22	NABAKU	237	2009
23	NAKARO	130	2009
24	NAKOREI	174	2009
25	NUMAKEI	124	2009
26	OKOMO	116	2009
27	OMITARO	74	2009
28	OREMUTSI	114	2009
29	PARERONO	177	2009
30	PIARINO	117	2009
31	PIRURUINO	66	2009
32	SIALAU	22	2009
33	SIURU	126	2009
34	TARAPA	131	2008
35	TOGULEGU	26	2009
36	TOKUAKA	14	2009
37	TSIMBO	150	2009
38	TUARAGAI	124	2009
39	TUBARU	192	2009
40	TUBOBISOU	113	2009
41	TUGIOGU N0.1 & 2	369	2009
42	TUGIU	282	2009
43	TURIGAU	158	2009
44	UBANMOIUTO	143	2009
Division	12 Porobere		
1	BOGISAGO	237	2009
2	BOTULAI	114	2007
3	IAMARU	104	2009
4	IPILAI	224	2009
5	IULA NO.1	189	2009
6	IULA NO.2	165	2009
7	IULA NO.3	99	2009
8	KAITU	133	2009
9	KAMOURO	270	2009
10	KEKEMONO	141	2007
11	KIKIBATSIOGU	98	2009
12	KOGU	95	2009
13	KOGUIKIRU	111	2009
14	KOMAI	32	2009
15	KOUKOUSINO	95	2007
16	KUGUIOGU	144	2009
17	KUKUMAI	150	2009
18	LAITARO	349	2009
19	LAKOVE	136	2009
20	LAMUAI	70	2009
21	LUAGUO	170	2009
22	LUILAU	134	2009
23	LUKAUKO	179	2009
24	MAIKA	136	2009
25	MALABITA	277	2009
26	MAMAROMINO NO.1	170	2009
27	MAMAROMINO NO.2	179	2009
28	MITUAI	87	2009
29	MOGOROI	188	2009
30	MORIU	95	2009
31	MUGUAI	184	2009
32	MUISURU	107	2009
33	NKUMU	50	2009
34	OKOIRAGU	126	2009
35	ORAVA	66	2009
36	OREMAI	307	2007
37	ORIA	182	2007
38	ORO ROI	112	2009
39	ORUMOI	82	2009
40	PAGUI	228	2007
41	PARERO	86	2009
42	PARIRO	455	2009
43	PAULOUKU	100	2009
44	PIRIRARO	123	2009
45	SADI	53	2009
46	SIUL	118	2009
47	SIURAI	116	2007
48	SULUKUNU	198	2007
49	TABAGO	127	2009
50	TAGURUAI	115	2009
51	TANTAREKI	233	2009
52	TUBARO	115	2009
53	TURUTAI	75	2009
54	UGUPAKOGU	76	2009
DISTRICT	3 Kieta		
Division	13 Koromira-Kongara		
1	AMAPONG	187	2007
2	AURUI	152	2007
3	BAKAKANI	156	2007
4	BANEI	181	2007
5	DAMBEWEI	51	2007
6	DAMAOSI	69	2008
7	DAMUNA	93	2007
8	DAMUNG	173	2008
9	DONGETA	222	2007
10	IORO	98	2007
11	ISINA	180	2007
12	KAMAROVI	151	2007
13	KAPIKAVE	236	2007
14	KARURU	72	2008
15	KEREMONA	150	2007
16	KURAI	207	2007
17	KURITAVE	187	2008
18	MANGONA	106	2007
19	MARILAU	110	2008
20	MARURA	134	2007
21	MINANI	84	2007
22	MORO	123	2008
23	MUAU	196	2008
24	MUNIAS	116	2007
25	NABUIA	64	2007
26	PEIWANA	147	2007
27	PIRENEIU	287	2007
28	PONDONA	68	2007
29	ROMEINA	122	2007
30	SIOROVI	132	2007
31	SIPURU	104	2008
32	SIPUREI	121	2007
33	SIROVAI	133	2008
34	TAKE	113	2007

6.1 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN CENSUS ORDER
Province: 20 Bougainville

	Village	Population	System
35	WIDA	100	2007
Division	14 Nasioi-Pirung		
1	AMION	123	2007
2	ANGANAI	155	2007
3	ARAWA	231	2007
4	BAIRIMA	120	2007
5	BAKATUNG	195	2007
6	BAKAWORI	106	2007
7	BONAMUNG	155	2007
8	BUNUMANG	114	2007
9	DAITA	85	2007
10	DARUTUE NO.1	207	2007
11	DARUTUE NO.2	279	2007
12	DINGUNA	114	2007
13	DOKOTORO	89	2007
14	DONSIRO	208	2007
15	KARAKUNG	119	2007
16	KARIKIRA	135	2007
17	KOBUAN	79	2007
18	KOKADEI	133	2007
19	KOVENANG	102	2007
20	KUKA	57	2007
21	KUPEI	169	2007
22	MAKENIKO	64	2007
23	MAUANG	171	2007
24	MOINANG	87	2007
25	MONGONTORO	102	2007
26	MORANGISINA	166	2007
27	NASIOI	207	2007
28	PANKAMA	51	2007
29	PARAIANO	142	2007
30	PAVAIRE	166	2007
31	PIDIA	174	2007
32	POKPOK	303	2007
33	POMA	248	2007
34	POMAUA	134	2007
35	ROROVANA NO.1	246	2007
36	ROROVANA NO.2	264	2007
37	RUMBA	291	2007
38	SIAIE	142	2007
39	SIBUNA	112	2007
40	SINKAI	64	2007
41	SIPA	50	2007
42	SIROMBA	117	2007
43	SIROMBANA	106	2007
44	TAULAPELIA	47	2007
45	TAVIDUA	112	2007
46	TOBOROI	141	2007
47	TOPINA	153	2007
48	UNABATO	103	2007
Division	15 Ioro-Eivo		
1	ALAKABAU	64	2007
2	ATAMO	413	2007
3	BOIRA	239	2007
4	BORUMAI	198	2007
5	BOVE	225	2007
6	DAPERA	431	2007
7	DARENAI	326	2008
8	DARU	112	2007
9	GUAVA	131	2008
10	IRANG	274	2008
11	KARNIVITU	326	2007
12	KOKOMATE	127	2008
13	KOKORE	396	2008
14	KOPANI	533	2007
15	KOPIKIRI	172	2007
16	KORPEI	420	2007
17	MAINOKI	346	2008
18	MORONI	89	2007
19	MUMURAI	318	2008
20	MUSINAU	235	2008
21	NASIWOIWA	243	2007
22	ONOVI	238	2008
23	ORAMI	333	2008
24	PAKIA	275	2007
25	PANKA	172	2008
26	PIAWORA	166	2008
27	PISINAU	225	2008
28	SIREONDJI	174	2007
29	SIROWAI	172	2007
30	SUIEMA(PAURA)	197	2007
31	TARARA	152	2007
32	VITO	145	2007
Division	16 Rotokas		
1	BULISTORO	231	2005
2	IBU	203	2005
3	INUS	112	2005
4	IPARAKA	312	2005
5	KAKARAPAIA	303	2005
6	KOROBORA	244	2005
7	KUSI NO.1 & 2	133	2005
8	MAPEARO	327	2005
9	NUPATORO NO.1 & 2	405	2005
10	OKOBUPAIA	215	2005
11	OSOWAIPA	162	2005
12	OWAIWAIPA	213	2005
13	PIPIAIA	281	2005
14	POKAIA	245	2005
15	RURUVU	246	2005
16	SIRORIPAIA	255	2005
17	SISIVI	310	2006
18	TEARAKA	283	2005
19	TEPEROI	135	2005
20	TOGARAO	458	2005
21	TOKAI	325	2005
22	TURIMA	193	2005
23	TUTUPAIA	318	2005
24	TUVIA	209	2005

