

Food and Other Crops in Fiji: an Annotated Bibliography

T.K. Lim and E.M. Fleming

The Australian Centre for International Agricultural Research (ACIAR) was established in June 1982 by an Act of the Australian Parliament. Its primary mandate is to help identify agricultural problems in developing countries and to commission collaborative research between Australian and developing country researchers in fields where Australia has special competence.

Where trade names are used this constitutes neither endorsement of nor discrimination against any product by the Centre.

ACIAR MONOGRAPH SERIES

This series contains the results of original research supported by ACIAR, or deemed relevant to ACIAR's research objectives. The series is distributed internationally, with an emphasis on the developing world.

©Australian Centre for International Agricultural Research

GPO Box 1571, Canberra, ACT 2601.

Lim, T. K., and Fleming, E.M. Food and other crops in Fiji: an annotated bibliography.
ACIAR Monograph No. 55, 378 pp.

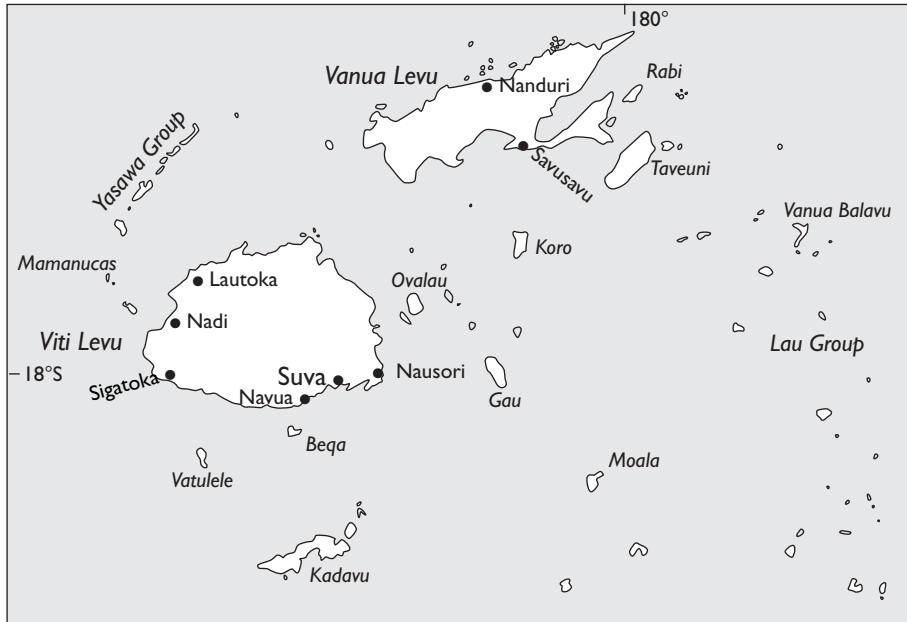
ISBN 1 86320 240 4

Design by Arawang Communication Group, Canberra

Printed by Brown Prior Anderson, Melbourne

CONTENTS

Introduction	5
Agricultural Development Planning and Policies	8
Land Tenure	25
Agricultural Economics, Marketing, Geography and Statistics	31
Agricultural Extension, Education, Information and Research Techniques	73
Agricultural Production Practices and Farming Systems	85
Soil Management, Soil Conservation and Plant Nutrition	98
Crop Introduction, Distribution and Description	118
Insect Pests, Plant Diseases and Weeds	131
Food and Human Nutrition	204
Pulses, Legumes and Leguminous Trees	240
Vegetables	243
Rice and Other Cereals	250
Fruits	260
Beverages	274
Spices	287
Root and Tuber Crops	296
Taro/Tannia/Giant Swamp Taro	306
Coconut and Other Palms	320
Miscellaneous Cash Crops	330
Annual Reports	331
Author Index	343
Title Index	355



Map of Fiji

INTRODUCTION

This bibliographic study is a part of a range of strategic approaches used in a feasibility study on the status, constraints and solutions in the production, marketing and consumption of nutritious food crops in Fiji. The primary objective of this annotated bibliography is to assist in the identification of pre- and post-production activities on food crops that have received considerable research and development emphasis and, conversely, highlight those important areas that have received inadequate emphasis and require greater focus and more action.

The scope of the bibliography includes published and unpublished (mimeograph) documents on research and development activities that are readily accessible or available to us. These documents report on work carried out in relation to all aspects of production, marketing and consumption of nutritious food crops in Fiji. An attempt was made to scan publications from the early years of European visitations to Fiji in the 1860s until the present. However, this literature survey is not exhaustive, as many publications are unavailable or inaccessible. For similar reasons, some citations were not annotated. Annotations were also not provided in a few cases where the title is self-explanatory, as in the cases of a number of pamphlets and lists that are included. An attempt is also made to include associated literature from other Pacific countries where it is relevant to food and agriculture in Fiji.

It is hoped that this bibliographic study will be useful to researchers, scientists, policy makers, planners, nutritionists and health workers. Also, we hope it will be relevant to consumers of nutritious food crops and those who are interested in finding out more about Fiji.

The bibliography is arranged according to key production activities and crops, as outlined below. Entries are arranged chronologically in 10-year segments and then alphabetically according to the first author's surname. We found this format to be useful for our feasibility study and feel that it would also be useful to other researchers.

Production topics covered in this bibliography are grouped into:

- ▶ Agricultural development planning and policies
- ▶ Land tenure
- ▶ Agricultural economics, marketing, geography and statistics
- ▶ Agricultural extension, education, information and research techniques
- ▶ Agricultural production practices and farming systems —irrigation and water management, cultural practices and farming systems
- ▶ Soil management, soil conservation and plant nutrition
- ▶ Crop introduction, distribution and description
- ▶ Insect pests, plant diseases and weeds (including general plant protection)
- ▶ Weedicides, pesticides and their application technology
- ▶ Plant tissue culture and biotechnology
- ▶ Post-harvest handling, grading, processing and technology
- ▶ Food and human nutrition.

Crop categories covered are:

- ▶ Pulses, legumes and leguminous trees
- ▶ Vegetables
- ▶ Rice and other cereals
- ▶ Fruits (bananas, papaya, pineapple, breadfruit, citrus, passionfruit, guava, mango, melons)
- ▶ Nut crops
- ▶ Beverages (cocoa, coffee, tea, kava)
- ▶ Spices (vanilla, pepper, turmeric)
- ▶ Sugarcane
- ▶ Root and tuber crops (ginger, taro, tannia, giant swamp taro, yams, cassava, sweet potato, potato, miscellaneous)
- ▶ Coconut and other palms
- ▶ Miscellaneous cash crops.

A special category is included for annual reports of the Department of Agriculture/Ministry of Primary Industries/Ministry of Agriculture, Fisheries and Forests (MAFF). An index of authors is also included. Scientific names of crops are entered in italics.

Information for this bibliography was extracted from the published and unpublished works held in the library collections in Fiji of MAFF; National Food and Nutrition Committee; the University of South Pacific, Suva—South Pacific and General Collections; and the Trade Forum Secretariat. Other sources include publications of the South Pacific Commission, Pacific Regional Agricultural Programme (PRAP), Soil and Crop Evaluation Project (SCEP), United Nations Development Programme (UNDP), Institute for Research, Extension and Training in Agriculture (IRETA), Bureau of Statistics, and consultants in Fiji; library collections of the University of New England, the Australian Centre for International Agricultural Research (ACIAR) and the Department of Primary Industry and Fisheries, Northern Territory, and from CD-ROM databases of CAB (1972+), AGRICOLA (1970-1994), Current Contents (Agriculture, Biology and Environmental Science), and Australian-Based Agriculture and Natural Resources.

The authors express their thanks for assistance rendered in this compilation to staff of ACIAR, especially to Dr Padma Lal, Dr Greg Johnson and Dr Paul Ferrar for their valued assistance, to Mr Paula Taukei and staff in his division and in the library of MAFF, Ms Seini Seiniloli and the staff of NFNC, Dr Malcolm Hazelman of the South Pacific Commission, Mr Peter Walton and Dr Mecki Kronen of PRAP, Mr J. Widdowson of SCEP, and Mr Andrew McGregor, a private consultant in Suva.

AGRICULTURAL DEVELOPMENT PLANNING AND POLICIES

1930–1939

Roth, G. K. 1936. *Fiji: Handbook of the Colony*. Government Printer, Suva, 163 pp.

Separate chapters are included on the sugar industry, coconuts and copra industry, banana cultivation, canned pineapples, citrus fruits, rice production, cotton growing and subsidiary crops. In the chapter on subsidiary crops, there are brief notes recorded on tobacco, coffee, pulses, maize, sweet potato, oilseeds, cassava, rubber, citronella oil, spices, tomatoes, cucumbers, melons pumpkins, papaya, grenadillas and avocado.

Stockdale, F. 1938. *Report on Visit to Fiji 1937*. Colonial Office, London.

This is an early document on agricultural planning that begins with a short history of agricultural development and agricultural activities at the time of the visit. Analyses are made of the coconut, sugar and banana industries, other existing crops are mentioned, and notes are made on crops showing potential for introduction and development. The work of the Fiji Department of Agriculture comes under scrutiny, and recommendations are made for its future organisation. A short description is given of plant import regulations. A set of recommendations is made that covers all aspects of agricultural activity in Fiji.

1940–1949

Jack, H. W. 1940. Local food production. *Fiji Agricultural Journal*, 11(2), 33–35.

The author expresses puzzlement over the need to import so much food given the bountiful land resources in Fiji. He expresses the opinion that local farmers need greater incentives to produce more food for the welfare of the whole population. He is particularly concerned about the import of so much rice, and details efforts to stimulate local rice production that had met with little success. He mentions the potential advantages of irrigated rice production. Details are provided on a number of other foods that could be remunerative for farmers while acknowledging the many obstacles to greater food self-sufficiency. It is an early example of the underestimation of the important role of traditional staples, and of the confusion between self-sufficiency and nutrition security.

Harvey, C. 1941. Food crops and the 1941 hurricane. *Fiji Agricultural Journal*, 12(2), 35–37.

A report is presented on the relative damage to different crops of a cyclone in 1941. The importance is emphasised of maintaining reserves, either in the ground or storehouse. Yams are perceived as having a vital role in this respect.

Parham, B. E. V. 1946. Fiji and the Food and Agriculture Organization. *Fiji Agricultural Journal*, 17:96–101.

The author summarises the general position and principles of the Food and Agriculture Organization of the United Nations, and reviews the situation for the production and local use or export of major existing and potential crops in Fiji. Crops covered include sugar, copra, bananas, peanuts, soya beans, pulses, rice, grain sorghum, maize, cassava and starch foods, sweet potato, cottonseed and other oils, and pineapples and other fruits.

Blackie, W. J. 1949. Agriculture research and policy in Fiji. *Fiji Agricultural Journal*, 20:98–120.

The author provides a general account of agricultural development with tabulated data on crop area and exports for 1948, history of the Department of Agriculture, research achievements and policy measures adopted. Crops listed for research attention include coconut, citrus, other fruit crops, coffee, tea, sugar, bananas, tobacco and vegetables.

1950–1959

Roth, G. K. 1953. *Fijian way of life*. Oxford University Press, London, reprinted 1973, 176 pp.

Roth describes the physical background of village life and land custom. An appendix is provided on Fijian plant names and their botanical equivalents.

Spate, O. H. K. 1959. *The Fijian People: Economic Problems and Prospects*. Council Paper No. 13, Legislative Council of Fiji, Suva.

A major thrust of this report concerned the perceived need for land reform to hasten agricultural development. The author felt that the structure of indigenous Fijian society was closely linked to the land tenure system in impeding rural development. A movement away from a

communitarian system to one based more on individual initiative in production was considered necessary. Access to alienable land was seen as an integral part of this process.

1960–1969

Burns, A., Watson, T. Y. and Peacock, A. T. 1960. Report of the Commission of Enquiry into the Natural Resources and Population Trends in the Colony of Fiji. Council Paper No. 1 of 1960, Legislative Council of Fiji, Suva.

The findings on agricultural and rural development in this report largely supported those by Spate a year earlier. It was recommended that individualism should be given greater emphasis in agricultural production, with implications for the land tenure system.

Central Planning Office 1966. Fiji Development Plan 1966–1970: Agriculture and Forestry. Suva.

Included in this plan are agricultural policy aims, details of export crops and domestic products, production targets for agriculture, land development, activities of the Department of Agriculture, marketing cooperatives, and research program and expenditure estimates for the plan period.

1970–1979

Adams, M. E. 1970. Land use planning, physical resource surveys and agricultural development in Fiji. *Fiji Agricultural Journal*, 32:22–26.

Three stages of surveying physical, social and economic resources are outlined as a means to determine the potential of different resource combinations and implementing development policies. In Fiji, the first stage had been piecemeal and uncoordinated in the field, leading to difficulties in the second and third stages. It is argued that agricultural shortcomings in Fiji have been attributed to poor soil and climatic conditions while social and institutional factors have been overlooked.

Central Planning Office 1970. Fiji's Sixth Development Plan 1971–1975. Suva, 264 pp.

A chapter is included in the plan on agriculture, fisheries and forests, with a separate section on each plus an annex on programs for major agricultural commodities. Details are provided on the agricultural sector plan and policies. Separate sections are devoted to the research program,

extension division and agricultural training. Policies covered in some depth include marketing and price policy, rural credit, financial services, irrigation, land tenure and sugar.

Chandra, S. 1972. Agriculture, land use and smallholder farming problems in the Sigatoka Valley (Fiji). *Fiji Agricultural Journal*, 34:21–26.

A survey made of 54 farms totalling 203 ha showed a very dense population with a high proportion of youth. Each year an increasing proportion of farm produce was being used for home consumption leaving little for cash income. Cropping is very inefficient because subsistence crops do not realise the full soil potential. The main barriers to development identified were: over-population, insecurity of tenure, the slow rate of adoption of innovations, lack of capital and the low yield and unsuitability for summer cropping of most crop varieties.

Government of Fiji. 1975. *Fiji's Seventh Development Plan 1976–1980*. Central Planning Office, Suva, 267 pp.

The seventh development plan contained a brief chapter on food and nutrition in the first part of the plan in which development objectives and strategies were outlined. In the second part on sectoral plans, the agricultural plan is outlined first. The outline begins with the observation that agricultural performance was not as good as expected in the previous plan period, with some implied criticism of lack of motivation by farmers. Nevertheless, the seventh development plan largely follows the format of previous plans.

Fisk, E. K., Hardaker, J. B. and Thaman, R. R. ed. 1976. *The R. W. Parkinson Memorial Lectures: Food Production in the South Pacific*. University of the South Pacific, Suva.

These lectures were delivered in August and September 1974, and their main theme was the inappropriateness of some of the current agricultural development strategies in the South Pacific and the need to use indigenous agricultural systems as stable bases for development rather than considering them as inefficient obstacles in need of radical modernisation. The three lectures were: traditional agriculture as a source of food in a development situation (E. K. Fisk); agricultural policies for development in South Pacific countries (J. B. Hardaker); and the role of indigenous agricultural systems in fulfilling the needs of Pacific Island societies (R. R. Thaman).

Haynes, P. H., Brookfield, H. C. and Hardaker, J. B. 1976. Population and Environment Project: Eastern Islands of Fiji (Papers on Agriculture and Marketing. UNESCO/UNFPA Man in the Biosphere Project. Australian National University for UNESCO, Canberra.