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
AGABAI	2	7	1	2008
AGAWA	2	8	1	2008
AITARA	2	9	1	2008
AKOPAI	1	5	1	2006
AKU	2	11	1	2009
ALAKABAU	3	15	1	2007
AMAPONG	3	13	1	2007
AMEO	2	9	2	2008
AMION	3	14	1	2007
AMOTU	1	1	1	2002
AMUM	1	5	2	2006
ANAKEI	1	4	1	2003
ANGANAI	3	14	2	2007
ARAI	2	9	3	2008
ARAVIA	1	6	1	2005
ARAWA	3	14	3	2007
ASTAPAI	1	5	3	2006
ATAMO	3	15	2	2007
ATANGATO	2	7	2	2006
ATSILIMA	1	5	4	2006
AUKEI	1	5	5	2006
AUMARI	2	8	2	2008
AURUI	3	13	2	2007
BAIRIMA	3	14	4	2007
BAKAKANI	3	13	3	2007
BAKATUNG	3	14	5	2007
BAKAWORI	3	14	6	2007
BAKORAM NO.1	2	8	3	2008
BAKORAM NO.2	2	8	4	2008
BALIL	1	1	2	2001
BANEI	3	13	4	2007
BARIKUA	1	3	1	2003
BEI	1	3	2	2003
BEIKUT	1	3	3	2003
BERERÉKI	2	7	3	2008
BERETEMBA	2	8	5	2008
BETERAIO	1	5	6	2006
BIROI	2	8	6	2008
BIROS	2	8	7	2008
BOBOASI	1	5	7	2006
BOGISAGO	2	12	1	2009
BOIRA	3	15	3	2007
BOKU	2	8	8	2008
BONAMUNG	3	14	7	2007
BORUMAI	3	15	4	2007
BORUPI	2	11	2	2009
BOTULAI	2	12	2	2007
BOVE	3	15	5	2007
BULISTORO	3	16	1	2005
BUNUMANG	3	14	8	2007
BURUBURUNNO	2	11	3	2009
CHUNDAWAN	1	4	2	2003
DAITA	3	14	9	2007
DAMAOSI	3	13	6	2008
DAMBEWEI	3	13	5	2007
DAMUNA	3	13	7	2007
DAMUNG	3	13	8	2008
DAPERA	3	15	6	2007
DARENAI	3	15	7	2008
DARU	3	15	8	2007
DARUTUE NO.1	3	14	10	2007
DARUTUE NO.2	3	14	11	2007
DEOS	1	6	2	2005
DINGUNA	3	14	12	2007
DOKOTORO	3	14	13	2007
DOMONINO	2	9	4	2008
DONGETA	3	13	9	2007
DONSIRO	3	14	14	2007
ELUTUPAN	1	2	1	2003
GAGAN	1	3	4	2003
GOGOHEI NO.1	1	4	3	2003
GOGOHEI NO.2	1	4	4	2003
GOHI	1	4	5	2003
GOTON	1	5	8	2006
GUAVA	3	15	9	2008
HAGUS	1	2	2	2003
HAHALIS	1	2	3	2003
HANAHAN	1	2	4	2003
HANGAN	1	4	6	2003
HANONG	2	10	1	2008
HANPAN	1	2	5	2003
HANTOBIN	1	6	3	2005
HAPAN	1	3	5	2003
HARI	2	9	5	2008
HARI KAKU	2	9	6	2008
HINO	2	10	2	2008
HIRE	2	9	7	2008
HIRUHIRU	2	9	8	2008
HITAU	1	3	6	2004
HORINO	2	9	9	2008
HUKOHAH	2	9	10	2008
IAMARU	2	12	3	2009
IANGAIN	1	1	3	2002
IAUN NO.1	1	6	4	2005
IAUN NO.2	1	6	5	2005
IBIRO	2	11	4	2009
IBU	3	16	2	2005
IEGU	2	10	3	2008
IELELINA	1	2	6	2003
IESILA	1	1	4	2002
IETA	1	4	7	2003
ILOSA	1	1	5	2002
INUS	3	16	3	2005
IOLOHANAN	1	1	6	2002
IORO	3	13	10	2007
IPARAKA	3	16	4	2005
IPILAI	2	12	4	2009
IRANG	3	15	10	2008
IRU	2	9	11	2008

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
IRUE	1	6	7	2005
ISINA	3	13	11	2007
IULA NO.1	2	12	5	2009
IULA NO.2	2	12	6	2009
IULA NO.3	2	12	7	2009
JABA	2	7	4	2008
KABANAMI	2	7	5	2008
KAHULE	1	3	7	2003
KAITU	2	12	8	2009
KAKAPARA	1	5	9	2006
KAKARAPAIA	3	16	5	2005
KAKOTOKORI	2	9	12	2008
KAMAROVI	3	13	12	2007
KAMOURO	2	12	9	2009
KANNAURO	2	11	5	2009
KAPANA	2	10	4	2008
KAPARO	2	9	13	2008
KAPIKAVE	3	13	13	2007
KARAKUNG	3	14	15	2007
KARARITU	1	5	10	2006
KARATO	2	7	6	2006
KAREKOPA	2	7	7	2006
KARIKIRA	3	14	16	2007
KARNIVITU	3	15	11	2007
KARURU	3	13	14	2008
KASIPEKE	2	7	8	2008
KATSUNKOVERI	1	4	8	2003
KAUBATEI	1	5	11	2006
KAUNA	1	5	12	2006
KAVAKAKATSU	2	7	9	2006
KAVIKI	1	5	13	2006
KEKEMONO	2	12	10	2007
KENAIA	2	7	10	2006
KEPUI	1	5	14	2006
KEREMONA	3	13	15	2007
KETSKETS	1	2	7	2003
KIAKARA	1	5	15	2006
KIKIBATSIOGU	2	12	11	2009
KIKIMOGU	2	11	6	2009
KIMMAKU	2	9	14	2008
KINIRUI	2	10	5	2008
KOATOROI	1	5	16	2006
KOBUAN	3	14	17	2007
KOGISAGANO	2	11	7	2009
KOGU	2	12	12	2009
KOGUIKIRU	2	12	13	2009
KOHINO	1	3	8	2003
KOHISO	1	3	9	2003
KOIARE	2	7	11	2006
KOKADEI	3	14	18	2007
KOKOMATE	3	15	12	2008
KOKOPO	2	11	8	2009
KOKORE	3	15	13	2008
KOKUI	2	10	6	2008
KOMAI	2	12	14	2009
KONAWA	2	8	9	2008
KONGARA	2	8	10	2008
KONIGURU	2	11	9	2009
KOPAI	1	5	17	2006
KOPANI	3	15	14	2007
KOPIKIRI	3	15	15	2007
KOREPOVI	1	5	18	2006
KORO	2	7	12	2008
KOROBORA	3	16	6	2005
KOROMAKETO	2	7	13	2006
KOROPO	2	9	15	2008
KOROVI	2	7	14	2006
KORPEI	3	15	16	2007
KOSIPAI	1	5	19	2006
KOTOITA	1	6	10	2005
KOTOPAN	1	2	8	2003
KOTU	2	9	16	2008
KOUKOUSINO	2	12	15	2007
KOVANIS	1	6	11	2005
KOVENANG	3	14	19	2007
KUGUGAI	2	11	10	2009
KUGUIOGU	2	12	16	2009
KUHINO	2	10	7	2008
KUKA	3	14	20	2007
KUKUMAI	2	12	17	2009
KUKUMARU	2	11	11	2009
KUKURINA	1	6	12	2005
KULIS	1	1	7	2001
KUMIROGU	2	11	12	2009
KUMUKI	2	9	17	2008
KUNAPOPO	1	5	20	2006
KUNIKA	2	7	15	2008
KUNOKOMOK	1	5	21	2006
KUNU	2	10	8	2008
KUPEI	3	14	21	2007
KUPINKU	2	9	18	2008
KUPON	2	7	16	2008
KURAI	3	13	16	2007
KURITAVE	3	13	17	2008
KURUR	1	5	22	2006
KUSI NO.1 & 2	3	16	7	2005
KUTIN	2	10	9	2008
LABALAM	2	7	17	2008
LABONAMI	2	7	18	2008
LAGUAI	2	11	13	2009
LAITARO	2	12	18	2009
LAKEMBA	2	9	19	2008
LAKOVE	2	12	19	2009
LAKU	2	10	10	2008
LALUM	1	5	23	2006
LAMUAI	2	12	20	2009
LARENAI	2	8	11	2008
LARUMA	2	7	19	2006
LAVORO	2	8	12	2008
LEMANKOA	1	2	9	2003
LEMANMANU	1	2	10	2003
LEROTU	2	11	14	2009
LIHON	1	1	8	2001

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
LOBIGOU	2	11	15	2009
LONAHAN	1	4	9	2003
LONKOGARI	1	5	24	2006
LONTIS	1	2	11	2003
LOPERE	2	8	13	2008
LORO	2	8	36	2008
LUAGUO	2	12	21	2009
LUILAU	2	12	22	2009
LUKARARO	2	11	16	2009
LUKAUKO	2	12	23	2009
MABES	2	8	14	2008
MAIKA	2	12	24	2009
MAINOIATA	2	9	20	2008
MAINOKI	3	15	17	2008
MAISUA	2	10	11	2008
MAKENIKO	3	14	22	2007
MALABITA	2	12	25	2009
MALASANG	1	4	10	2003
MAMAGOTA	2	9	21	2008
MAMAROMINO NO.1	2	12	26	2009
MAMAROMINO NO.2	2	12	27	2009
MANGONA	3	13	18	2007
MANNAKE	2	9	43	2008
MANOB	1	4	11	2003
MAPEARO	3	16	8	2005
MAPIRI	1	1	9	2001
MAPISI	1	5	25	2006
MARAMUKU	2	11	17	2009
MARIGA	2	8	15	2008
MARILAU	3	13	19	2008
MAROWA	2	7	20	2006
MARURA	3	13	20	2007
MASIWAKORE	2	8	16	2008
MASUNKE	2	8	17	2008
MATERAS	2	10	12	2008
MATITSORA	1	5	26	2006
MATONA	2	8	18	2008
MATSIOUGU	2	11	18	2009
MATSUNGAN	1	3	10	2004
MATUKORI	2	9	22	2008
MAUANG	3	14	23	2007
MAWERE	2	8	19	2008
MELELUP	1	6	13	2005
MENDAI	2	8	20	2008
MEWA	2	8	21	2008
MEWARAKA	2	8	22	2008
MIHERO	2	9	23	2008
MINANI	3	13	21	2007
MINGETA	2	8	23	2008
MITSIKORI	2	7	21	2006
MITUAI	2	12	28	2009
MOAINO	2	8	24	2008
MOGOROI	2	12	29	2009
MOIBINEI	2	9	24	2008
MOINANG	3	14	24	2007
MOKOKOREU	2	7	22	2008
MOKOLI NO.1	2	10	13	2008
MOKOLI NO.2	2	10	14	2008
MOM	2	7	23	2006
MOMOGANARI	2	7	24	2008
MONGONTORO	3	14	25	2007
MONTONIA	1	1	10	2001
MORANGISINA	3	14	26	2007
MORIU	2	12	30	2009
MORO	3	13	22	2008
MOROKAIMORO	2	10	15	2008
MORONEI	2	10	16	2008
MORONI	3	15	18	2007
MOROU	2	11	19	2009
MORULA	2	11	20	2009
MOSIGETA	2	8	25	2008
MOSILAIE	1	5	27	2006
MOSINO	2	8	26	2008
MOUAKEI	2	11	21	2009
MUAU	3	13	23	2008
MUGUAI	2	12	31	2009
MUIRE	1	5	36	2006
MUISURU	2	12	32	2009
MUMURAI	3	15	19	2008
MUNIAS	3	13	24	2007
MUNU	2	10	17	2008
MUSIMINOI	2	10	18	2008
MUSINAU	3	15	20	2008
MUTAHI	1	6	14	2005
MUWOKU	2	9	25	2008
NABAKU	2	11	22	2009
NABUIA	3	13	25	2007
NAIRONA	2	8	27	2008
NAKARO	2	11	23	2009
NAKOREI	2	11	24	2009
NAMAKERIO	1	6	15	2005
NAMASIORA	1	6	16	2005
NAMATOA	1	6	17	2005
NAMBAROSI	1	5	28	2006
NARINAI	2	7	25	2008
NARONAI	2	10	19	2008
NASIOI	3	14	27	2007
NASIWOIWA	3	15	21	2007
NEBLAHIU	1	6	18	2005
NKUMU	2	12	33	2009
NOPAN	1	3	11	2003
NOVAH	1	3	12	2003
NUGURIA	1	1	11	2002
NUKUI	2	8	28	2008
NUKUI	2	9	26	2008
NUKUTOA	1	1	12	2002
NUMAKEI	2	11	25	2009
NUPATORO NO.1 & 2	3	16	9	2005
OKARU	2	8	29	2008
OKOBUPAIA	3	16	10	2005
OKOIRAGU	2	12	34	2009
OKOMO	2	11	26	2009
OMITARO	2	11	27	2009