This publication contains three project working papers and appendices on smallholder crop production in the Eastern Islands of Fiji. The first paper by Haynes is an account of some aspects of agriculture in Taveuni and Lakeba. Crop production processes are described, details are given on taro yields, and the issue of choice of appropriate technology is discussed. Brookfield's paper begins with a background of land sub-division in Fiji, and is followed by a description of the farming activities of five blockholders on settlement schemes, three in official schemes, one in an unregistered scheme and one settled on a piece of estate back-land. Discussion focuses on a comparison of the farms and the evolution of a production system that makes good use of the natural resources. Hardaker discusses some economic aspects of agricultural production and marketing in Taveuni, dealing with production methods and economic characteristics, the organisation of marketing and marketing reform, land tenure policy and extension programs. Appendices contain data on the main smallholder crops, estate crop production, technical considerations of rehabilitating coconuts, and notes on crop density and diversity.

Brookfield, H. C. 1977. Population, Resources and Development in the Eastern Islands of Fiji: Information for Decision-Making. General Report No. 1, UNESCO/UNFPA Man in the Biosphere Project. Australian National University for UNESCO, Canberra.

This report deals with all factors expected to influence the rate of development in the Eastern Islands of Fiji. Issues covered include ecology, resources and their use, population dynamics, hazards, economics and marketing, transport links and tourism. Agricultural change is reviewed, and a description is given of past agricultural systems covering copra and other export crops, subsistence crops and livestock. The commercialisation processes for indigenous crops are observed.

Chandra, S. 1979. Smallholder farm resource inventory and agricultural development planning in the Sigatoka Valley, Fiji. *Fiji Agricultural Journal*, 41(1), 1-19.

The author presents an inventory of farm resources for a sample of semi-subsistence Fijian and Indian farmers in the Sigatoka Valley, Fiji. He derives optimum resource allocation for the farms based on allocative and

technical efficiency analyses. A discussion is presented on the level of resource readjustments on the farms, followed by examples of crop mixes and calculation of gains in gross farm output. This study focuses on the need for detailed inventories of farm resources for agricultural development planning.

1980–1989

Chandra, S. 1980. Root crops in Fiji: Part 2 Development and future food production strategy. *Fiji Agricultural Journal*, 42(1), 11–17.

A food production strategy based on root crops is described that will give maximum returns in terms of kilojoules of food energy produced per unit of agricultural input. Energy relations in crop production are discussed. A two-goods model of semi-subsistence agricultural production is developed to show the need for the allocation research resources into root crops. Some general policy recommendations on the development of root crops in Fiji are also drawn from the analysis.

Government of Fiji. 1980. Eighth Development Plan 1981–1985: Policies and Programmes for Social and Economic Development. Central Planning Office, Suva, 369 pp.

The eighth development plan contains a chapter on increasing economic production with a sizeable section on agriculture. Agricultural development during the period of the seventh development plan is reviewed, and objectives and strategies for DP8 are outlined. Brief descriptions are given of the main agricultural programs that are planned for the period, concentrating on crops that have most export potential.

Ward, R. G. and Proctor, A. 1980. Fiji. In: Ward, R. G. and Proctor, A. ed. *South Pacific Agriculture: Choices and Constraints*. Australian National University Press, Canberra, pp. 421–430.

The chapter provides a brief description of the agricultural sector in Fiji. Issues covered include the base for agricultural diversification and the main agricultural options for planners.

Bourke, R. M. 1981. Self-sufficiency in horticultural crops. *South Pacific Journal of Natural Science*, 3:31–43.

The author discusses the factors that make South Pacific agriculture so diversified, then briefly reviews horticultural production in a number of South Pacific countries, including Fiji. The major constraints to smallholder agricultural development in Papua New Guinea and Cook Islands are analysed.

Cull, B. W. 1981. Utilising advanced technology in tree crops to improve productivity in the South Pacific. *South Pacific Journal of Natural Science*, 3:9–30.

The main purpose of this paper is to identify the main opportunities for, and constraints to, adoption of improved technologies in tree crop production in South Pacific countries, including Fiji. Factors influencing technology adoption relate to the characteristics of the farm population, environmental factors, infrastructure, markets, and availability of finance and resources.

Patel, N. P. 1981. Agriculture in Fiji. *Alafua Agricultural Bulletin*, 6:9–11.

Agricultural policies and strategies under the eighth development plan (1981–1985) in Fiji are elucidated. Agricultural diversification to reduce the dependence on sugarcane, development of a variety of export commodities and emphasis on the production of food for domestic consumption are the highlights of agricultural policy.

Sivan, P. 1981. Self-sufficiency in food production in the Pacific: opportunities and constraints—field crops. *South Pacific Journal of Natural Science*, 3:44–53.

The main field crops grown in South Pacific countries are outlined, with emphasis on root crops. Some references are made to the production of root crops in Fiji.

Ward, R. G. 1981. Dilemmas in South Pacific agriculture. *South Pacific Journal of Natural Science*, 3:9–30.

The focus of this article is the set of dilemmas facing smallholders in developing their farming systems in South Pacific countries. Alternative modes of agricultural production are assessed, especially of crops for commercial sale.

Chandra, S. 1982. Food production and consumption in a Fijian village and an Indian settlement in the Sigatoka Valley, Fiji. *Agricultural Systems*, 9:1–13.

A survey of the two different ethnic communities showed distinct differences in the dietary patterns and sources of food energy and protein among different food commodities. Indians were more efficient than Fijians in meeting their food requirements from the farms. Fijians tend to purchase more store food and more expensive sources of food energy and protein to supplement their diets. Results are used to formulate food policies for Fiji and other developing nations.

Institute for Research, Extension and Training in Agriculture 1982–present. IRETA's Agriculture News. University of the South Pacific, Alafua.

IRETA's Agriculture News is the agricultural newsletter of the Institute for Research, Extension and Training in Agriculture. It provides summaries of happenings in the areas of agricultural research, training and extension throughout the South Pacific, including Fiji. Its publication is aimed at spreading agricultural information from individual countries throughout the region.

Chandra, S. 1983. *Agricultural Development in Fiji*. Australian Universities International Development Program (AUIDP), Canberra, 172 pp.

This book covers farming systems in Fiji, broader environmental factors of land, soils and climate, and the socioeconomic factors of marketing, credit, ethnic composition, food preferences and livestock.

Hardaker, J. B., Fleming, E. M. and Harris, G. T. 1984. Smallholder modes of agricultural production in the South Pacific: prospects for development. *Pacific Viewpoint*, 25(2), 196–211.

The relative merits are assessed of smallholder, plantation and nucleus estates as modes of production for agricultural development in the South Pacific. The principal thrust of the paper is to support the village-based semi-subsistence system as a suitable one for agricultural development in countries such as Fiji.

Hardaker, J. B., Fleming, E. M. and Harris, G. T. 1984. Modes of agricultural production in the South Pacific: a rejoinder. *Pacific Viewpoint*, 25(2), 223–226.

Further support is offered for the village-based semi-subsistence system as suitable for agricultural development in the South Pacific in response to criticisms by Watters and Ward.

McGregor, A. 1984. A Program for the Development of the Batiri Citrus Project. School of Social and Economic Development, University of the South Pacific, Suva.

The report begins with a description of the project, the terms of reference and methodology. Major findings are presented on the orange juice enterprise, juice quality, ex-factory revenues and costs, and orchard costs. Details are provided of a number of potential diversification crops. Detailed projections are given, along with a financial analysis, for oranges, pineapples, passionfruit and tomatoes.

Ward, R. G. 1984. Production or management —where is the problem? *Pacific Viewpoint*, 25(2), 196–211

Criticisms are made of the arguments put by Hardaker, Fleming and Harris in favour of the village-based semi-subsistence system as a suitable one for agricultural development in South Pacific countries. Attention is given to the potentially valuable role that nucleus estates could play in the commercialisation of agricultural production in countries such as Fiji.

Government of Fiji. 1985. Fiji's Ninth Development Plan 1986–1990: Policies, Strategies and Programmes for National Development. Central Planning Office, Suva, 191 pp.

The ninth development plan contains a chapter on the primary production sectors, with 19 pages devoted to agriculture. Agricultural development during the period of the eighth development plan is reviewed, and objectives and strategies for DP9 are outlined. Brief descriptions are given of the main agricultural industries although virtually the only emphasis on food crops is placed on rice and maize.

Hardaker, J. B. and Fleming, E. M. 1986. Policy issues in agricultural market development in the South Pacific Region. Islands/Australia Working Paper No. 86/17, National Centre for Development Studies, Australian National University, Canberra.

The main policy issues concerning agricultural market development in the South Pacific are discussed. Particular attention is paid to the relative merits of different modes of agricultural marketing and the role of the public sector.

International Service for National Agricultural Research 1985. Agricultural Research Plan: Fiji. Ministry of Primary Industries, Suva.

This is one of a number of country studies in the South Pacific describing the national agricultural research system and recommending a research plan to improve food and cash crop production.

Fleming, E. M., Hardaker, J. B. and Jones, S. C. 1987. Agrarian development strategies for South Pacific island countries. Paper presented at the 31st Annual Conference of the Australian Agricultural Economics Society Conference, Adelaide, February.

The authors present and evaluate the major strategic options for agricultural development in South Pacific countries.

Morrison, R. J. 1987. Environmental problems associated with agricultural development on atolls. *Alafua Agricultural Bulletin*, 12:117–120.

Atolls represent a unique but very fragile environment. This paper briefly overviews the atoll environment in the South Pacific region and discusses the likely problems of agricultural development resulting from the introduction of new plant species, the increased use of fertilisers and other agricultural chemicals, the extraction of groundwater, vegetation removal and erosion, and some general development-related activities.

Persley, G. J. and Ferrar, P. 1987. South Pacific Agriculture: Challenges and Opportunities for ACIAR and its Research Partners. ACIAR Technical Reports 5, Australian Centre for International Agricultural Research, Canberra.

This edited collection describes a one-day seminar held in conjunction with the Policy Advisory Council of ACIAR meeting in Apia, Western Samoa from 17–21 June 1985. The agriculture sector of the South Pacific is described to council members, ACIAR's activities in the region are

outlined and views of other agencies working in the Pacific on agricultural research needs and possible areas of collaboration are sought. Policy issues related to ACIAR's activities are raised for Council's considerations and views are sought on the future direction of ACIAR's program in the South Pacific.

Asian Development Bank 1988. Agricultural research in the Asian and Pacific Region: Current situation and outlook. Asian Development Bank, Manila.

This publication brings together the findings of a number of country studies of national agricultural research systems, including Fiji, and suggests ways in which agricultural research can be improved on a regional basis.

Bayliss-Smith, T. and Haynes, P. 1988. Land settlement as a rural development strategy. In: Overton, J. ed., Rural Fiji. Institute of Pacific Studies, Suva, pp. 123–146.

The authors are concerned with regional imbalances and the impacts that modern settlement and resettlement schemes on these imbalances. They discuss in general terms local resettlement, inter-regional resettlement and intensification of productive activities. Land settlement in Fiji is examined from the viewpoint of the so-called 'Indian frontier'. Phase 1 of this frontier is termed the 'haphazard frontier', while phase 2 represents sugar company settlements. The origins of state involvement are explored in this process. Land settlements for Fijians are also discussed and examples are mentioned of British colonial experiments. Details are provided on the Seaqaqa scheme which is evaluated in terms of efficiency and equity by income and racial groups. Implications are provided for development planning.

Fleming, E. M. and Piggott, R. R. 1988. Assessment of policy options for agricultural export stabilisation in the South Pacific. *Journal of Developing Areas*, 23(2), 271–90.

Measures of sources of export earnings instability in selected South Pacific countries, including Fiji, are used to assess the options available to South Pacific governments to stabilise export earnings and incomes.

Crocombe, R. 1989. Constraints and opportunities for small-scale farmers in the Pacific Islands. In: *Transfer of Technology to Small Scale Farmers: Meeting of FFTC/ASPAC*. ASPAC Food and Fertiliser Technology Centre, Taipei, pp. 37–45.

Haynes, R. J. and Naidu, R. ed. 1989. *Agricultural Development in the Pacific Islands in the 90s: Proceedings of the International Conference and Workshop*, Suva, 31 March to 1 April 1989, Institute of Agricultural Science, Suva.

Ministry of Primary Industries, Fiji and Food and Agriculture Organization of the United Nations 1989. *Fiji and the Food and Agriculture Organization of the United Nations: A Partnership in Development*. Suva.

Details are provided on the FAO Technical Cooperation Programme and Special Action Programmes in Fiji. Relations are outlined between FAO and the Ministry and details are given on FAO's contributions. Specific initiatives outlined include rice progress, revitalising the land, battling malnutrition, a plan for coconuts, plant protection and strengthening of root crops, cocoa growing, commodity planning, development through water and the World Food Programme in Fiji.

Reeve, P. P. 1989. *On Fiji Soil: Memories of an Agriculturist*. Institute of Pacific Studies, University of the South Pacific, Suva.

This volume is compiled from the journals of W. L. Parham by his daughter. Parham was an agriculturalist in Fiji from 1918 to 1942. Interesting sections are included on his times at Naduruloulou, Ra, Sigatoka and Tailevu.

1990–present

United Nations Development Programme 1990. *UNDP Regional Workshop on Environmental Management and Sustainable Development*, 17–21 April, 1990, Suva.

Country reviews and technical papers on environmental management and sustainable development were presented at a regional workshop. The proceedings are published in this report.

Eyzaguirre, P. 1991. *The scale and scope of national agricultural research in small developing countries: concepts and methodology*. ISNAR Small Countries Study Paper No. 1, International Service for National Agricultural Research, The Hague.

The ideas in this paper were presented for discussion at the International Workshop on Issues and Methodology for the Analysis of National Agricultural Research Systems (NARS) in small countries, held from 29 January to 2 February at the International Service for National

Agricultural Research in The Hague. This methodology is being used in seven countries, including Fiji. Generally the methodology for the analysis of NARS comprises three parts. Part 1 contains the statement of the problem, focus of study and definition of a small country NARS. Part 2 is the analytical methodology in which the concepts used in study are defined. It provides common terminology and classifies areas of information needed to conduct analyses. Part 3 defines specific categories of information required to substantiate the analysis and contains conclusions of the study.

South Pacific Commission 1992–present. SPC Agricultural News. South Pacific Commission, Suva.

This is a quarterly newsletter for dissemination of agricultural information, especially of the South Pacific Commission agricultural program and projects, regional programs, institutions and country activities. It provides summaries of happenings in agriculture throughout the South Pacific, including Fiji.

Government of Fiji. 1993. Opportunities for Growth: Policies and Strategies for Fiji in the Medium Term. Parliamentary Paper No. 2, Ministry of Finance and Economic Planning, Government of the Republic of Fiji, Suva.

This government publication outlines the market-oriented development strategy being pursued by the government. Its implications for agriculture are drawn out in that there is to be growing emphasis on export-oriented agricultural development and less protection and subsidies for agricultural industries. However, in the section on agriculture in Chapter 12 on primary production, there is still a tendency for the government to assume the role of selecting those agricultural activities for expansion. Some details are given for major activities under the headings: background; constraints; and development prospects. Categories covered are sugar, coconut products, fresh fruit and vegetables, and livestock.

World Bank 1993. Pacific Island Economies: Toward Efficient and Sustainable Growth. World Bank, Washington, D.C.

Fiji is among the countries for which the World Bank analyses economic performance and suggests policies for improvements. The role expected to be played by the agricultural sector in these improvements is spelt out.

Hardaker, J. B. and Fleming, E. M. 1994. Pacific 2010: Strategies for Melanesian Agriculture for 2010: Tough Choices. Pacific Policy Paper 13, National Centre for Development Studies, Australian National University; Canberra, 156 pp.

This study addresses strategic questions about the development of Melanesian agriculture to the year 2010 in the light of both current problems and emerging trends in the environment in which agricultural enterprises operate. The countries studied are Fiji, Papua New Guinea, Solomon Islands and Vanuatu. The discussion covers: (1) strategic decision making for agricultural development, which requires recognition of the importance of agricultural development in the economy; (2) strategic agricultural planning, including agricultural development goals and the nature of government intervention; (3) inter-sectoral strategies concerning production sector emphasis and the balance of rural and regional development; (4) agricultural sector strategies, including mode of agricultural production, land tenure, farm size, agricultural research and choice of technology, degree of commodity specialisation or diversification, and level of factor intensity; (5) agricultural marketing strategies and marketing regulations, and (6) government capacity to implement agricultural development strategies.

Narayan, D. 1994. Gender awareness in agricultural development. Paper presented at a Gender Awareness Workshop, Ministry of Agriculture, Fisheries, Forests and ALTA /UNIFEM/SCEP/AusAID, Suva.

Emphasis is placed on the important roles played by women in agricultural development in Fiji, and the need to incorporate their activities in agricultural development planning processes.

Wood, I. M. 1994. Case study 2: planning a new crop project. Proceedings of a Crop Research Planning Seminar, Fiji, 10–11 August 1994.

Asian Productivity Organization 1995. Improvement of Farm-Level Infrastructures, Report of an APO Seminar, 31 August–10 September 1993, Tokyo, 381 pp.

The objectives of the seminar were: (1) to assess the current situation of farm-level infrastructures (particularly irrigation, but also including land improvement, farm input supply, farm roads, marketing and processing facilities) in APO member countries; and (2) to identify and appraise the major problems and suggest measures for improving organisation and management of farm-level infrastructure systems. Eight resource papers and 16 country papers were presented. The country papers cover:

Bangladesh, Fiji, India (two papers), Iran, South Korea, Malaysia, Mongolia, Nepal, Pakistan, Philippines (two papers), Sri Lanka, Taiwan (two papers) and Thailand. The resource papers cover: Japanese experience in improving farm-level infrastructures; government policy on irrigation system development in Asia; the role of farmers' organisations in improving infrastructure; and problems and prospects of operation and maintenance of irrigation facilities in Japan.

Kumar, J., Field, S. P., Dowling, A. J., Wood, I. M., Widdowson, J. P. and Hine, P. T. 1995. Setting priorities for an agricultural research program in Fiji. *Fiji Agricultural Journal*, 51(2), 43–52.

The authors suggest that the most appropriate method for MAFF to set its research priorities—both between new and established industries and within an established industry—is a scoring system whereby all factors considered to be key indicators of the national value of each industry are rated. These ratings are then added to give a score that can be used as a quantitative measure to compare the relative importance of each option. If considered necessary, a weighting can be given to the factors so that the more important factors have a greater impact on the total score.

McGregor, A. and MacCarney, J. 1995. *Fiji Agricultural Sector Study*. Asian Development Bank, Suva.

This report is an insightful look into the way ahead for agricultural development in Fiji. Objectives and strategies are spelt out in detail. The general thesis is that agricultural development should be market-led, and the government should confine its inputs to a supporting role. Details are provided of important crops, their characteristics and scope for development.

Ministry of Agriculture, Fisheries and Forests, Fiji 1995. *Sigatoka Valley Rural Development Project: Annual Report 1994*. Sigatoka Research Station, Suva.

This is the final report for the Sigatoka Valley Rural Development Project which officially ended on 30 June 1994. It reports on project activities such as roads, drainage, irrigation, farm buildings, trials carried out and the production situation of major crops grown in the valley, namely maize, rice, broom corn, vegetables, potatoes, passionfruit, papaya, watermelon, peanut, pulses and root crops.

Pacific Regional Agricultural Programme 1995. Report of the Annual Meeting of the Regional Advisory Board, Nadi, Fiji, 10–14 July 1995. Suva.

Progress reports and work programs are presented on the various projects of the Pacific Regional Agricultural Programme in the South Pacific. There are numerous comments made and questions asked by country representatives, including Fiji, which were directed towards the need for project outcomes to benefit the individual countries. Statements are included on agroforestry, agricultural information, intellectual property rights and plant germplasm, and agricultural extension.

Asian Development Bank 1996. Fiji Agriculture Sector Review—A Strategy for Growth and Diversification. Pacific Studies Series, Asian Development Bank, Manila.

This report reviews the performance of the agricultural sector in Fiji over the previous decade and suggests a revised strategy for growth and diversification in light of recent events. The report highlights a strategy based on private sector-led development with the government and other public agencies modifying their activities to play a facilitating role.

Asian Productivity Organization 1996. Agricultural Trade Policy in Asia-Pacific—A Study Meeting Report, 24–31 October 1995, Seoul. Asian Productivity Organization, Tokyo, 329 pp.

Papers presented at the study meeting assessed the current status of trade in agricultural products in APO member countries, discussed the impact of the GATT/WTO agreements on the future growth and direction of agricultural trade in the Asia-Pacific region, identified emerging issues and suggested remedial measures on technical barriers to agricultural trade. The country papers presented by the participants provide information on the status of policies relating to agricultural trade and measures being taken by governments to adopt an open market economy and introduce trade reforms. Country papers were presented for China, Fiji, India, Indonesia, Iran, Malaysia, Mongolia, Myanmar, Nepal, Papua New Guinea, Philippines and Thailand.

Fairbairn-Dunlop, P. 1996. The broadening role of agriculture: women's role. Paper presented at a Gender Sensitising Workshop, Dreketi, Fiji. Soil and Crop Evaluation Project, Ministry of Agriculture, Fisheries & Forests, Suva.

It is posited that the contributions by women in agriculture in South Pacific countries are many and varied. Much still needs to be done to meet their needs and increase their contribution to agricultural development.

Eyzaguirre, P. 1996. *Agriculture and Environmental Research in Small Countries: Innovative Strategies to Strategic Planning*. Wiley, New York, 231 pp.

This book contains 11 chapters covering key issues for planning agricultural research in small developing countries. The first chapter deals with defining the 'small country' problem, and is followed by a chapter detailing how to work with small and diverse institutions. Chapters 3 and 4 deal with national research portfolios, with Fiji used as one of the case study countries in the fourth chapter. The fifth chapter covers research on natural resource management. Chapter 6 is particularly relevant to South Pacific countries as it is concerned with diversification and high-value non-traditional export crops. Biotechnology is the subject of Chapter 7 and planning for the information revolution is dealt with in the eighth chapter. The scope for regional partnerships is examined in Chapter 9, and the key role of agricultural research networks is discussed in Chapter 9. A conclusion completes the study, and contains a summary of some key lessons for agricultural research in small developing countries.

Pacific Regional Agricultural Programme 1996. Report of the annual meeting of the Regional Advisory Board, Suva, 30 September–4 October 1996. Pacific Regional Agricultural Programme, Suva.

This is a report of the presentations to the Regional Advisory Board of the Pacific region in Suva, Fiji. Project work in 11 PRAP projects is outlined, and programs and budgets are reviewed. Recommendations of the PRAP Transition Review are detailed and the idea of a meeting of ministers was mooted.

Pacific Regional Agricultural Programme 1996. Report of the meeting of Ministers of Agriculture of the Pacific ACP countries, 8–9 October, Suva. Pacific Regional Agricultural Programme, Suva.

Ministers presented statements on the economic framework in their countries and the status of agricultural research and development. They also reviewed achievements of the Pacific Regional Agricultural Programme (PRAP) and their shortcomings, addressed the issue of post-PRAP activities, and offered suggestions for improvements to PRAP. They also concurred on the final resolutions, which covered issues and concerns raised in the 1996 Regional Advisory Board meeting about the

declining interest in agricultural research, development and services, agroforestry, agricultural information, plant genetic diversity and resource conservation, and national agricultural extension services.

Fairbairn-Dunlop, P. 1997. Pacific Women and Household Food Production. UNICEF Pacific, Suva, 70 pp.

Two case studies were undertaken of household food security among poor urban Indian and Fijian families. The first was of a project implemented by the Housing Assistance and Relief Trust which was established in 1970. A household survey was undertaken that covered employment in the household, gardening activities by crop type and use of output. Labour was found to be an important constraint, especially for aged and solo mothers. A number of other factors were identified as affecting production: group motivation, economic need, demand for produce, regular and sound technical support, availability of seed and good returns. The second study was of the Wailea WOSSED group in Vatuwaqa. Results showed the viability of women's systems in providing for their families in an area where there are few gardening possibilities. A small loan made a big difference, and income security was found to lead to food security. Training needs were identified.

LAND TENURE

Before 1940

Fison, L. 1881. Land tenure in Fiji. *Journal of the Royal Anthropological Institute*, 10:333–352.

1940–1949

Harwood, L. W. 1945. An agricultural survey of Indian farmers in Navua. *Fiji Agricultural Journal*, 16(2), 50–55.

A total of 366 Indian farmers were surveyed of which 81 per cent held annual tenancies. An historical sketch is given of the area of the survey and land tenure types in Navua, and a table is presented containing details of farm size, areas cultivated, rentals, livestock numbers and details of rice plantings.

1960–1969

Ward, R. G. 1965. *Land Use and Population in Fiji: A Geographical Study*. Overseas Research Publication No. 9, Department of Technical Cooperation, HMSO, London.

This book is an important source of information on the basis for land use, predominantly for agriculture, in Fiji. Chapters are included on the course of settlement and land use, the resource base, population, land tenure, the patterns and systems of commercial farming, and village agriculture. In the latter chapter, interesting sections are included on so-called banana, coconut and sugarcane villages. The book closes with an appraisal of the different regions in the country and a summary. The conclusion is drawn that it is difficult to foresee any changes in existing pattern of rural land use and population distribution to cater for more than a small proportion of the increase in the workforce unless major changes take place in the land tenure situation.

1970–1979

Nayacakalou, R. R. 1971. *Fiji: manipulating the system*. In: Crocombe, R. ed., *Land Tenure in the Pacific*. Oxford University Press, London, pp. 206–226.

The theme of this chapter on the land tenure system in Fiji is set in the first sentence: 'Recent studies of Fijian society have demonstrated that the official view of Fijian social structure is starkly at variance with Fijian social practice, and since socially recognised rights and obligations in regard to land have no backing in statute law, individuals may manipulate this field of divergence to advantage'. Sections are included on native land and relevant public agencies, law and custom in land tenure, and land use and modern development. In a conclusion, the author states that the divergences between social and legal norms are changing over time, opening up new opportunities to manipulate the land tenure system.

Crocombe, R. 1975. *Customary tenures and incentives to produce*. In: Hardaker, J. B. ed., *The Subsistence Sector in the South Pacific*. University of the South Pacific/University of New England, Armidale, pp. 31–46.

This paper comprises a succinct and very useful coverage of customary tenures in South Pacific countries and their effects on incentives to produce, with relevance to Fiji. It commences with a clarification of the meaning of customary tenure: there are no pre-European contact tenures left in Pacific island countries and current tenure systems are more

appropriately referred to as colonial tenure. Another important observation concerns the traditional agricultural production mode in these island countries: most farmers operated as individuals or families, and not communally. It is also explained that the best lands are not under customary tenure. The question of the relationship between land tenure system and production incentives is addressed in detail. It is obviously a complex issue to resolve, and the point is made that limitations on land transfer reduce incentives to produce. Legal equality is considered a disincentive, and tying land to social groups as a means of increasing production has its disadvantages which are spelt out. The leasing of land provides much-needed flexibility, but this is limited in a number of ways that are detailed. The paper ends with an assessment of the scope for improving the tenure system. There are prospects for improvement through some fairly small but useful changes.

Chappelle, T. 1978. Customary land tenure in Fiji: old truths and middle-aged myths. *Journal of the Polynesian Society*, 87(2), 71–88.

It is observed that the most important characteristic of traditional tenure systems in Fiji is their flexibility. Efforts by Fiji's first governor, Sir Arthur Gordon, to simplify and rationalise customary land tenure revealed that he had not understood much about these systems. The fact that there has been little acknowledgment since of this fact reflects a general lack of appreciation of land tenure systems in Fiji. This article is an attempt to remedy this situation. Sections are included on descent groups, rights to direct land use and categories of landholders, status and rights, rights to indirect economic gains, rights to control and transfer land, residual and symbolic rights, and population movements and the concept of ancestral lands.

Rutz, H. J. 1978. Fiji land tenure and agricultural growth. *Oceania*, 49(1), 20–34.

This paper is mainly concerned with Fijian communal land tenure and the perception of its negative consequences on agricultural growth. The issue is examined in the context of land use in the district of Waimaro in the Waidina Valley, Viti Levu. It was found that communal tenure did have an effect on ideas about land rights; these ideas are discussed in detail. The responses by villagers to alternative land tenure strategies are also examined. It is concluded that far too much emphasis had been placed on kinship groups to the exclusion of households as important units of

production, exchange and consumption. Communal tenure can be expected to function as effective tenure to the extent that it provides security for the aspirations of households.

Walter, M. A. H. B. 1978. The conflict of the traditional and the traditionalised: an analysis of Fiji land tenure. *Journal of the Polynesian Society*, 87(2), 89–108.

The author argues that the most dire effects of not viewing traditional society as capable of undergoing innovative change had been felt where an 'omnipotent alien administration has seen fit to codify a traditional social system—thereby ossifying it'. He presents the results of a case study in which he examined the effects of 'traditionalisation' on a society of the land tenure system in Mualevu, in the Lau Islands in Fiji. He shows how the people in this village adapted traditional principles to cope with new economic pressures as they became more involved in cash cropping. Sections are included on the rights of territoriality, right of prior access from customary rights established by original cultivation, changes effected by Tongan conquest, establishment of an official traditional tenurial system, the initial effects of growing coconuts and effects of involvement in the cash economy.

1980–1989

Ushman, S. 1984. Fiji: land tenure and productivity. In: Crocombe, R. and Acquaye, B. ed. *Land Tenure and Rural Productivity in the Pacific Islands*. University of the South Pacific, Suva, pp. 97–101.

Land tenure arrangements, legislation and registration in Fiji are described, and the issue of tenure security and productivity in land use is addressed.

Utrecht, E. 1984. Land and agriculture, fishing and mining. In: Utrecht, E., ed., *Fiji: Client State of Australasia? Transnational Corporations Research Project*, University of Sydney, pp. 119–178.

Descriptions are provided of the land tenure and ownership situation in Fiji. Production of the following commodities are described: rice, sugar, copra, tobacco, coffee, ginger, cocoa, passionfruit, citrus and pineapple.

Bolabola, C. 1986. Fiji: customary constraints and legal progress. In: Land Rights of Pacific Women, Institute of Pacific Studies. Suva, pp. 1–67.

The author identifies land ownership patterns among Fijians, outlines the customary or traditional land rights of women, identifies ways in which land institutions in Fiji have affected the land rights of women, and identifies contemporary practices and attitudes in the exercise of land rights by women in Fiji.

Kamikamica, J. 1987. Fiji: making native land productive. In: Crocombe, R. and Arutangai, S. ed. Land Tenure in the Pacific. Third edition, Institute of Pacific Studies, University of the South Pacific, Suva, pp. 226–239.

This is a new chapter in the revised version of the 1971 book that features a chapter on land tenure in Fiji by Nayacakalou. In this chapter, the Native Lands Trust Board is described and some emerging problems are discussed associated with the dual land tenure systems operating side by side. New opportunities and initiatives are identified for the leasing of Native Lands Trust land.