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
ONOVI	3	15	22	2008
ORAMI	3	15	23	2008
ORAVA	2	12	35	2009
OREMAI	2	12	36	2007
OREMUTSI	2	11	28	2009
ORIA	2	12	37	2007
ORORO	2	8	30	2008
ORUROI	2	12	38	2009
ORUMOI	2	12	39	2009
OSIAGE	2	8	31	2008
OSILADA	2	8	32	2008
OSOKOLI	2	9	27	2008
OSOWAIPA	3	16	11	2005
OWAIWAIPA	3	16	12	2005
PAGUI	2	12	40	2007
PAKIA	3	15	24	2007
PANAKE	2	10	20	2008
PANAM	2	7	26	2008
PANKA	3	15	25	2008
PANKAMA	3	14	28	2007
PARAIANO	3	14	29	2007
PARERO	2	12	41	2009
PARERONO	2	11	29	2009
PARIRO	2	12	42	2009
PATEAVEAVE	1	6	19	2005
PAULOUKU	2	12	43	2009
PAVAIRE	3	14	30	2007
PEIWANA	3	13	26	2007
PERE	2	8	33	2008
PETATS	1	3	13	2004
PETSPETS	1	5	29	2006
PIARINO	2	11	30	2009
PIAWORA	3	15	26	2008
PIDIA	3	14	31	2007
PIKEI	2	8	34	2008
PININAI	2	9	28	2008
PIPIAIA	3	16	13	2005
PIRENEIU	3	13	27	2007
PIRIRARO	2	12	44	2009
PIRURUINO	2	11	31	2009
PISINAU	3	15	27	2008
PIUL	1	1	13	2003
PIVA	2	7	27	2006
POKA	1	3	14	2003
POKAIA	3	16	14	2005
POKAPA NO.1	1	6	20	2005
POKAPA NO.2	1	6	21	2005
POKPOK	3	14	32	2007
POKUITO	1	5	30	2006
POLANAVIA	2	7	28	2008
POMA	3	14	33	2007
POMARATE	2	8	35	2008
POMAUA	3	14	34	2007
PONDONA	3	13	28	2007
POPOHERAI	1	5	31	2006
PORAPORA	1	4	12	2003
PORIWON	1	1	14	2001
PORORAN	1	3	15	2004
PURIKORI	2	9	29	2008
PUSKOMBU	1	6	22	2005
PUTO	1	5	32	2006
RABAULU	2	9	30	2008
RAMUNDATA	1	4	13	2003
RARIE	1	6	24	2005
RATSUA	1	4	14	2003
RELA	2	7	29	2008
ROGOS	1	1	15	2001
ROKUSEI	2	10	21	2008
ROMARI	2	8	37	2008
ROMEINA	3	13	29	2007
ROMSIS	1	6	25	2005
ROROVANA NO.1	3	14	35	2007
ROROVANA NO.2	3	14	36	2007
ROTARE NO.1	2	8	38	2008
ROTARE NO.2	2	8	39	2008
RUKUSSIA	1	5	33	2006
RUMBA	3	14	37	2007
RUPUMMO	2	9	44	2008
RURI	1	4	15	2003
RURUVU	3	16	15	2005
RUSEI	2	10	22	2008
RUUNAI	2	9	31	2008
SADI	2	12	45	2009
SALEPEN	1	1	16	2001
SAPANI	1	3	16	2003
SAPOSA	1	5	34	2006
SIAIE	3	14	38	2007
SIAKEN	1	1	17	2001
SIALAU	2	11	32	2009
SIANEKI	2	7	30	2008
SIAR	1	1	18	2001
SIARA	1	4	16	2003
SIBUNA	3	14	39	2007
SIKOREWA	2	7	31	2008
SIKUMONE	2	10	23	2008
SIKURAI	2	10	24	2008
SING	1	4	17	2003
SININNAI	2	9	32	2008
SINKAI	3	14	40	2007
SINSIRUAI	2	8	40	2008
SIOROVI	3	13	30	2007
SIPA	3	14	41	2007
SIPI	2	8	41	2008
SIPUREI	3	13	32	2007
SIPURU	3	13	31	2008
SIRARUHO	2	9	33	2008
SIREONDJI	3	15	28	2007
SIROI	2	9	34	2008
SIROMBA	3	14	42	2007
SIROMBANA	3	14	43	2007
SIRORIPAIA	3	16	16	2005
SIROT	1	1	19	2001
SIROVAI	3	13	33	2008