Overton, J. 1987. Fijian land: pressing problems, possible tenure solutions. Singapore Journal of Tropical Geography, 8(2), 139–151.

This paper begins with the premise that Fiji is facing a major land shortage and gives an overview of existing land leasing processes and land tenure arrangements. A distinction is drawn between *de jure* land tenure and *de facto* land use, with case study evidence supplied for Draubuta village in the Rewa delta. It is found that tenancy-at-will (Vakavanua leasing) does free up some land, uses recognised and respected customs and can relate rents to market values. This is despite tenure insecurity, an absence of written agreements and increased likelihood of land degradation on short-term leases. The paper also contains a discussion of sharecropping and group farming. Five potential solutions to land tenure problems are offered and analysed. A major reform of the NLTB leasing system is the most desirable but politically difficult solution. Extension of Vakavanua leasing and sharecropping would be desirable to complement a reformed NLTB leasing structure. The *status quo* is the least desirable option given that the present land tenure system is in need of change.

Eaton, C. 1988. Vakavanua land tenure and tobacco farming. In: Overton, J. ed., *Rural Fiji*. Institute of Pacific Studies, Suva, pp. 19–30.

Land use patterns are determined not only by the natural environment but also by the nature of ownership and the form of customary land use arrangements in the study area. Evolution and current status of land tenure are described, covering the Native Lands Commission, Native Land Trust Board, native reserve land, native leases and traditional arrangements and Vakavanua arrangements. There is a section on the relationship between land tenure and agricultural development and a case study of tobacco farming in the Sabeto Valley in southwest Viti Levu.

Mitchell, S. 1988. Agricultural legislation and leasehold land in Fiji. *Journal of Pacific Studies*, 14:97–111.

The system of land tenure in Fiji is described in fairly general terms, along with the Agricultural Landlords and Tenants Act. Data are examined relating to leasehold transactions that demonstrate that improvements could be made to the Act as well as the dissemination to tenants of information contained in it. The current system of rent assessment is considered to be rigid and archaic.

1990–present

Prasad, B. C. and Tisdell, C. 1996. Getting property rights ‘right’: land tenure in Fiji. *Pacific Economic Bulletin*, 11(1), 31–46.

The slow pace of economic reforms in Fiji has been blamed for the economy’s poor performance. A discussion is presented of reforms to the land tenure system in Fiji, with the Agricultural Landlords and Tenants Act central to that process. The insecurity of land tenure in all sectors has discouraged new investment and entrepreneurship. The impending expiry of leases in the sugar industry and the way this is resolved will determine the future of the industry. The role of the Native Land Trust Board and the government in successfully resolving the leases under the Agricultural Landlords and Tenants Act is critical. Security of tenure for tourism, industrial and residential development also needs to be considered. It is concluded that long-term leases and proper contractual enforcement can create an overall climate conducive to investment and entrepreneurship in all sectors of the Fijian economy.

Barbour, P. 1997. The 'ALTA issue' and its impact on investment in Fiji's sugar industry. *Journal of South Pacific Agriculture*, 4(1/2), 109–120.

It is observed that the ALTA issue currently dominates the agricultural sector and the sugar industry in particular. Seventy-four per cent of sugarcane farms are on native land leases, and the majority are covered by ALTA regulations. Almost all of these leases will have expired by 2024. The implications of this for sugarcane and general agricultural development are explored. An outline is presented of options for future reform of the land tenure system. Also, an historical review is given of the land tenure system and the sugar industry in Fiji.

AGRICULTURAL ECONOMICS, MARKETING, GEOGRAPHY AND STATISTICS

1930–1939

Barnes, A. C. 1931. Citrus exports—experimental shipments. *Fiji Agricultural Journal*, 4(2), 55–61.

This study reflects growing interest at the time in the commercialisation of citrus production, notably oranges and mandarins. Prospective seasonal markets were thought to exist for oranges in Australia, New Zealand, USA, Tahiti and Norfolk Island. Supplies from a small plantation at Nasinu were used to secure shipments to New Zealand for experimental purposes. Shipment procedures and results were considered satisfactory given the condition of the oranges and season of shipment. The shipment was commercially unattractive but showed promise. It is concluded that careful attention to marketing matters is needed for commercial success.

Anon. 1932. Marketing of Fiji bananas in Vancouver. *Fiji Agricultural Journal*, 5(2), 74–83.

A detailed account is given of experiences of exporters marketing bananas in Vancouver from 1932. It is a good example of early efforts to meet buyer requirements in respect of various quality dimensions. The conclusion was drawn that 'a ready market at satisfactory prices awaits supplies of Fiji bananas in Vancouver, provided that the fruit can be landed in a condition comparable with Central American bananas, i.e., free from blemishes and skin markings'. Recommendations are given as to the standards reached for successful export marketing.

Barnes, A. C. 1932. Fruit and minor crops. *Fiji Agricultural Journal*, 5(2), 55–58.

The author outlines export marketing problems and prospects for fruit and minor crops, concentrating mainly on the disease problems in bananas. He expects an expansion in the production and export of fruits, especially canned pineapples. Prospects for the cotton industry are considered in the light of the introduction of a new strain to revive commercial operations. Concern is expressed about the need to improve production methods for rice. Brief mention is made of tomato and maize production.

Ackland, A. B. 1937. The international sugar agreement. *Fiji Agricultural Journal*, 8(4), 42–46.

The major features of the five-year international sugar agreement are described and its implications drawn for the Fiji industry. Commencing in 1937 and signed by 21 producing and consuming countries, the agreement was aimed at regulating the production and marketing of sugar.

1940–1949

Ackland, A. B. 1940. The banana export trade. *Fiji Agricultural Journal*, 11(2), 43–46.

Details are given of banana exports in 1939, with estimates of returns per case.

Parham, B. E. V. 1940. Fijian farmers' co-operative market at Nausori. *Fiji Agricultural Journal*, 11(1), 7–9.

The author recounts the processes in getting approval for the Fijian farmers' co-operative market at Nausori, and provides details of its construction.

Surridge, H. R. 1940. A note on the Lawaqa market. *Fiji Agricultural Journal*, 11(2), 32.

The author describes activities at the Lawaqa market, commenting on the small throughputs of Fijian and Indian produce. He expressed concern that the market may be destroyed by a new traffic ordinance covering the carriage of produce on local buses.

Harvey, C. 1942. Survey of Indian farmers in the Central district. Fiji Agricultural Journal, 13(4), 120.

This is a report on survey of non-sugarcane growers in the Indian farming population in the Ra, Tavua and Ba sub-districts in late 1939 and early 1940. Information was collected on farm size, farming type and their relative efficiencies.

Harvey, C. 1943. A further note on the Nausori Fijian co-operative market. Fiji Agricultural Journal, 14(2), 36.

This update of the activities of the Nausori Fijian co-operative market reports that membership had risen to 206. The important role of fresh produce in agricultural development is highlighted.

Harvey, C. 1943 Copra notes. Fiji Agricultural Journal, 14(1), 29–30.

A progress report is given on the volumes and origins of copra exports.

Jack, H. W. 1943. Fresh food supplies. Fiji Agricultural Journal, 14(1), 2–7.

An update is given of quantities of fresh food supplies, plus a repeated call for increased food production.

SurrIDGE, H. R. 1943. Vegetable and fruit prices. Fiji Agricultural Journal, 14(3), 88–89.

A range of prices are presented for 11 native vegetables and 17 European vegetables.

Harvey, C. 1944. Export of fruit and vegetables to New Zealand. Fiji Agricultural Journal, 15(1), 24–25.

World War 2 led to increased exports of fruit and vegetables to New Zealand. In 1939, minor exports included fresh pineapples, pumpkins, watermelon, papaya, yams, sweet potato, taro, green ginger, cucumbers, tomatoes, mangoes and fresh coconut together with seasonal small shipments of grenadilla and avocado pear.

SurrIDGE, H. R. 1944. Fruit and vegetable supplies in 1944. Fiji Agricultural Journal, 15(4), 116.

An update is provided on the supplies of different items of fresh produce from local farmers in Fiji, as part of government efforts directed to encourage increased food production.

Surridge, H. R. 1946. Peanuts for export. *Fiji Agricultural Journal*, 17(4), 116.

The internal marketing division of the Department of Agriculture had considered peanuts for export to New Zealand. Replies had been received to questions on demand and the type of peanut preferred, prices, import restrictions and other supply sources.

Harvey, C. 1947. Agriculture and other industries in Fiji—the 1946 census. *Fiji Agricultural Journal*, 18(4), 93–96.

Tables are presented on the numbers of males engaged in each industry by race and principal activities, and numbers of Fijian and Indian males engaged on their own account or as wage-earners in agricultural production.

Parham, B. E. V. 1947. Brief history of cooperation in Fiji. *Fiji Agricultural Journal*, 18(1), 8–9.

The author recounts the administrative action taken to develop cooperation in Fiji among European and Fijian farmers. Details are provided on agricultural clubs, the Planters' Association, the Fijian Cooperative Market Association Ltd and other Fijian cooperatives. There is also a section on Indian cooperation.

1950–1959

South Pacific Commission 1952. Current Research in the South Pacific in the Field of Economic Development. Technical Paper No. 29, Noumea.

This technical paper gives details of research undertaken on coconut in Fiji among other items. A survey had been undertaken of coconut and copra production, copra drying, testing for moisture and the status of potash of coconuts on Viti Levu. There are also reports relating to Fiji on a survey of banana production, proposals for the development of the cocoa industry, research into sugar production by CSR, quite a deal of material on rice production and research, current pests and diseases, and general farming practices and land use.

Harvey, C. 1953. A cool store at Suva wharf. *Fiji Agricultural Journal*, 24(3/4), 100–101.

With increased volumes of banana exports, fruit was being packed earlier and left standing on the wharf longer. The case is put here for the usefulness of a cool store at Suva wharf to overcome this growing problem. The purpose of the cool store was to pre-cool the bananas. Details are given on plans for construction.

Nield, J. 1954. Quarterly report—marketing officer, 2nd quarter 1954. *Fiji Agricultural Journal*, 25(3/4), 93–96.

This is an early reference to procedures followed to report prices and availability of fruits and vegetables in frequent demand in Suva. Details are also given on the grading and packing of export crops, statistics and surveys, and new export projects. The latter covered dried ginger, coir, banana flour, vau (a fibre) and fruit juices.

O'Loughlin, C. 1956. *The Pattern of the Fiji Economy: The National Income 1950–53*. Government Press, Suva, 80 pp.

This analysis of the pattern of the Fiji economy contains useful statistics on the agricultural economy and its importance in the general economy in the early post-war period. Output is valued for the agriculture, fisheries and forests sector as a whole and separate sections are included on sugarcane, bananas, copra, root crops, rice, kava and fruits and vegetables in which values of output are estimated. There is also an interesting analysis of the Fijian village economy in Chapter 10 that covers the effects of monetisation, and a note in the appendices on hurricane damage to crops.

1960–1969

McPaul, J. W. 1960. Some aspects of banana cultivation in Fiji: II The economics of banana growing on a plantation scale. *Fiji Agricultural Journal*, 30(1), 5–13.

An economic analysis of banana production was undertaken. The production of 200 cases/ac gives returns of 250 Sterling pounds per annum. Costs were estimated for establishment and production where yield is 200 cases/acre/day. Three methods of selling output are considered. Banana cultivation is also considered as an activity in an interplanting system with two rows of taro between paired rows of bananas. Results of the economic analysis are summarised in a table, and it

is concluded that there is scope for reasonable returns to the small producer on good land and with regular input levels. It is concluded that a 3-acre block is an economic area for a small-scale farmer to maintain.

Frazer, R. M. 1964. Changing Fijian agriculture. *Australian Geographer*, 9(3), 148–155.

The author begins by describing the pre-contact setting in Fiji, describing which crops were grown, land use and social obligations. Coverage then moves to the period of early contact and its effects on crops grown and land use patterns. The present, covering the period from the late 1930s, is dominated by the growing importance of commercial crops. It is noted that current crops that resemble traditional crops in their attributes and make no great demands for change in land use technology or land holding are the most readily accepted and most easily disseminated.

Ward, R. G. 1964. Cash cropping and the Fijian village. *Geographical Journal*, 130(4), 484–506.

This is a seminal paper that examines some of the changes that were taking place in the transition from subsistence to cash cropping and a commercial rural economy in Fijian villages. This transition is discussed in terms of new attitudes to the allocation of labour and time, socio-economic organisation, value systems and the appraisal of land. A description is given of the typical Fijian village based on subsistence production, and the rise of cash cropping and the changes it had brought about in agriculture. Some of the first important changes that occurred because of an increase in cash cropping influenced subsistence production practices. Land quality was reappraised by villagers in the light of the new requirements of cash crops which led to changes in land settlement. Larger and more consolidated agricultural holdings are forecast, along with movement of population towards areas with better soils and market access, and a decline in the amount of bush fallowing. It is thought that an increasing proportion of the population would have to find employment in non-agricultural pursuits.

Belshaw, C. S. 1964. *Under the Ivi Tree: Society and Economic Growth in Rural Fiji*. University of California Press, Berkeley, 336 pp.

This book comprises four parts. In the first part, descriptions are given of the Fijian way of life, the village and social structure. A specific description is given of the Sigatoka region. Emergent enterprise in rural Fiji is the focus of Part 2. This part includes discussions on the Nadroga banana venture, the role of bureaucracy in guiding enterprise, Fijian corporate organi-

sations, enterprise and corporatism in the sugar industry, experiments of Fijian farmers and the activities of marketers. Part 3 contains an analysis of factors influencing change in rural Fiji, and the final part is a short conclusion.

Ward, R. G. 1964. A geographical study of population and land use in Fiji: interim report. Research School of Pacific Studies, Australian National University, Canberra.

This report contains material similar to that provided in Ward's major publication.

Nand, S. 1965. Fiji islands land settlement cooperatives: a testing challenge to co-operation in its traditional forms. *South Pacific Commission Quarterly Bulletin*, 15(2), 41–43.

This article deals with the challenge created by a recent upsurge in enthusiasm for land settlement cooperatives in Fiji. The land settlement cooperative schemes are described with specific details on the Bubalevu Landholding Co-operative Society Ltd and the Drasa Land-Purchase Co-operative Society Ltd. A sanguine view is portrayed for the future of the cooperative movement in Fiji.

Biggs, H. C. 1967. Report on the Marketing of Agricultural Produce in Fiji. Ministry of Overseas Development, London.

Anderson, A. G. 1969. Duality in Indo-Fijian small-farming. In: Bassett, I. G. ed., *Pacific Peasantry*, Manawatu Branch, New Zealand Geographical Society, Palmerston North, pp. 23–47.

The duality of Indian small-scale farming between sugar and non-sugar production is highlighted. Separate sections are provided on sugar production and domestic food production. Changes in the labour force are briefly analysed and it is concluded that agriculture was continuing to absorb a large proportion of the growth in the Indian labour force. The dominant position of sugar cultivation is discussed but it is also acknowledged that growth had occurred in other agricultural activities. Land tenure conditions are contrasted between the sugarcane belt and elsewhere. Some notes are added on management and marketing in the sugar and non-sugar industries.

Nand, S. 1969. The cooperative movement in Fiji. *South Pacific Commission Quarterly Bulletin*, 19(2), 41–44.

The author presents a general history of the cooperative movement worldwide and explains the meaning of the term, cooperative. He records the growth of the cooperative movement in Fiji between 1949 and 1967. Details are also given on thrift and credit societies, which commenced in 1961, and land-purchase societies. The focus of the article is on Lami Co-operative Education Centre which was established in 1964.