6.2 RURAL VILLAGES WITH AGRICULTURAL SYSTEM NUMBERS IN ALPHABETICAL ORDER
Province: 20 Bougainville

Village	Dist	Div	Unit	System
SIROWAI	3	15	29	2007
SISIAPAI	1	5	35	2006
SISIVI	3	16	17	2006
SIUL	2	12	46	2009
SIURAI	2	12	47	2007
SIURU	2	11	33	2009
SIURUHINO	2	10	25	2008
SOROM	1	4	18	2003
SUANGU	1	6	26	2005
SUHIN	1	4	19	2003
SUIEMA(PAURA)	3	15	30	2007
SULUKUNU	2	12	48	2007
SUNVAHORA	1	6	27	2005
TABAGO	2	12	49	2009
TAGURI	2	8	42	2008
TAGURUAI	2	12	50	2009
TAHAITAHAI	1	4	20	2003
TAIDORIMA	2	8	43	2008
TAIOF	1	5	37	2006
TAKE	3	13	34	2007
TAKEMARI	2	8	44	2008
TANAHERAN	1	1	20	2001
TANAMALIT	1	1	21	2001
TANDEKI	1	2	12	2003
TANTAREKI	2	12	51	2009
TAPSANWARA	1	4	21	2003
TARAPA	2	11	34	2008
TARARA	3	15	31	2007
TARBUT	1	4	22	2003
TARONGAL	1	1	22	2001
TARUBA	2	7	32	2008
TAULAPELIA	3	14	44	2007
TAVIDUA	3	14	45	2007
TEABES	1	6	30	2005
TEAH	1	1	23	2001
TEANANA	1	6	31	2005
TEARAKA	3	16	18	2005
TELATU	1	3	17	2003
TENDU	1	6	32	2005
TEOBUHIN NO.1	1	6	33	2005
TEOBUHIN NO.2	1	6	34	2005
TEOP	1	6	35	2005
TEPEROI	3	16	19	2005
TERAUTUP	1	1	24	2001
TETAKUTS	1	6	36	2005
TOBOROI	3	14	46	2007
TOGARAO	3	16	20	2005
TOGULEGU	2	11	35	2009
TOHATSI	1	2	13	2003
TOHEI	1	5	38	2006
TOHU	2	9	35	2008
TOIRA	2	9	36	2008
TOITOI	2	9	37	2008
TOKAI	3	16	21	2005
TOKUAKA	2	11	36	2009
TOKUNUTU	2	9	38	2008
TONNUI	2	9	39	2008
TONU	2	9	40	2008
TOPINA	3	14	47	2007
TOROBAI	1	6	37	2005
TOROKOKAPIA	1	6	38	2005
TOROTEI	1	4	23	2003
TOSIAVI	1	5	39	2006
TOTOKI	1	5	40	2006
TSIKOT	1	6	39	2005
TSIMBO	2	11	37	2009
TSISIKO	1	6	40	2005
TSITO	2	7	33	2006
TSUNPETS	1	6	41	2005
TUARAGAI	2	11	38	2009
TUBARO	2	12	52	2009
TUBARU	2	11	39	2009
TUBOBISOU	2	11	40	2009
TUGIOGU NO.1&2	2	11	41	2009
TUGIU	2	11	42	2009
TUMURI	1	6	42	2005
TUNG	1	3	18	2003
TURIGAU	2	11	43	2009
TURIMA	3	16	22	2005
TURUGUM	2	10	26	2008
TURUTAI	2	12	53	2009
TUTUPAIA	3	16	23	2005
TUVIA	3	16	24	2005
UBANMOIUTO	2	11	44	2009
UGUPAKOGU	2	12	54	2009
UMUM	1	4	24	2003
UNABATO	3	14	48	2007
UNUNAI	2	9	41	2008
USO	2	9	42	2008
VAINANA	1	6	44	2005
VAROPA	1	6	45	2005
VASPOS	1	6	46	2005
VITO	3	15	32	2007
WAITAWUNA	2	8	45	2008
WAKUPA	2	8	46	2008
WARARIU	2	7	34	2008
WARUWARU	2	7	35	2008
WAUWANGINUVA	1	6	47	2005
WIDA	3	13	35	2007
WIWIARO	2	7	36	2008
YAPARU	1	3	19	2004
YEGITS	1	3	20	2003
YOTCHIBOL	1	1	25	2001

6.3 RURAL VILLAGES LISTED BY AGRICULTURAL SYSTEM Province: 20 Bougainville

Village	Dist	Div	Unit	RMU
SYSTEM 2001				
BALIL	1	1	2	2
KULIS	1	1	7	2
LIHON	1	1	8	2
MAPIRI	1	1	9	2
MONTONIA	1	1	10	1
PORIWON	1	1	14	2
ROGOS	1	1	15	1
SALEPEN	1	1	16	2
SIAKEN	1	1	17	2
SIAR	1	1	18	2
SIROT	1	1	19	2
TANAHERAN	1	1	20	2
TANAMALIT	1	1	21	2
TARONGAL	1	1	22	2
TEAH	1	1	23	1
TERAUTUP	1	1	24	2
YOTCHIBOL	1	1	25	2
SYSTEM 2002				
AMOTU	1	1	1	137
IANGAIN	1	1	3	129
IESILA	1	1	4	129
ILOSA	1	1	5	129
IOLOHANAN	1	1	6	129
NUGURIA	1	1	11	127
NUKUTOA	1	1	12	128
SYSTEM 2003				
ANAKEI	1	4	1	16
BARIKUA	1	3	1	4
BEI	1	3	2	130
BEIKUT	1	3	3	4
CHUNDAWAN	1	4	2	16
ELUTUPAN	1	2	1	3
GAGAN	1	3	4	4
GOGOHEI NO.1	1	4	3	3
GOGOHEI NO.2	1	4	4	3
GOHI	1	4	5	16
HAGUS	1	2	2	3
HAHALIS	1	2	3	3
HANAHAN	1	2	4	3
HANGAN	1	4	6	3
HANPAN	1	2	5	3
HAPAN	1	3	5	4
IELELINA	1	2	6	3
IETA	1	4	7	3
KAHULE	1	3	7	130
KATSUNKOVERI	1	4	8	16
KETSKETS	1	2	7	3
KOHINO	1	3	8	4
KOHISO	1	3	9	4
KOTOPAN	1	2	8	3
LEMANKOA	1	2	9	3
LEMANMANU	1	2	10	3
LONAHAN	1	4	9	3
LONTIS	1	2	11	3
MALASANG	1	4	10	3
MANOB	1	4	11	16
NOPAN	1	3	11	4
NOVAH	1	3	12	8
PIUL	1	1	13	129
POKA	1	3	14	130
PORAPORA	1	4	12	19
RAMUNDATA	1	4	13	16
RATSUA	1	4	14	140
RURI	1	4	15	16
SAPANI	1	3	16	4
SIARA	1	4	16	16
SING	1	4	17	3
SOROM	1	4	18	16
SUHIN	1	4	19	3
TAHAITAHAI	1	4	20	3
TANDEKI	1	2	12	3
TAPSANWARA	1	4	21	16
TARBUT	1	4	22	16
TELATU	1	3	17	3
TOHATSI	1	2	13	3
TOROTEI	1	4	23	16
TUNG	1	3	18	130
UMUM	1	4	24	16
YEGITS	1	3	20	130
SYSTEM 2004				
HITAU	1	3	6	126
MATSUNGAN	1	3	10	120
PETATS	1	3	13	120
PORORAN	1	3	15	7
YAPARU	1	3	19	7
SYSTEM 2005				
ARAVIA	1	6	1	26
BULISTORO	3	16	1	50
DEOS	1	6	2	21
HANTOBIN	1	6	3	19
IAUN NO.1	1	6	4	23
IAUN NO.2	1	6	5	23
IBU	3	16	2	50
INUS	3	16	3	53
IPARAKA	3	16	4	56
IRUE	1	6	7	141
KAKARAPAIA	3	16	5	50
KOROBORA	3	16	6	51
KOTOITA	1	6	10	52
KOVANIS	1	6	11	22
KUKURINA	1	6	12	19
KUSI NO.1 & 2	3	16	7	25
MAPEARO	3	16	8	57
MELELUP	1	6	13	25
MUTAHI	1	6	14	25
NAMAKERIO	1	6	15	143
NAMASIORA	1	6	16	19
NAMATOA	1	6	17	24
NEBLAHIU	1	6	18	24
NUPATORO NO.1 & 2	3	16	9	51
OKOBUPAIA	3	16	10	68
OSOWAIPA	3	16	11	25
OWAIWAIPA	3	16	12	25