Watters, R. F. 1969. *Koro: Economic Development and Social Change in Fiji*. Clarendon Press, Oxford, 305 pp.

Case studies were undertaken in four Fijian villages which are compared in this book for the purpose of assessing economic development and social change. Special attention is given to increases in individualistic farming and rural-urban migration. Chapters on entrepreneurship, leadership in a transitional society, and cooperatives and community development touch on agricultural matters. The author opines that rural-urban migration should not be seen as a deleterious process in Fiji. Emergence of the 'independent farmer' is described in detail by relying on material from the case study villages. He concludes that the government should encourage a more dispersed settlement pattern that leads to a more widely distributed and more intensive agricultural system: 'the villager of today is the independent farmer or townsman of tomorrow'.

Watters, R. F. 1969. Tribesman or peasant? The evolution of rural society in Fiji. In: Bassett, I. G. ed., *Pacific Peasantry*, Manawatu Branch, New Zealand Geographical Society, Palmerston North, pp. 7–21.

Case studies of Nalotawa, in the Ba hills in the dry zone, and Sorolevu, 30 miles from Nalotawa, are used to show the changes being wrought in rural society in Fiji. By comparing the two villages at distinct stages of development, the author shows that peasantry was emerging as a product of the historical processes of capitalism and feudalism. This was allowing Fijians to participate in the capitalistic market economy.

1970–1979

Rhodes, P. L. 1970. Report on the first season's operation of the Clayson 975 combine for harvesting rice in Fiji. *Fiji Agricultural Journal*, 32(1), 18–19.

Records for one season of operating costs form the basis of an economic analysis of operating costs of the Clayson 975 combine for harvesting rice in Fiji. These costs compare unfavourably with those in Malaysia; but losses in hand harvesting cover the hire charges.

Rhodes, P. L. 1970. Mechanical rice production costs, Koronivia 1968–69. *Fiji Agricultural Journal*, 32(1), 20–21.

Partial mechanisation allows savings when labour cannot be costed at its full rate.

Crocombe, R. 1971. Review article: Watters, R. F.: *Koro: economic development and social change in Fiji*. *Journal of the Polynesian Society*, 80(4), 505–520.

This thorough review of Watters' book on economic development and social change in Fiji contains an interesting critique of the analysis by Watters of land tenure, the independent farmer and factors that motivate rural villagers. It points up the risk of loose use of important terms and the need for inter-disciplinary studies of rural village life.

Ward, M. 1971. *The Role of Investment in the Development of Fiji*. Cambridge University Press, 349 pp.

In a chapter on market demand factors, the author describes the agricultural sector, covering the main agricultural activities and assessing the scope for development of subsidiary crops. There are also sections on land, labour and capital in which each of these factors is assessed as a determinant of agricultural development. Among the special problems that are analysed, attention is given to agricultural loan finance and security for agricultural credit.

Fisk, E. K. 1972. Motivation and modernization. *Pacific Perspective*, 1(1), 21–33.

The strength and nature of motivation that compels people to leave subsistence farming and infiltrate the monetary sector of the economy are discussed in the Pacific Islands context where subsistence farming is the main source of livelihood. Fiji is used as an example in the microeconomic analysis of farm households and peasant farms. Rapid growth of the labour

force is causing considerable underemployment in agriculture, compounded by too few jobs in tourism and processing. Availability of land is another crucial factor. A simple model of factors influencing motivation is set up, showing the satisfaction and problems derived from applying varying amounts of family labour to farming. It is shown that dissatisfactions are small at very low levels of labour input.

Fisk, E. K. and Honeybone, D. 1972. Belshaw's 'emergent Fijian enterprise' after ten years. In: Epstein, T. S. and Penny, D. H. ed. *Opportunity and Response: Case Studies in Economic Development*. Hurst, London, pp. 173–192.

Belshaw's taxonomy of emergent Fijian enterprise is examined and found to be of value in explaining the impact of the institutional framework in which Fijians enter the exchange economy and become important producers of goods and services for exchange. Of contemporary relevance is the finding that, where bureaucracy has guided enterprise, as in the case of agricultural land development schemes, the new schemes tend to compete with the old. The authors find that traditional forms of Fijian corporate activity have considerable potential to mobilise surplus land and labour, but only for a limited level of economic activity beyond which substantial adaptation and modification of these forms is required. Another finding is that the institution of the independent semi-subsistent farmer provides an operational framework that works well for Fijians.

Frazer, R. 1973. The Fijian village and the independent farmer. In: Brookfield, H. C. ed., *The Pacific in Transition: Geographical Perspectives on Adaptation and Change*. St. Martin's Press, New York, 75–96.

A description is given of the Fijian village and how it has changed over time from a highly cohesive entity to a looser organisation with a diversity of individual goals. As government restrictions on village structure become less stringent, the village is likely to change as its members seek greater freedom in making economic decisions while retaining the social benefits that the village provides.

Barnard, R. 1974. Deuba: economic change in a Fijian village. *Oceania*, 45(1), 1–17.

This paper reports on a village study carried out in 1972. The main problem of Fijian village development is argued to be the transformation from a subsistence economy to an exchange economy. The village has easy access to urban markets. It is also close to two big projects, an irrigation scheme and a harbour modernisation program, both of which

promise new cash-earning opportunities for villagers. Commercial agriculture has developed rapidly since 1942, although not on a cooperative basis. The village is characterised by its livestock and crop combinations with dairying a preferred enterprise since cash returns are higher than for root crops. Wage work is also taken out of farming and women are becoming more involved in farming. In 1947 two cooperatives were established. Growing urban markets make farming in the area more attractive although the prospect of industrialisation raises farm labour problems.

Chandra, S., de Boer, A. J. and Evenson, J. P. 1974. Economics and energetics: Sigatoka Valley, Fiji. *World Crops*, 26(1), 34–37.

This study is based on data collected in 1970–71 on densely populated smallholder villages comprising Fijians and Indian immigrants in southwest Viti Levu. The two groups of smallholders operate under virtually identical ecological conditions yet they produce different results. In order to assess these differences and help improve incomes, two efficiency tests were carried out: (1) economic efficiency; and (2) biological efficiency. By use of simple measures to compare the subsistence of commercial crops produced in the 1970–71 crop season, it was hypothesised that the much higher levels of efficiency in energy use in one area for subsistence crops had an influence on economic performance. Differences were found between the two areas. In neither of the villages was labour used in quantities sufficient to approach an economically efficient level.

Kidston, W. 1974. Co-operation: development without change. *South Pacific Commission Quarterly Bulletin*, 24(1), 16–18.

Fiji is used as an example to illustrate the main problems confronting the growth and development of cooperatives in a developing country. Cooperatives involved in the production, processing and credit operations of copra are studied where copra production is the main source of income. They are argued to play a vital role in social and economic development of emerging societies but the development must take place within the bounds of local traditions and outlooks. The main problem seems to be lack of education. Analysis is based on Lakeba Cooperatives.

Anderson, A. G. 1975. *Indo-Fijian Small Farming: Profiles of a Peasantry*. Oxford University Press, London, 199 pp.

The objective of this study was to illustrate the evolution of the small farm sector. Stabilisation of the small-scale peasant farm resulted from governmental influence and the role of the Colonial Sugar Refining Company which adopted a leasing policy favouring small plots. Apart from diseconomies arising from difficulties of adopting innovations, the policy has been criticised for protecting endowed peasant farmers at the expense of the progressive, innovating larger scale farm sector. The nature of the rural society in Fiji is also discussed. The introduction of cooperative farms has generally met with failure, largely as a result of traditional village society suspecting new organised institutions. Kinship alignments are still important in this respect. The author stresses the persistence of economic dualism in Fiji.

Desai, A. V. 1975. Commercialization of subsistence agriculture in Fiji. In: Hardaker, J. B. ed., *The Subsistence Sector in the South Pacific*. University of the South Pacific/University of New England, Armidale, pp. 11–30.

It is observed that the subsistence sector in Fiji conforms to the general subsistence model in many respects, particularly in terms of the importance of family labour as a resource for the analysis undertaken in this paper. In examining the commercialisation of the subsistence sector in Fiji, attention is paid to the determinants of an agricultural marketed surplus, cropping patterns and labour use. The progress made in commercialising agriculture in Fiji is assessed, and it is noted that the data do not support any relationship between commercialisation and population pressure.

Goneyali, E. 1975. Who wants to stay on the farm? In: Tupouniua, S., Crocombe, R. and Slatter, C. ed. *The Pacific Way: Social Issues in National Development*. South Pacific Social Sciences Association, Suva, pp. 58–62.

The paper examines the role of the village in farming and the factors influencing young people's decisions to move away from the farm in the rural community of Ra in Fiji.

Haynes, P. H. 1975. Some aspects of technology in subsistence agriculture. In: Hardaker, J. B. ed., *The Subsistence Sector in the South Pacific*. University of the South Pacific/University of New England, Armidale, pp. 123–130.

This paper is written to encompass all South Pacific countries but has particular relevance to Fiji from which some examples are drawn. A good discussion is given of the ways in which subsistence producers protect themselves against adversity, maintain soil fertility and mobilise household labour. An assessment is made of the opportunities for introducing new technologies in a subsistence cropping system.

Ram, T. 1975 Some aspects of technology in subsistence agriculture. In: Hardaker, J. B. ed., *The Subsistence Sector in the South Pacific*. University of the South Pacific/University of New England, Armidale, pp. 207–210.

Details are provided on efforts by the Bureau of Statistics to impute values of non-monetary outputs in the economy of Fiji. This imputation was based on the 1968 Census of Agriculture and the 1968 Urban Household Budget Survey. The method is described, and estimates are presented for agricultural subsistence output for the years, 1968–1971. They show that the value of agricultural subsistence output is about 10 per cent of gross domestic product.

Rutz, H. J. 1975. Household production performance and entrepreneurship: incentives to work in the Waidina Valley, Fiji. University of the South Pacific, Suva (mimeograph).

The relationship between household production performance and entrepreneurship in traditional agriculture is the focus of this study. It is concluded that this relationship works through existing organisation forms above the household level, shown through the economic strategies selected by the households. According to the author, 'the dynamic for production performance does not stem solely from differential access to resources or some attitude about acceptable level of output to meet consumption, but rather from the ability of leaders to be organisational innovators, bringing together the assets of the household into more efficient units for saving and investment'.

Chandra, S. and de Boer, A. J. 1976. Food production efficiency in Fijian semi-subsistence agriculture. *Agricultural Economics Discussion Papers Series No. 8*, Department of Agriculture, University of Queensland, Brisbane, 32 pp.

A conventional production function was fitted to a two-year cross-section of farm management data from Indian and Fijian smallholders in the Sigatoka Valley. The results indicated very large differences in productivity between the two groups that were not adequately explained by resource endowments. The relative technical efficiency of each farm was determined through the production frontier approach that revealed few large differences within or between racial groups. It was therefore postulated that resource productivity variations were related to underlying differences in utility between the two groups and a two-good model (subsistence and commercial crops) was developed. This model was applied in a utility analysis framework associated with the subsistence affluence concept. The results adequately represent the differences in social, cultural and dietary patterns between the two groups that were the ultimate determinants of productivity.

Chandra, S., Evenson, J. P. and de Boer, A. J. 1976. Incorporating energetic measures in an analysis of crop production practices in Sigatoka Valley, Fiji. *Agricultural Systems*, 1(4), 301–311.

This paper describes how energetic measures applied to farm-level crop production data can be used to explain some differences between Indian and Fijian farm households in the Sigatoka Valley. The main attributes of the two groups are presented, some details are provided on farming patterns, and some insights are offered on the slow rate of technological progress in the area. The energy relationships in agriculture are summarised and the efficiency ratios of the two groups compared to reveal very large differences. Market prices were used to derive estimates of earning power which again revealed large differences between the groups. No direct relationship was discerned between the energy efficiency of a crop and its value. Cropping intensity was analysed in energetic terms. Results are used to consider the pressing policy issues of population, food supplies, income distribution, dietary preferences and agricultural employment.

Knapman, B. 1976. Indigenous involvement in the cash economy of Lau, Fiji, 1840–1946. *Journal of Pacific History*, 11(3), 167–188.

The author assesses the major policy aim of the government of Fiji to integrate rural Fijians into the 'modern' market economy specifically in relation to cooperatives in the eastern Lau group of islands. He finds that the demand for production inputs sets a minimum level to personal cash expenditure, determined by the copra price and personal preferences. It is concluded that planners are unwittingly trying to accelerate a process that began over a century ago.

Rutz, H. J. 1976. The efficiency of traditional agriculture, phases of development, and induced economic change in the Waidina Valley, Fiji. In: Pitt, D. ed., *Development from Below*. Mouton, The Hague, pp. 167–188.

A case study of the Waidina Valley is used to demonstrate the confusion between a 'traditional' and 'modern' production organisation and its relation to efficient and intensive cultivation. Details are provided of a plan in 1969 to sub-divide Waidina into smallholder plots that would be leased by smallholder-cultivators from the landowners. It is argued that the change in organisation might entail capital improvements beyond the immediate means of the cultivators and high labour costs, and is thought unlikely to appeal to producer-cultivators.

Basha, M. J., de Boer, A. J. and Chandra, S. 1977. A model of production and consumption for Indian farms in the Sigatoka Valley, Fiji. *Agricultural Economics Discussion Papers Series No. 6–77*, Department of Agriculture, University of Queensland, 24 pp.

The study entails an examination of the effect on the supplies of traditional staple food crops when more efficient farm plans are generated. The framework used is linear programming, where both farm production and consumption activities are included. This methodology is then applied to two groups of farmers operating under very similar environmental conditions in the Sigatoka Valley, Fiji, but possessing very different staple food crop consumption patterns. Data were collected during farm management studies among Indian and Fijian farmers in 1970–72. The model is considered useful because it shows production and consumption activities on small-scale farms. It incorporates elements of both the farm management problem and the diet problem that are usefully integrated for analysing semi-subsistence farms.

Chandra, S. 1977. Productive efficiency of Fijian and Indian farming systems in semi-subsistence agriculture: Part 1 Review of the problem and research approach. *Fiji Agricultural Journal*, 39(1), 1–11.

A review of studies carried out on agricultural problems in Fiji. A research problem is formulated to study the allocative, technical and energetic efficiency of crop production on Fijian and Indian smallholder farms in the Sigatoka Valley and to determine how agricultural production is affected by race, diet, regions, soils and land tenure. The research methodology and the farm management survey are outlined.

Chandra, S. 1977. Productive efficiency of Fijian and Indian farming systems in semi-subsistence agriculture: Part 2 Description of the farming systems and partial productivity results. *Fiji Agricultural Journal*, 39(2), 57–70.

The following characteristics of Fijian and Indian farms are described: farm sizes and cropping intensities, capital items and current expenditure patterns, family composition and population densities, cropping and labour use seasonality, crop consumption and marketing. The partial productivity analysis demonstrated that the gross outputs, gross margins and cash sales on the Indian farms were nearly twice those on the Fijian farms. On the Fijian farms the gross output per hectare and per man hour decreased with increasing farm size, whereas on Indian farms these measures increased with increasing farm size.

Chandra, S. and de Boer, A. J. 1977. Measuring the economic productivity of soil water in crop production systems. *Fiji Agricultural Journal*, 39(1), 25–31.

A production function model developed to measure the productivity of available soil moisture during dry periods (when potential evapotranspiration exceeds precipitation) was tested using data derived from smallholder farms in the Sigatoka Valley. Productivity estimates were also made of other inputs such as land, labour, capital and current expenses. Only partial success was obtained with the soil water component of this model. This is attributed to data limitations imposed on the specification of this variable. Suggestions are made for further refinement of the model for other types of farm productivity analysis.