6.3 RURAL VILLAGES LISTED BY AGRICULTURAL SYSTEM **Province: 20 Bougainville**

Village	Dist	Div	Unit	RMU
PATEAVEAVE	1	6	19	24
PIPIAIA	3	16	13	51
POKAIA	3	16	14	50
POKAPA NO.1	1	6	20	19
POKAPA NO.2	1	6	21	19
PUSKOMBU	1	6	22	23
RARIE	1	6	24	25
ROMSIS	1	6	25	19
RURUVU	3	16	15	49
SIRORIPAIA	3	16	16	57
SUANGU	1	6	26	19
SUNVAHORA	1	6	27	23
TEABES	1	6	30	22
TEANANA	1	6	31	23
TEARAKA	3	16	18	54
TENDU	1	6	32	143
TEOBUHIN NO.1	1	6	33	19
TEOBUHIN NO.2	1	6	34	19
TEOP	1	6	35	125
TEPEROI	3	16	19	55
TETAKUTS	1	6	36	19
TOGARAO	3	16	20	49
TOKAI	3	16	21	51
TOROBAI	1	6	37	25
TOROKOKAPIA	1	6	38	19
TSIKOT	1	6	39	143
TSISIKO	1	6	40	19
TSUNPETS	1	6	41	16
TUMURI	1	6	42	24
TURIMA	3	16	22	51
TUTUPAIA	3	16	23	50
TUVIA	3	16	24	24
VAINANA	1	6	44	23
VAROPA	1	6	45	23
VASPOS	1	6	46	25
WAUWANGINUVA	1	6	47	19
SYSTEM 2006				
AKOPAI	1	5	1	36
AMUM	1	5	2	34
ASTAPAI	1	5	3	35
ATANGATO	2	7	2	78
ATSILIMA	1	5	4	60
AUKEI	1	5	5	37
BETERAIO	1	5	6	35
BOBOASI	1	5	7	37
GOTON	1	5	8	17
KAKAPARA	1	5	9	17
KARARITU	1	5	10	36
KARATO	2	7	6	78
KAREKOPA	2	7	7	78
KAUBATEI	1	5	11	37
KAUNA	1	5	12	36
KAVAKAKATSU	2	7	9	66
KAVIKI	1	5	13	37
KENAIA	2	7	10	148
KEPUI	1	5	14	29
KIAKARA	1	5	15	33
KOATOROI	1	5	16	29
KOIARE	2	7	11	80
KOPAI	1	5	17	29
KOREPOVI	1	5	18	36
KOROMAKETO	2	7	13	63
KOROVI	2	7	14	78
KOSIPAI	1	5	19	33
KUNAPOPO	1	5	20	17
KUNOKOMOK	1	5	21	29
KURUR	1	5	22	29
LALUM	1	5	23	17
LARUMA	2	7	19	135
LONKOGARI	1	5	24	63
MAPISI	1	5	25	29
MAROWA	2	7	20	80
MATITSORA	1	5	26	17
MITSIKORI	2	7	21	63
MOM	2	7	23	78
MOSILAIE	1	5	27	33
MUIRE	1	5	36	36
NAMBAROSI	1	5	28	17
PETSPETS	1	5	29	29
PIVA	2	7	27	63
POKUITO	1	5	30	60
POPOHERAI	1	5	31	29
PUTO	1	5	32	17
RUKUSSIA	1	5	33	17
SAPOSA	1	5	34	123
SISIAPAI	1	5	35	33
SISIVI	3	16	17	49
TAIOF	1	5	37	11
TOHEI	1	5	38	33
TOSIAVI	1	5	39	29
TOTOKI	1	5	40	29
TSITO	2	7	33	66
SYSTEM 2007				
ALAKABAU	3	15	1	72
AMAPONG	3	13	1	76
AMION	3	14	1	76
ANGANAI	3	14	2	76
ARAWA	3	14	3	76
ATAMO	3	15	2	76
AURUI	3	13	2	76
BAIRIMA	3	14	4	76
BAKAKANI	3	13	3	89
BAKATUNG	3	14	5	76
BAKAWORI	3	14	6	145
BANEI	3	13	4	77
BOIRA	3	15	3	76
BONAMUNG	3	14	7	76
BORUMAI	3	15	4	76
BOTULAI	2	12	2	147
BOVE	3	15	5	72
BUNUMANG	3	14	8	76
DAITA	3	14	9	76
DAMBEWEI	3	13	5	77
DAMUNA	3	13	7	76
DAPERA	3	15	6	144
DARU	3	15	8	77