Chandra, S. and de Boer, A. J. 1977. Productive efficiency of Fijian and Indian farming systems in semi-subsistence agriculture: Part 3 Production function models and statistical estimation procedures. *Fiji Agricultural Journal*, 39(2), 71–86.

General forms of production functions are reviewed and the properties and limitations of the various types of production functions are discussed. A class of production functions is chosen for use in this study. Statistical problems associated with these functions are discussed, followed by a literature review of studies using these functions. The production function models used in this study of productive efficiency of Fijian and Indian farming systems are summarised. Finally the estimation procedures employed in quantifying the dependent, independent and dummy variables in the production models are described.

Chandra, S. and de Boer, A. J. 1977. The allocative efficiency of Fijian root crop producers. *Proceedings of the Fourth Symposium of the International Society for Tropical Root Crops, Cali, Colombia, 1–7 August 1976*, pp. 221–226.

It was found that the most efficient root crop producers are those farming the light-textured soils in the lower Sigatoka Valley, and the most important production factors are labour and capital. Recommendations are made on the optimum levels of resource use under various conditions of limited capital and fixed availability of land or labour.

Government of Fiji, Bureau of Statistics 1977. *Report of Household Income and Expenditure Study*. Government Printer, Suva.

Summary details are provided that relate to income and expenditure patterns of rural households in Fiji.

Chandra, S. 1978. Productive efficiency of Fijian and Indian farming systems in semi-subsistence agriculture: Part 7 Summary and conclusions. *Fiji Agricultural Journal*, 40(1), 51–57.

In this final part of a series of papers, the whole study is reviewed and a summary of conclusions is presented. Suggestions are outlined for future research and the future of the Sigatoka Valley is discussed.

Chandra, S. 1978. The production, marketing and consumption of root crops in Fiji. In: Fisk, E. K. ed., *The Adaptation of Traditional Agriculture: Socioeconomic Problems of Urbanization*. Monograph No. 11, Development Studies Centre, Australian National University, Canberra, pp. 303–323.

A description is given of the typical semi-subsistence smallholding in Fiji. The crop production and consumption systems are explained on the basis of research work carried out by the author in the Sigatoka Valley. The marketing system for products of these smallholdings is described in terms of structure, produce and participants. The chapter concludes with a brief analysis of the dilemma created by urbanisation accompanied by increasing malnutrition.

Chandra, S. and de Boer, A. J. 1978. Productive efficiency of Fijian and Indian farming systems in semi-subsistence agriculture: Part 4 Resource allocation. *Fiji Agricultural Journal*, 40(1), 1–17.

Results are presented of regression analyses of production functions with dummy variables for small and large Fijian and Indian farms. Marginal value products were estimated for all factors. The method of analysis to determine the optimal allocation of resources by farmers is described. Policies based on the results are developed for farm readjustments.

Chandra, S. and de Boer, A. J. 1978. Productive efficiency of Fijian and Indian farming systems in semi-subsistence agriculture: Part 5 Frontier production function analysis and results. *Fiji Agricultural Journal*, 40(1), 19–36.

The concept of technical efficiency is explained and studies on the methods of measurement are reviewed. A linear programming procedure is described, which was used to derive the levels of technical efficiency on Fijian and Indian farms. This is followed by a discussion on the differences in technical efficiency ratings between years and races, and between villages and settlements. The results of the linear programming analysis are used to derive optimum farm plans and optimal crop mixes on these farms. Agricultural policies for farm development programs are then discussed.

Chandra, S. and de Boer, A. J. 1978. Productive efficiency of Fijian and Indian farming systems in semi-subsistence agriculture. Part 6 Energetic efficiency analysis and results. *Fiji Agricultural Journal*, 40(1), 37–50.

The theoretical bases for efficiency ratio and energy purchasing power are discussed followed by a review of the energetics of crop production in the Sigatoka Valley of Fiji. The food crop dietary preferences of Fijians and Indians are utilised to define a minimum subsistence bundle for each race. Semi-subsistence farming models are discussed and the concept of subsistence affluence outlined, A subsistence cash production model for Fijian and Indian farms is then developed, based on the energetics concept. This model is used for the test of utility maximisation between the two ethnic groups. The test established that the two groups have significantly different utility functions. Finally, some implications are drawn of using energetics in agricultural development policy formulation.

Chandra, S., de Boer, A. J. and Basha, M. J. 1978. A model for production and consumption for Fijian and Indian farms in Sigatoka valley. *Fiji Agricultural Journal*, 40(2), 71-80.

A description is given of a linear programming model used to integrate production and consumption modules of a sample of Fijian and Indian semi-subsistence households in the Sigatoka Valley. The model was only partly successful because of deficiencies in the data base. Improvements in data are argued to be necessary to enable realistic model results to point the way to more efficient allocation of production and consumption activities for agricultural development.

De Boer, A. J. and Chandra, S. 1978. A model of crop selection in semi-subsistence agriculture and an application to mixed agriculture in Fiji. *American Journal of Agricultural Economics*, 60(3), 436–444.

Models of fully subsistence agriculture are modified to allow a two-goods analysis of cash crop and staple crop production. A further extension allows comparisons between two groups of farmers— Indians and Fijians—possessing different production functions for their respective staple crops. Production possibility curves are constructed for each group of farmers and an empirical test is formulated. Empirical results confirmed the hypothesised behavioural relationships which would give rise to the observed differences in resource allocation and resource productivity between Indian and Fijian farmers operating within a similar agricultural environment.

Fiji Sugar Board 1978. Annual Report for 1978 Season. Lautoka, 16 pp.

As required by the Fiji Sugar Industry Ordinance Act 1961, this is a report submitted on the operation of the Sugar Board and Sugar Advisory Council during the 1978 cane harvesting and crushing season. Information is included on cane production, cane harvesting and crushing, on the marketing of sugar and molasses, and on other matters concerning the sugar industry (e.g. cane prices), and there is a brief section on future prospects. Appendices contain accountants' reports and accounts for the year ended 31 December 1977. This report is included as an example of the contents of the annual reports.

International Sugar Organization 1978. The World Sugar Economy, Structure and Policies: National Sugar Economies and Policies No. 3—Australia, Fiji, New Zealand. International Sugar Organization, London, 40 pp.

In the coverage of the sugar industry in Fiji, it is reported that the sugar industry contributes about one-sixth of the gross domestic product and accounts for more than one-quarter of total employment. Nine-tenths of the sugar produced is exported and the commodity accounts for more than two-thirds by value of all exports.

Nayacakalou, R. R. 1978. Tradition and Change in the Fijian Village. South Pacific Social Sciences Association, Suva, 164 pp.

The tasks carried out in this book are to define traditional Fijian social structure in the villages studied on Viti Levu (Draubuta, Lomawai and Nakorosule), determine whether new circumstances had caused cultural change, and proffer alternative courses of action made possible by the new circumstances. Fieldwork was carried out in 1954. Separate chapters are presented on the three villages, and there are chapters on the traditional Fijian village economy and the factors causing change. In the final chapter on choice and compromise, the author considers the scope for choice in the traditional organisation, the impact on choice of the introduction of money, economic growth and social change, and the need for compromise in a situation of change.

Rutz, H. J. 1978. Ceremonial exchange and economic development in village Fiji. *Economic Development and Cultural Change*, 26(4), 777–805

The author analyses the ceremonial exchange system in Fiji by addressing questions about the 'economic functions of ceremonial systems and the conditions of agricultural growth'. He concludes that ceremonial

exchange 'is intrinsically neither inhibitory nor facilitative of economic development'. It is argued that ceremonial exchange that inhibits development could be explained by the need to provide welfare services that otherwise are inadequately provided by the government.

Sharma, A. P. 1978. Studies on the mechanised harvesting of cassava in Fiji. *Fiji Agricultural Journal*, 40(1), 59–61.

Cassava is argued to be shifting from a peasant crop to a commercial plantation crop in Fiji. Larger scale production with minimum input cost is more practicable when supported by suitable mechanical equipment. Some of the results of studies on the mechanised digging of cassava roots are reported. Field tests were carried out at Koronivia on farmers' fields to find a more suitable machine than existing ones for use as a cassava digger, to reduce cultivation cost and increase net profit per unit of investment. Results indicated that a medium horsepower tractor attached to a single bottom mouldboard plough can harvest 0.4 ha of crop in 6 hours with minimum acceptable (1.44 per cent) tuber damage.

Amerasinghe, A. R. B. 1979. Sugar cane crop insurance. Commonwealth Secretariat South Pacific Regional Insurance Adviser and Commissioner of Insurance, Suva, 30 pp.

The paper lists the nature of the hazards involved in crop production, the scope and limitations of commercial and state insurance schemes and the options available. It focuses on Fiji. Tables illustrate sugar production, sugarcane yields and prices, sugar proceeds (1968–1978) as well as statistics on sugarcane crop losses and average yields (1966–1978).

Chandra, S. 1979. Crop production statistics for Sigatoka Valley, Fiji. *Fiji Agricultural Journal*, 41(1), 21–30.

Crop production statistics are presented for 13 Fijian villages and Indian settlements in the Sigatoka Valley. Data are given for each village or settlement on cropped and total area, mean plot size, yield, labour use, value of crop output, variable costs and gross margins per hectare, man-day and farm. The results are discussed in terms of crop diversity, labour requirements and gross margins analysis of the staple and commercial crops.

Chandra, S. 1979. Root crops in Fiji: Part 1 Production, marketing and consumption patterns. *Fiji Agricultural Journal*, 41(2), 73–85.

The author describes the system of root crops production including use of land, labour and capital on semi-subsistence farms and offers suggestions to improve the system. The contributions by farmers, middlemen and the National Marketing Authority in the marketing structure are assessed. The consumption patterns for root crops are described and the implications for future food supply are reviewed.

Government of Fiji, Bureau of Statistics 1979–current. *Current Economic Statistics*. Government Printer, Suva.

Contains statistics on agricultural production and prices.

1980–1989

Chandra, R. ed., 1980. *Food Distribution Systems in the South Pacific: Report on a Conference, Suva, 13–17 December 1978*. Development Studies Centre, Australian National University, Canberra.

This edited collection reports the results of two years of investigations into the food distribution systems in Fiji, New Hebrides (now Vanuatu) and Tonga. The seminar report emphasises the role of indigenous and non-indigenous people in food distribution; the role of government; satisfaction of food preferences using local and overseas sources; and the role of the intermediaries in food distribution.

Chandra, S. 1980. The productivity of the sugar cane farms in the Sigatoka Valley, Fiji. *Fiji Agricultural Journal*, 42(1), 35–39.

Sugar, the principal economic enterprise in Fiji, is produced by some 19 000 smallholders, covering 80 000 ha, and producing some 500 000 tons of sugar in the dry zones of the two main islands. Exports account for 70 per cent of foreign exchange earnings. The farm production systems are outlined and the levels of land, labour, capital and cash utilisation are discussed. The productivity levels, based on partial productivity measures for the Fijian and Indian farmers, are discussed.

Knapman, B. and Walter, M. A. H. B. 1980. The way of the land and the path of money: the generation of economic inequality in Eastern Fiji. *Journal of Developing Areas*, 14(2), 201–222.

The authors argue that the traditional basis of social inequality has been eroded over time and replaced by a new basis of economic inequality. The latter reflects 'differential access to resources within a cash-dominated society'. They report on the processes of change in the Eastern islands of Fiji, focusing on monetisation, population growth and coconut cash cropping, and analyse the pattern of economic differentiation that follows.

Rothfield, R. and Kumar, B. 1980. Report on the Census of Agriculture 1978. Parliamentary Paper No. 28, 1980, Parliament of Fiji, 114 pp.

A broad array of tables is provided on farm numbers and sizes, employment, planted areas and yields in the agricultural sector in Fiji, with considerable detail by agricultural activity, province and division, and ethnic group. Details are also provided on livestock and poultry numbers. Data collection procedures are outlined, including their organisation, scope of the census and program of data collection, sector classification and sample design, data processing and program of verification. A note is included to explain classification by land tenure, land occupancy, race and agricultural activity.

Ward, R. G. 1980. Agricultural options for the Pacific Islands. In: Shand, R. T. ed., *The Island States of the Pacific and Indian Oceans: Anatomy of Development*. Monograph No. 23, Development Studies Centre, Australian National University, Canberra.

The author outlines the options for developing agriculture in the South Pacific, which are derived from the ADB agricultural survey undertaken in 1979.

Ward, R. G. 1980. Plus ça change ... plantations, tenants, proletarians or peasants in Fiji. In: Jennings, J. N. and Linge, G. J. R. ed. *Of Time and Place*. Australian National University Press, Canberra.

There are sharp divisions in the landscape of rural settlement in Fiji on ethnic, social, tenurial and economic bases. The study reported in this paper focuses on the sugarcane areas in Western Division where activities and life on the estates are described. An account is given of the history of the relationships between CSR and workers on estates and European planters. Progress was rapid in subdivision and leasing in the early part of the 20th century, leading to a new landscape of small tenant

farms and individual homesteads which ensued from labour problems in the 1920s. But the labour problems were not responsible for a sharp break in settlement patterns. These patterns were more a direct derivative of the earlier estate pattern, and activities still remained under the close control of CSR from which producers held tenancies.

World Bank 1980. Fiji: Selected Development Issues. Washington, D.C., 95 pp.

About one-third of this report is devoted to agricultural development. The structure of the agricultural sector is described as background for discussing three issues. They are the development of the sugar industry and prospects for alternative export crops, commercialisation of subsistence agriculture, and rural regional development. In the latter case, the Eastern islands are used as a case study.

Chandra, S. 1982. Economics of vegetable production in Fiji. *Alafua Agricultural Bulletin*, 7(3), 52–59.

In this paper, the vegetable production system in Fiji is described in terms of production areas, yields and farm husbandry. A gross margin analysis of the main vegetables is carried out, and the marketing structure is outlined. The inputs of agricultural research and extension in vegetable development are evaluated. Finally, some agricultural policy implications are considered.

Evans, D. B. 1982. The Seaqaqa Sugar Cane Development Project: A study of farmer commitment with some implications for the selection of settlers. *Fiji Agricultural Journal*, 44(1), 1–8.

A sample of sugarcane farms was selected and divided into groups according to a number of socioeconomic characteristics. Analysis was undertaken which suggested that official criteria for selection settlers were, in general, well-conceived.

Evans, D. B. 1982. Plantations and the plantation mode of production. In: May, R. J. and Nelson, H. ed. *Melanesia Beyond Diversity*, Vol. 2. Research School of Pacific Studies, Australian National University, Canberra.

The author briefly describes plantations and the plantation mode of production, with Fiji used as an example for sugar. Economic behaviour is analysed under the plantation mode of production, with a specific focus

on group decision making and its implications for this mode. It is difficult to draw firm conclusions about the desirability of such a production mode: understanding of group decision making is crucial.

Prasad, C. and Fleming, E. M. 1982. Supply response of irrigated rice producers in Fiji. *Fiji Agricultural Journal*, 44(2), 53–60.

The price elasticity of supply of irrigated rice producers in the Lakena irrigation scheme in Fiji was estimated. Data were used for the period from 1978 to 1981. Producers were found to be price-responsive, to an extent similar to that reported in studies of rice farmers in other tropical countries.

Ellis, F. 1983. A Study of Employment and Earnings in Cane Harvesting in Fiji. Discussion Paper No. 148, School of Development Studies, University of East Anglia, Norwich.