6.3 RURAL VILLAGES LISTED BY AGRICULTURAL SYSTEM Province: 20 Bougainville

Village	Dist	Div	Unit	RMU
DARUTUE NO.1	3	14	10	76
DARUTUE NO.2	3	14	11	77
DINGUNA	3	14	12	76
DOKOTORO	3	14	13	76
DONGETA	3	13	9	93
DONSIRO	3	14	14	76
IORO	3	13	10	76
ISINA	3	13	11	76
KAMAROVI	3	13	12	76
KAPIKAVE	3	13	13	139
KARAKUNG	3	14	15	76
KARIKIRA	3	14	16	77
KARNIVITU	3	15	11	76
KEKEMONO	2	12	10	93
KEREMONA	3	13	15	89
KOBUAN	3	14	17	76
KOKADEI	3	14	18	76
KOPANI	3	15	14	69
KOPIKIRI	3	15	15	69
KORPEI	3	15	16	76
KOUKOUSINO	2	12	15	93
KOVENANG	3	14	19	76
KUKA	3	14	20	76
KUPEI	3	14	21	77
KURAI	3	13	16	76
MAKENIKO	3	14	22	76
MANGONA	3	13	18	76
MARURA	3	13	20	139
MAUANG	3	14	23	76
MINANI	3	13	21	76
MOINANG	3	14	24	77
MONGONTORO	3	14	25	76
MORANGISINA	3	14	26	76
MORONI	3	15	18	144
MUNIAS	3	13	24	76
NABUIA	3	13	25	76
NASIOI	3	14	27	77
NASIWOIWA	3	15	21	76
OREMAI	2	12	36	93
ORIA	2	12	37	147
PAGUI	2	12	40	147
PAKIA	3	15	24	76
PANKAMA	3	14	28	76
PARAIANO	3	14	29	95
PAVAIRE	3	14	30	76
PEIWANA	3	13	26	76
PIDIA	3	14	31	138
PIRENEIU	3	13	27	76
POKPOK	3	14	32	96
POMA	3	14	33	76
POMAUA	3	14	34	76
PONDONA	3	13	28	76
ROMEINA	3	13	29	76
ROROVANA NO.1	3	14	35	76
ROROVANA NO.2	3	14	36	76
RUMBA	3	14	37	95
SIAIE	3	14	38	76
SIBUNA	3	14	39	76
SINKAI	3	14	40	76
SIOROVI	3	13	30	76
SIPA	3	14	41	138
SIPUREI	3	13	32	76
SIREONDJI	3	15	28	76
SIROMBA	3	14	42	76
SIROMBANA	3	14	43	76
SIROWAI	3	15	29	78
SIURAI	2	12	47	100
SUIEMA(PAURA)	3	15	30	78
SULUKUNU	2	12	48	147
TAKE	3	13	34	76
TARARA	3	15	31	70
TAULAPELIA	3	14	44	76
TAVIDUA	3	14	45	76
TOBOROI	3	14	46	76
TOPINA	3	14	47	76
UNABATO	3	14	48	77
VITO	3	15	32	72
WIDA	3	13	35	76
SYSTEM 2008				
AGABAI	2	7	1	85
AGAWA	2	8	1	85
AITARA	2	9	1	92
AMEO	2	9	2	131
ARAI	2	9	3	131
AUMARI	2	8	2	85
BAKORAM NO.1	2	8	3	85
BAKORAM NO.2	2	8	4	85
BEREREKI	2	7	3	85
BERETEMBA	2	8	5	85
BIROI	2	8	6	85
BIROS	2	8	7	85
BOKU	2	8	8	86
DAMAOSI	3	13	6	94
DAMUNG	3	13	8	94
DARENAI	3	15	7	78
DOMONINO	2	9	4	131
GUAVA	3	15	9	77
HANONG	2	10	1	87
HARI	2	9	5	131
HARI KAKU	2	9	6	131
HINO	2	10	2	131
HIRE	2	9	7	131
HIRUHIRU	2	9	8	131
HORINO	2	9	9	131
HUKOHAH	2	9	10	131
IEGU	2	10	3	87
IRANG	3	15	10	78
IRU	2	9	11	87
JABA	2	7	4	79
KABANAMI	2	7	5	86
KAKOTOKORI	2	9	12	131
KAPANA	2	10	4	131
KAPARO	2	9	13	131
KARURU	3	13	14	77
KASIPEKE	2	7	8	86
KIMMAKU	2	9	14	131
KINIRUI	2	10	5	131

6.3 RURAL VILLAGES LISTED BY AGRICULTURAL SYSTEM Province: 20 Bougainville

Village	Dist	Div	Unit	RMU
KOKOMATE	3	15	12	78
KOKORE	3	15	13	77
KOKUI	2	10	6	131
KONAWA	2	8	9	85
KONGARA	2	8	10	85
KORO	2	7	12	78
KOROPO	2	9	15	131
KOTU	2	9	16	131
KUHINO	2	10	7	87
KUMUKI	2	9	17	131
KUNIKA	2	7	15	83
KUNU	2	10	8	131
KUPINKU	2	9	18	131
KUPON	2	7	16	83
KURITAVE	3	13	17	77
KUTIN	2	10	9	131
LABALAM	2	7	17	78
LABONAMI	2	7	18	78
LAKEMBA	2	9	19	131
LAKU	2	10	10	87
LARENAI	2	8	11	85
LAVORO	2	8	12	85
LOPERE	2	8	13	85
LORO	2	8	36	85
MABES	2	8	14	85
MAINOIATA	2	9	20	131
MAINOKI	3	15	17	78
MAISUA	2	10	11	87
MAMAGOTA	2	9	21	118
MANNAKE	2	9	43	131
MARIGA	2	8	15	85
MARILAU	3	13	19	90
MASIWAKORE	2	8	16	85
MASUNKE	2	8	17	82
MATERAS	2	10	12	87
MATONA	2	8	18	85
MATUKORI	2	9	22	131
MAWERE	2	8	19	85
MENDAI	2	8	20	85
MEWA	2	8	21	85
MEWARAKA	2	8	22	79
MIHERO	2	9	23	131
MINGETA	2	8	23	85
MOAINO	2	8	24	87
MOIBINEI	2	9	24	131
MOKOKOREU	2	7	22	85
MOKOLI NO.1	2	10	13	87
MOKOLI NO.2	2	10	14	87
MOMOGANARI	2	7	24	85
MORO	3	13	22	77
MOROKAIMORO	2	10	15	87
MORONEI	2	10	16	87
MOSIGETA	2	8	25	85
MOSINO	2	8	26	85
MUAU	3	13	23	94
MUMURAI	3	15	19	78
MUNU	2	10	17	131
MUSIMINOI	2	10	18	131
MUSINAU	3	15	20	145
MUWOKU	2	9	25	87
NAIRONA	2	8	27	85
NARINAI	2	7	25	85
NARONAI	2	10	19	87
NUKUI	2	8	28	85
NUKUI	2	9	26	131
OKARU	2	8	29	86
ONOVI	3	15	22	78
ORAMI	3	15	23	78
ORORO	2	8	30	85
OSIAGE	2	8	31	85
OSILADA	2	8	32	85
OSOKOLI	2	9	27	131
PANAKE	2	10	20	131
PANAM	2	7	26	86
PANKA	3	15	25	77
PERE	2	8	33	85
PIAWORA	3	15	26	78
PIKEI	2	8	34	85
PININAI	2	9	28	131
PISINAU	3	15	27	78
POLANAVIA	2	7	28	85
POMARATE	2	8	35	85
PURIKORI	2	9	29	131
RABAULU	2	9	30	131
RELA	2	7	29	78
ROKUSEI	2	10	21	131
ROMARI	2	8	37	85
ROTARE NO.1	2	8	38	85
ROTARE NO.2	2	8	39	86
RUPUMMO	2	9	44	131
RUSEI	2	10	22	131
RUUNAI	2	9	31	131
SIANEKI	2	7	30	85
SIKOREWA	2	7	31	78
SIKUMONE	2	10	23	87
SIKURAI	2	10	24	131
SININNAI	2	9	32	131
SINSIRUAI	2	8	40	85
SIPI	2	8	41	85
SIPURU	3	13	31	77
SIRARUHO	2	9	33	131
SIROI	2	9	34	131
SIROVAI	3	13	33	76
SIURUHINO	2	10	25	131
TAGURI	2	8	42	85
TAIDORIMA	2	8	43	85
TAKEMARI	2	8	44	85
TARAPA	2	11	34	131
TARUBA	2	7	32	85
TOHU	2	9	35	131
TOIRA	2	9	36	131
TOITOI	2	9	37	131
TOKUNUTU	2	9	38	131
TONNUI	2	9	39	131
TONU	2	9	40	131
TURUGUM	2	10	26	87
UNUNAI	2	9	41	131
USO	2	9	42	131