The aim of the study was to describe the employment situation in cane harvesting in Fiji, and the evolving pattern of labour use and income distribution. Details are provided on the size of the harvesting labour force and its trend, the importance of cane harvesting in wage employment in Fiji, trends in wage rates and cash earnings of hired cane cutters. Policy matters are raised that reflect on the future organisation of cane harvesting.

Fleming, E. M. and Piggott, R. R. 1983. Analysis of trade instability in the South Pacific region. Paper presented at the 15th Pacific Science Congress, Dunedin, February.

Sources of instability in export earnings from South Pacific countries, including Fiji, are outlined and measured.

Matthews, I. 1983. Export Market for Pawpaw and Mangoes by Air Cargo to Japan, with Reference to Canada, Australia and New Zealand. Report Prepared for the Native Land Corporation, Suva.

Estimates are provided of prices and transport and marketing costs of mangoes and papaya into the Canadian, Australian and New Zealand markets. Prospects of success are assessed.

Brookfield, H. C. 1985. An historical and prospective analysis of the coconut districts. In: Brookfield, H. C., Ellis, F. and Ward, R. G. ed. *Land, Cane and Coconuts: Papers on the Rural Economy of Fiji*. Australian National University, Canberra, pp. 111–248.

The history and structure of the ailing coconut industry are analysed. Attention is given to the merits of a number of new initiatives that had been undertaken.

Ellis, F. 1985. Employment and incomes in the Fiji sugar economy. In: Brookfield, H. C., Ellis, F. and Ward, R. G. ed. *Land, Cane and Coconuts: Papers on the Rural Economy of Fiji*. Australian National University, Canberra, pp. 65–110.

This paper covers the nature of employment and incomes in the Fiji sugar industry, with special reference to the growers and cane cutters.

Fairbairn, T. I. J. 1985. *Pacific Island Economies: Studies from the South Pacific*. Institute of Pacific Studies, University of the South Pacific, Suva, 442 pp.

Discussions of Pacific Island economies are wide-ranging. However, there is some material specific to Fiji, notably a tax incentives case study, and some observations on agriculture in a chapter on current developments that have relevance to Fiji.

Fleming, E. M. and Piggott, R. R. 1985. Analysis of export earnings instability in the South Pacific region. *Singapore Economic Review*, 30(1), 14–33.

Sources of export earnings instability in South Pacific countries, including Fiji, are decomposed into price, quantity and price–quantity interaction terms.

Forsyth, D. J. C. 1985. *Mechanisation of Sugar Harvesting in Fiji*. Technical Report No. WEP 2–22, Tr. No. 4, World Employment Programme, International Labour Office, Geneva, 44 pp.

The study was conducted to ascertain what was by far the most serious technology policy issue facing Fiji: the choice of technology in sugarcane harvesting. The government of Fiji opposed the use of mechanical harvesters and enforced this policy by forbidding their importation. The problem arose because of a combination of heavy concentration of resources in a single industry, sugar, with a technology characterised by severe limitations of the number of alternatives and by a wide gap in

labour intensity between the current manual harvesting and the nearest alternative (whole-stick mechanical harvesters). Any change is considered likely to involve a very sharp shift in capital:labour ratios in the industry with consequent large-scale dislocation as resources are reallocated on a massive scale. The author develops detailed cost comparisons between the different technologies to isolate strands of economic and social arguments for and against mechanisation.

Sivan, P. 1985. Economic evaluation of taro production systems in Fiji. *Fiji Agricultural Journal*, 47(1/2), 7–12.

The profitability of different ways of incorporating taro in smallholder farming systems is assessed. The paper points up the opportunities for using taro in an economic manner as an intercrop.

Sofer, M. 1985. Yaqona and the peripheral economy. *Pacific Viewpoint*, 26(2), 415–436.

Kava (yaqona) is becoming an increasingly important cash crop besides its prominent role in all rituals and ceremonial events as well as social gatherings for native Fijian communities in peripheral areas. Three less developed regions as represented by Kadavu Island are increasing their engagement in cultivation and commercialisation of kava. This is shown through the cultivation patterns of crops, distribution of income sources and spatial pattern of yaqona flows centred on the Suva market. The main reasons for this area specialisation are thought to be the suitability of the physical conditions, agrotechnical advantages, and the nature of the core-periphery structure of Fiji's economy.

Ward, R. G. 1985. Land, land use and land availability. In: Brookfield, H. C., Ellis, F. and Ward, R. G. ed. *Land, Cane and Coconuts: Papers on the Rural Economy of Fiji*. Australian National University, Canberra, pp. 15–64.

World Bank 1985. *Fiji: Adjustment and Selected Development Issues*. Washington, D.C., 117 pp.

The primary production sector is analysed for the period 1979–83, and its future prospects are assessed. Commodity profiles are included for sugar, root crops and vegetables, export tree crops and export fruit crops. A chapter is devoted to rural development programs and the alleviation of regional income disparities.

Fleming, E. M. 1986. Agricultural market development in the South Pacific. Ph. D. thesis, University of New England, Armidale.

Analyses are made of a number of dimensions of agricultural markets in selected South Pacific countries, and the implications for agricultural market development are discussed.

Fleming, E. M. 1986. A study of agricultural market development in the South Pacific region: structure, conduct and performance. South Pacific Smallholder Project Occasional Paper 3, South Pacific Smallholder Project, University of New England, Armidale, 50 pp.

A structure–conduct–performance framework is used to study the development of agricultural markets in South Pacific countries.

Fleming, E. M. and Hardaker, J. B. 1986. Agricultural supply response in the South Pacific. Pacific Economic Bulletin, 1(1), 25–26.

The empirical evidence is reviewed on short-run and long-run estimates of price elasticities of supply for agricultural products in South Pacific countries, including Fiji.

Fleming, E. M. and Hardaker, J. B. 1986. Analysis of Agricultural Marketing Performance in Five South Pacific Countries. Occasional Paper 6, South Pacific Smallholder Project, University of New England, Armidale.

The performance is assessed of agricultural marketing systems in selected South Pacific countries, including Fiji, in terms of the value of exports relative to the value of food imports.

Hardaker, J. B. and Fleming, E. M. 1986. Rural development and social change. Paper presented at the Conference on Australia and the Pacific Islands, June, 1986. Academy for the Social Sciences in Australia, Canberra.

This paper focuses on the way that social factors interact with economic factors in influencing the nature and rate of rural development in the South Pacific.

Hardaker, J. B., Fleming, E. M. and Delforce, J. C. 1986. Prospects for Smallholder Development in the South Pacific: Background to a Research Project. Occasional Paper 1, South Pacific Smallholder Project, University of New England, Armidale.

An outline is presented of a project to study smallholder agricultural development in the South Pacific.

Piggott, R. R., Fleming, E. M. and Kunert, A. C. 1986. The debate on causes of export earnings instability: further conceptual issues with evidence from South Pacific economies. Paper presented at the 30th Annual Conference of the Australian Agricultural Economics Society, Canberra, February.

For a number of South Pacific countries, including Fiji, sources of export earnings instability are decomposed by major commodities and, for each commodity, into supply, demand and supply–demand interaction effects.

Sharma, P. 1986. Pricing policy in Fijian agriculture. *Review*, 13:34–39.

Brookfield, H. C. 1987. Export or perish: commercial agriculture in Fiji. In: Taylor, M. J. ed., *Fiji: Future Imperfect?*, Allen and Unwin, Sydney, pp. 46–57.

The author explains how early development in Fiji was based on the export of primary products, especially sugar, to meet the demands of the expanding metropolitan economies. Commercial agriculture based on the plantation system is described for the late colonial period. Sugar and coconuts are the focus of discussion. Major events in commercial agriculture in the early period of independence are recounted. Government initiatives included a subsidy on internal sea freight of copra, land development schemes, intervention in the marketing system, establishment of a national disaster organisation and support for the diversification of export crops. The growth of the kava industry, on the other hand, is described as a private initiative neither requiring nor receiving government assistance. Declines in world prices in the early 1980s hit commercial agriculture hard, and the response by the government is recounted. It is concluded that the relative prosperity of Fiji was largely built on primary production for export, and will only continue if prosperity in the export sector is sustained.

Cameron, J. 1987. A note on the history of the sugar sector in Fiji: ‘peasantisation’ under capitalism. *Journal of Peasant Studies*, 14(3), 211–219.

The author reviews the history of the sugar sector in Fiji from 1874 when Fiji became a formal British Colony, dividing it into periods: the early period, 1875–1916; crisis and confusion, 1916–1926; resolution through ‘peasantisation’, 1926–1939; and ‘a brittle continuity’, 1939–1970. After political independence in 1970 and nationalisation of the Fiji operations of the Colonial Sugar Refining Company of Australia (CSR) in 1973, the Fiji government accepted the small farm sugarcane system as an economic and political reality and expanded the area under sugarcane on that basis. Questions of mechanisation, ethnic mix, economic equity and institutional

arrangements for the whole industry are addressed in the framework of a typical 10-acre family farm. The paper concludes that the system created in the 1920s was convenient for a fully capitalist enterprise in the light of some peculiar local circumstances, and that in the 1980s that system acquired a strength in economic, political and social terms that still appear unchallengeable, despite vastly changed local circumstances. Physical and economic flexibility, financial accountability, local economic multiplier effects and producer participation are all at high levels.

Fleming, E. M., Hardaker, J. B. and Jones, S. C. 1987. Agricultural development in the South Pacific: Background Paper, UNESCO-SPEC High Level Regional Meeting on Policy and Management of Science and Technology for Development in the South Pacific Region, Apia, March.

The agricultural sectors and their development processes are described for South Pacific countries.

Government of Fiji, Bureau of Statistics. 1987. Census of Fiji, 1986. Government Printer, Suva.

Comprehensive summaries are presented in tabular format on a range of activities and characteristics, including agricultural production.

Kanbur, M. G. 1987. Forecasts and actuals of Fiji sugar cane output: a bird's eye view. *Economic Bulletin for Asia and the Pacific*, 38(1-2), 73-76.

The accuracy of an axonometric evaluation of sugarcane forecasts from the Fiji Sugar Corporation was assessed for the years 1965-1986. Results indicated that these forecasts, although better than those derived from naive models, were underestimates. It was recognised that most reported data contain measurement errors, usually in the condition of the crop, made by sugarcane farmers and FSC officers.

Knapman, B. 1987. Fiji's Economic History, 1874-1939: Studies of Capitalist Colonial Development. Pacific Monograph 15, National Centre for Development Studies, Canberra, 153 pp.

The spread, functioning and impact of capitalism in Fiji from 1874 to 1939 are examined through six case studies. Two of these case studies are on the sugar industry. In Chapter 2, the dominant influence of CSR on capitalist export growth is the topic of analysis. In Chapter 4, the demise of the white sugar planter is dealt with in which it shown that the 'white capitalist grip on the colonial economy was emphatically a corporate one'.

Parkinson, S. V. 1987. A study of the effects of economic development on food consumption and nutrition in a Fijian village, 1952–1982. In: Rae, C. and Green, S. ed. *Nutrition in the Tropics*. Menzies School of Public Health, Darwin.

Plange, N. 1987. *The Crisis in Partnership: Labour Unions, Associations and Management in the Fiji Sugar Corporation, 1973–1985*. School of Social and Economic Development Working Paper No. 7, University of the South Pacific, Suva, 56 pp.

The Fiji sugar industry is described, with particular emphasis on the role of the Fiji Sugar Corporation. A feature of the work of the Corporation that is dealt with in this paper is the resolution of disputes. A number of conflicts arose in the period 1973–85 that are analysed. The conclusion is reached that the bargaining strength of growers was enhanced by the new Sugar Industry Bill, with implications for the unions in the Fiji Sugar Corporation.

Sofer, M. 1987. Progress through transformation—a Fijian village. *Pacific Viewpoint*, 28(1), 1–19.

The issue of transformation of a subsistence village into one comprising market-oriented farmers is the issue considered in this paper, with institutional change in the village of particular interest. The transformation process in villages in Fiji is described specifically in relation to Narata village in the Sigatoka Valley. A comparison is drawn between current demographic characteristics, land distribution, agricultural activities and income pattern and those prevailing in the late 1950s, described in an earlier study in the village by Belshaw. Three conclusions are drawn: (1) greater flexibility and security occurred in the land tenure system, with greater individual mobility; (2) farmers in the village increased agricultural production and achieved higher incomes by adapting to a situation of no paternalistic support and weaker institutional assistance; and (3) the village mode of production was successfully modified to enable farmers to commercialise their activities.

Ward, R. G. 1987. Native Fijian villages: a questionable future? In: Taylor, M. J. ed., *Fiji: Future Imperfect?*, Allen and Unwin, Sydney, pp. 33–45.

The importance of the village as a symbol of Fijian society and polity is assessed in a present-day context. Its future importance is considered in the light of commercialisation in an increasingly monetised economy,

specialisation, and changes in land and labour use. Among the implications of these changes for villages are a growing number of Fijians without access to land and increasing wealth disparities within villages.

Chung, M. 1988. The impact of a road. In: Overton, J. ed., *Rural Fiji*. Institute of Pacific Studies, Suva, pp. 97–122.

The question is posed whether new roads contribute to rural development. It is explored by studying the initial and longer-term impacts of the Wainimala-Monasavu road in Fiji. Commercialisation was observed with greater access to markets. Changes occurred in market destination of produce and marketing arrangements, and there was a small increase in the quantity of goods transported. But little change ensued in production methods. The local population became more mobile and gained improved access to rural public services such as education and health. However, while there was a notable improvement in education services, little change occurred in the provision of health services because of complicating factors. The overall impact on rural development is adjudged not to be evidently beneficial in the longer term: development requires more than just a road.

Ellis, F. 1988. Small farm sugar production in Fiji: employment and distribution aspects. *IDS Bulletin*, 19(2), 47–53.

The sugar industry in Fiji shows that export crop production can satisfy equity criteria without sacrificing efficiency, growth or rising real incomes. This beneficial outcome results from a small farm structure maintained by government leasing of land, employment intensity linked to the prohibition of mechanical cane harvesting technology and a high grower share in sales revenue, assured by the high degree of grower participation in policy-making institutions. It is concluded that while Fiji is a special case, it may provide lessons for other countries.

Hardaker, J. B. and Fleming, E. M. 1988. Agricultural research problems in small developing countries: case studies from the South Pacific island nations. *Agricultural Economics*, 3:279–92.

The special difficulties in introducing new technologies in South Pacific agriculture are described. Greater reliance on more sharply focused adaptive work is recommended, as is the need to develop a more parsimonious research paradigm involving a broadening of the range of people who contribute to the research process.

Mangal, J. 1988. The marketing of yaqona. In: Overton, J. ed., Rural Fiji. Institute of Pacific Studies, Suva, pp. 59–70.

The role of yaqona in the economy of Fiji is described, and details are given on marketing channels. These channels include the Fiji Co-operative Association Ltd, producer-vendors, non-producer vendors, retailers and household sellers. It is concluded that yaqona is a well-established indigenous crop with increasing demand that yields good returns to producers.

Overton, J. 1988. The study of rural Fiji. In: Overton, J. ed., Rural Fiji. Institute of Pacific Studies, Suva, pp. 1–11.

The author commences this edited collection of papers on rural Fiji by giving details of studies of tradition and rural society, and outlining the material covered in succeeding chapters.

Plange, N. 1988. Shedding the emperor's clothes: from Colonial Sugar Refining to Fiji Sugar Corporation—the take-over and consolidation 1973–1976. *Journal of Pacific Studies*, 14:112–130.