Village	Dist	Div	Unit	RMU
WAITAWUNA	2	8	45	85
WAKUPA	2	8	46	85
WARARIU	2	7	34	85
WARUWARU	2	7	35	85
WIWIARO	2	7	36	85
SYSTEM 2009				
AKU	2	11	1	131
BOGISAGO	2	12	1	87
BORUPI	2	11	2	87
BURUBURUNNO	2	11	3	87
IAMARU	2	12	3	131
IBIRO	2	11	4	131
IPILAI	2	12	4	131
IULA NO.1	2	12	5	87
IULA NO.2	2	12	6	131
IULA NO.3	2	12	7	131
KAITU	2	12	8	87
KAMOURO	2	12	9	131
KANNAURO	2	11	5	131
KIKIBATSIOGU	2	12	11	131
KIKIMOGU	2	11	6	131
KOGISAGANO	2	11	7	87
KOGU	2	12	12	131
KOGUIKIRU	2	12	13	87
KOKOPO	2	11	8	131
KOMAI	2	12	14	131
KONIGURU	2	11	9	87
KUGUGAI	2	11	10	131
KUGUIOGU	2	12	16	131
KUKUMAI	2	12	17	131
KUKUMARU	2	11	11	131
KUMIROGU	2	11	12	87
LAGUAI	2	11	13	131
LAITARO	2	12	18	131
LAKOVE	2	12	19	131
LAMUAI	2	12	20	109
LEROTU	2	11	14	131
LOBIGOU	2	11	15	87
LUAGUO	2	12	21	131
LUILAU	2	12	22	131
LUKARARO	2	11	16	87
LUKAUKO	2	12	23	87
MAIKA	2	12	24	131
MALABITA	2	12	25	109
MAMAROMINO NO.1	2	12	26	131
MAMAROMINO NO.2	2	12	27	131
MARAMUKU	2	11	17	131
MATSIOUGU	2	11	18	87
MITUAI	2	12	28	131
MOGOROI	2	12	29	87
MORIU	2	12	30	87
MOROU	2	11	19	131
MORULA	2	11	20	87
MOUAKEI	2	11	21	131
MUGUAI	2	12	31	131
MUISURU	2	12	32	109
NABAKU	2	11	22	131
NAKARO	2	11	23	131
NAKOREI	2	11	24	131
NKUMU	2	12	33	109
NUMAKEI	2	11	25	87
OKOIRAGU	2	12	34	131
OKOMO	2	11	26	87
OMITARO	2	11	27	87
ORAVA	2	12	35	104
OREMUTSI	2	11	28	87
ORUROI	2	12	38	87
ORUMOI	2	12	39	87
PARERO	2	12	41	87
PARERONO	2	11	29	87
PARIRO	2	12	42	87
PAULOUKU	2	12	43	87
PIARINO	2	11	30	131
PIRIRARO	2	12	44	87
PIRURUINO	2	11	31	87
SADI	2	12	45	104
SIALAU	2	11	32	87
SIUL	2	12	46	131
SIURU	2	11	33	87
TABAGO	2	12	49	131
TAGURUAI	2	12	50	131
TANTAREKI	2	12	51	131
TOGULEGU	2	11	35	87
TOKUAKA	2	11	36	111
TSIMBO	2	11	37	87
TUARAGAI	2	11	38	87
TUBARO	2	12	52	131
TUBARU	2	11	39	87
TUBOBISOU	2	11	40	87
TUGIOGU NO. 1 & 2	2	11	41	131
TUGIU	2	11	42	87
TURIGAU	2	11	43	87
TURUTAI	2	12	53	131
UBANMOIUTO	2	11	44	87
UGUPAKOGU	2	12	54	100

APPENDIX A.1

NATIONAL POPULATION CENSUS PROVINCIAL CODES

Province	Abbreviation	Code
Western	WES	01
Gulf	GUL	02
Central	CEN	03
National Capital District	NCD	04
Milne Bay	MBP	05
Oro (Northern)	ORO	06
Southern Highlands	SHP	07
Enga	ENG	08
Western Highlands	WHP	09
Simbu (Chimbu)	SIM	10
Eastern Highlands	EHP	11
Morobe	MOR	12
Madang	MAD	13
East Sepik	ESP	14
West Sepik (Sandaun)	WSP	15
Manus	MAN	16
New Ireland	NIP	17
East New Britain	ENB	18
West New Britain	WNB	19
Bougainville	NSP	20

APPENDIX A.2

NATIONAL POPULATION CENSUS CODES FOR DISTRICTS AND CENSUS DIVISIONS, BOUGAINVILLE PROVINCE[1]

Code	Division	Code	Division
01	BUKA	03	KIETA
01	Islands	13	Koromira-Kongara
02	Haku-Halia	14	Nasioi-Pirung
03	Punen	15	Ioro-Eivo
04	Buka Passage	16	Rotokas
05	Konua		
06	Teop		
02	BUIN		
07	Bagana		
08	Basina		
09	Rino		
10	Pongo		
11	Rerebere		
12	Porobere		

[1] The Census Division and District names and codes are from the 1980 National Population Census.

APPENDIX A.2

NATIONAL POPULATION CENSUS CODES FOR DISTRICTS AND CENSUS DIVISIONS, BOUGAINVILLE PROVINCE[1]

Code	Division	Code	Division
01	BUKA	03	KIETA
01	Islands	13	Koromira-Kongara
02	Haku-Halia	14	Nasioi-Pirung
03	Punen	15	Ioro-Eivo
04	Buka Passage	16	Rotokas
05	Konua		
06	Teop		
02	BUIN		
07	Bagana		
08	Basina		
09	Rino		
10	Pongo		
11	Rerebere		
12	Porobere		

[1] The Census Division and District names and codes are from the 1980 National Population Census.