By focusing on the early years of operation of the Fiji Sugar Corporation, it is shown that the conduct of industrial relations changed with the new management. Background information is provided on the takeover of sugar operations by the newly formed Fiji Sugar Corporation and the plans for departure by Colonial Sugar Refining. Then, the takeover and subsequent changes are analysed, and it is explained how industrial problems were resolved. The first industrial crisis was caused by a general workers' strike in 1973. This event, and its prompt negotiation and settlement, is reported to show the flexible response taken by the new management. Cane growers' demands for an increase in the minimum cane price are also covered, along with an account of the variation in the Denning award that occurred in 1975. There are also sections on cane contracts and cane production, rehabilitation of sugar mills, and the Fiji Sugar Corporation in the international market. The paper concludes with an appraisal that, by the end of 1976, the corporation had matured and consolidated itself.

Tukai, M. 1988. In: Overton, J. ed., Rural Fiji. Institute of Pacific Studies, Suva, pp. 13–18.

The modernisation of society in Cautata, on the southeast coast of Viti Levu, is analysed. Emphasis is placed on economic linkages forged or strengthened by improved bus services.

Ali, R. A. and Narayan, J. P. 1989. The Fiji sugar industry: a brief history and overview of its structure and operation. *Pacific Economic Bulletin*, 4(2), 13–21.

Sugar, the principal export of Fiji since the 1880s, had maintained its dominant position despite efforts to diversify the economy. The numerous problems and challenges that beset the industry are discussed, including labour shortages in its early stage, production and price fluctuations and, in 1987, political difficulties. A chronology is presented of the establishment of the mills in various localities. Other issues covered include the sugar industry structure, smallholder system of farming, the sugarcane contract, ethnic farming, milling, transport, storage and markets including future prospects.

Brookfield, H. C. 1989. The human context of sustainable smallholder development in the Pacific. In: *Proceedings of Soil Management and Smallholder Development in the Pacific Islands*. Proceedings No. 8, International Board for Soil Research and Management, Bangkok, pp. 189–203.

Leunissen, J. 1989. Co-operatives in Fiji: a review and analysis. *Journal of Rural Cooperation*, 17(1), 3–20.

The author discusses the status of rural cooperatives in Fiji, using the rice cooperative as a case study. Special focus is placed on the relationship between the social and economic aspects of cooperative associations. The role of the government in the operation and performance of cooperatives is discussed. For widespread and close involvement of people in a cooperative, it is essential that the decision to form a cooperative comes from the participants themselves rather than an outside agency.

Low, J. 1989. An analysis of the marketing of fresh tropical fruits from the South Pacific islands in New Zealand. In: *Proceedings of the Regional Technical Meeting of Tropical Fruit Production in the South Pacific*. Apia, Western Samoa, Institute for Research, Extension and Training in Agriculture, Alafua, pp. 69–94.

An economic analysis is undertaken of the export marketing of fresh tropical fruits from South Pacific countries, including Fiji, to New Zealand. Fiji has one of the longest histories of trying to export fresh fruit to Pacific rim countries. Some of the difficulties faced by exporters are discussed.

Since the article was written, significant advances have been made by the government of Fiji in establishing quarantine protocols for fresh fruit with the New Zealand government.

McGregor, A. and Eaton, C. 1989. Developing a Viable Horticulture Export Sector in the Pacific Islands. Food and Agriculture Organization of the United Nations, Rome, 25 pp.

Focusing on a small number of niche export crops, including ginger and papaya in Fiji, some guidelines are presented on how to develop a viable horticultural export sector in Pacific countries. Particular attention is paid to the need to develop the export market in an orderly fashion. The roles of the private sector and the government are assessed in this endeavour.

Menz, K. M. and Fleming, E. M. 1989. Economic prospects for vanilla in the South Pacific. ACIAR Technical Reports 11, Australian Centre for International Agricultural Research, Canberra, 14 pp.

The vanilla industry in the South Pacific is discussed in terms of its production, processing and market characteristics. The future direction of the world market is considered and factors affecting the world market are outlined.

Menz, K. M. and Fleming, E. M. 1989. Vanilla in the South Pacific. Pacific Economic Bulletin, 4(1), 26-30.

This paper describes the main properties of vanilla and analyses the development of niche export markets in South Pacific countries such as Fiji, Vanuatu and Tonga. Production and consumption estimates are provided, together with price movements for vanilla.

National Marketing Authority of Fiji 1989. Fiji. In: Marketing Farm Products in Asia and the Pacific. pp. 217–230.

This paper describes the role of government in marketing developments in Fiji. Fiji's comparative advantage is seen to lie in the production and export of high-value, usually specialised, products. The programs outlined for tropical fruits, processed ginger, root crops and horticultural products are justified largely on the basis of comparative advantage. While the economic principle is sound, successful implementation is far from assured given Fiji's poor record in the export of fresh products. Future production will be based on smallholders who may have significant advantages in terms of employment and income distribution. However, heavy demands will be placed on organisational and marketing

infrastructure. A scheme proposed for nucleus estate production, marketing and servicing units aims to encourage smallholders to improve quality in order for their production to be combined with that of large estates for export and processing.

Prasad, L. 1989. Fiji's efforts in market promotion of fruits in Australia, Japan and Canada. *Alafua Agricultural Bulletin*, 14(1/2), 41–43.

The paper describes the efforts of the High Commission and Consulate-General in Australia, Embassy in Japan, Consulate-General in Los Angeles and the Fiji Trade and Investment Board in Fiji to promote exports, and stimulate and facilitate economic development. In 1986, papaya, pineapple, mango, guava, ivi, custard apple, jackfruit, kavika, star-apple and passionfruit were exported by air-freight in varying quantities to Australia, Japan and Canada.

1990–present

Eaton, C. S. 1990. Prospects of the private sector's participation in the development of smallholder agriculture in Fiji and Vanuatu. *Pacific Islands Development Program*, East-West Center, Honolulu.

The major constraints facing small-scale agriculture are identified and a model is presented for directing smallholder cultivators who are emerging from a semi-subsistence base to one oriented to the cash economy. Various potential private sector projects are described. Private management services, national planning objectives and governmental regulatory controls and policies are all crucial determinants in increasing private sector participation in smallholder agriculture.

Government of Fiji, Bureau of Statistics 1990. *Household Economic Survey 1989–90*. Government Printer, Suva.

Summary details are provided that relate income and expenditure patterns of rural households in Fiji during 1989–90.

Naidu, R. and Puttaswamaiah, K. 1990. Sugar production and rural development: a case study of Fiji. In: *Poverty and Rural Development: Planners, Peasants and Poverty*. Intermediate Technology Publications, London, pp. 236–263.

The chapter examines the contribution of the sugar industry to rural development in Fiji. With background information on population and employment, the industry is analysed with regard to sugarcane plantations, the sugar industry and its targets, inflation, income

distribution, government incentives for cane farmers and the spread effect of income generated by sugar. Sugar must remain a major export earner to balance imports and improve the ratio of rural to urban income.

Plange, N. 1990. *Rendezvous with the Cane Growers: The Restructuring of the Fiji Sugar Industry 1980–84*. School of Social and Economic Development Working Paper No. 17, University of the South Pacific, Suva, 59 pp.

The Denning award occurred in 1975 and is viewed as the point of departure for the major restructuring of the Fiji sugar industry that took place in the early 1980s. Early initiatives to restructure are described along with the search for a new framework for the sugar industry. The competing claims of the workers, growers, millers, researchers and the Fiji Sugar Corporation are analysed. It is explained how these divergent interests were resolved from mid-1981 onwards. The new Sugar Industry Act came into being in 1984. Details are given of the Act and its implications for a restructured industry.

Vinning, G. 1990. *Marketing Perspectives on a Potential Pacific Spice Industry*. ACIAR Technical Reports 15, Australian Centre for International Agricultural Research, Canberra, 60 pp.

Chapters cover: the definition of spices; global production and trade; spices in South Pacific countries; marketing prospects for various spices; case studies in the Pacific; commercialisation of spices in the Pacific; marketing issues; the Australian spice market; and prospects for spices in the Pacific.

Achary, S. S. 1991. *The lifeworld of National Marketing Authority in the Fijian socio-political economy: A critical analysis within the Hegel-Habermas model*. M. A. thesis, University of the South Pacific, Suva.

The author analyses the steering mechanisms influencing the operations of the National Marketing Authority. Of particular relevance is the subversion of the functions of both the National Marketing Authority and Ministry of Primary Industries by particular communities, notably producers in the Sigatoka Valley.

Asian Development Bank 1991. *Fiji Agricultural Pricing and Marketing Study*. Asian Development Bank, Manila.

Government of Fiji, Bureau of Statistics 1991. *Statistical Report on the Household Economic Activity Study, 1989-1990*. Government Printer, Suva.

The report comprises 26 tables providing information by sex, ethnic group and spatial division on the distribution of population, income and expenses by sector of origin and capital formation during 1989-90.

Economic Planning and Statistics Division 1992-present. *Market News*. Ministry of Agriculture, Fisheries, Forests and ALTA, Suva.

Market News is a quarterly market information newsletter on commodities, prices (domestic and overseas) and other relevant news in brief.

Otanez, G., Narayan, D. and Tubuna, S. 1992. *Fiji National Agricultural Census 1991*. Agricultural Planning and Statistics Division, Ministry of Primary Industries and Co-operatives, Suva.

The third agricultural census was conducted for the agricultural sector by the Ministry of Primary Industries and Co-operatives with technical assistance from UNDP/FAO. It contains a brief introduction and background of Fiji, an outline of the census program, the new area sampling frame method used, analysis of the census results, tables of raw census data and questionnaires used in data collection.

Asian Productivity Organization 1993. *Improvement of Agricultural Statistics in Asia and the Pacific*. Tokyo, 342 pp.

Good-quality statistics are argued to be necessary for the development of agriculture and the rural economy. To address the need for better agricultural data in APO countries, a meeting was held from 26 November to 6 December 1992 in Tokyo on how to improve the supply of agricultural statistics in member countries. The papers and proceedings of the meeting are documented in this publication, and include a Fiji country report.

Chand, P. and Rae, A. N. 1993. *New food and agribusiness market opportunities: some recent developments from the Forum Island countries*. In: *Pacific Rim Agriculture: Opportunities, Competitiveness and Reforms*.

Proceedings and Papers of the Fifth Workshop of the Agricultural, Trade and Development Task Force of the PECC, Hawaii, 14–16 May 1992, pp. 33–54.

The paper discusses how policy makers and private investors in the Forum Island Countries are now increasingly exploring opportunities for new food and agribusiness development. The Forum Island countries, comprising 13 independent and self-governing Pacific Island countries, traditionally relied on agriculture as the mainstay of their economies. Horticulture is seen as one of the areas where great untapped potential exists. The paper also briefly discusses horticultural export performance of Forum Island Countries. It puts forward a case for their special and different treatment in the emerging trade environment, given their unique problems faced in securing higher levels of income, employment and standards of living.

Asian Productivity Organization 1994. Oilseed Production and Marketing in Asia and the Pacific: Report of an APO Symposium, 11–18 December 1991, New Delhi. Tokyo.

Results of a survey for enhancing the contribution of oil crops to the economy are discussed. Regional analyses and 11 country papers, including one from Fiji, are covered.

Economic Planning and Statistics Division 1994. Farm Management Manual. Updated edition (1994), Ministry of Agriculture, Fisheries, Forests and ALTA, Suva.

This is the latest version of a longstanding manual on farm management in Fiji. It contains technical budgets, with information pertaining to all technical and husbandry data, and financial budgets, with information on financial, marketing and commodity analyses. Appendices contain information that helps users in decision making.

Fiji Association of Women Graduates 1994. Women market vendors in Fiji. Fiji Association of Women Graduates, Suva.

A survey was undertaken of women selling produce in markets in Fiji. This report on its results provides interesting information on their activities, and the important role they play in fresh produce marketing in Fiji.

South Pacific Commission/German Biological Control Project and the Ministry of Agriculture, Fisheries and Forests 1994. Seminar/Workshop on Rapid Rural Appraisal (RRA), Knowledge Attitude Practice (KAP)—Survey and Agricultural Economics, Nadi, Fiji, April 11–16, 1994. South Pacific Commission/German Technical Cooperation Agency, Suva, 76 pp.

Chand, H. and Field, S. P. 1995. Data Requirements for Economic Analysis. SCEP Technical Report No. 7, Soil and Crop Evaluation Project, Suva.

The purpose of this report is to develop a better understanding of the real costs farmers pay and the real returns they receive for their produce so that economic analysis could be undertaken. Its authors examine ways to collect information in order to undertake economic analysis through the number of options available to the research and extension officers.

Economic Insights 1995. The Economy of Fiji: Supporting Private Investment. International Development Issues No. 40, AusAID, Canberra, 109 pp.

The publication is a review of the economy of Fiji, potential opportunities and the role of the government. Some emphasis is given to the opportunities for the production and processing of foodstuffs for the domestic market and for export.

Grynberg, R. 1995. Bananas and sugar—the Lomé waiver and the Fiji sugar industry. *Journal of South Pacific Agriculture*, 2(1), 41–47.

Prognostications are made about the likely effects of the successful conclusion of the Uruguay round of GATT negotiations. The author focuses on the implications for special preferential access to the European Union for sugar and bananas from Fiji.

Grynberg, R. 1995. The Impact of the Sugar Protocol of the Lomé Convention on the Fiji Economy. Economics Division Working Paper No. 95–8, Research School of Pacific and Asian Studies, Australian National University, 56 pp.

The Sugar Protocol of the Lomé Convention must come to an end, the author predicts, because the European Union has no need for ACP sugar. An absence of potential economic growth in the sugar and garment industries sector means that the Fiji economy is in need of major adjustment. The effects of the Lomé convention on farm size, productivity and land use are discussed in detail, and a brief examination is made of the

environmental effects. Some actions are considered for economic reform open to the government to adjust rationally to a more efficient industrial structure.

McGregor, A. 1995. A marketing plan for pineapple and other tropical fruit for Fiji, with particular emphasis on the Seaqaqa Pineapple Micro-Project. Report prepared for the European Union, Suva.

Ministry of Agriculture, Fisheries, Forests and ALTA, Fiji 1995. Deregulation of the Primary Industry Sector. Management Information System Report. Suva.

The Ministry of Agriculture, Fisheries, Forests implemented a management information system to improve management procedures within the Ministry and enable it to respond more quickly to the needs of its clients. This report outlines procedures that were instituted.

South Pacific Forum Secretariat 1995-present. Trade Forum. South Pacific Forum Secretariat, Suva.

The Forum Secretariat publishes newsletters with a focus on trade and investment in South Pacific countries. They are produced by the Network for the Trade and Investment Division, South Pacific Forum Secretariat, Suva, Fiji in conjunction with its South Pacific Trade Commission office in Sydney and Auckland and the Pacific Islands Centre, Tokyo, Japan.

Woodward, K. 1995. Rice Sector Study. Ministry of Finance, Suva.

This study of the rice industry in Fiji was undertaken at a crucial stage in the history of the industry. Market liberalisation policies adopted by the government of Fiji had exposed the industry to greater competitive forces from imports. The study focuses on how the industry could best respond to the new challenges it faced by improving its performance. The future of irrigated rice production was considered to be grim.

World Bank 1995. Fiji: Restoring Growth in a Changing Global Environment. Country Operations Division, East Asia, Washington, D.C.

Suggestions are made on how the role of export-oriented agricultural activities could contribute to economic growth in Fiji in a climate of economic liberalisation.

Economic Planning and Statistics Division 1996. Agricultural Statistics (Part One) 1990–1994. Ministry of Agriculture, Fisheries, Forests and ALTA, Suva.

This statistical publication contains basic agricultural and related data from sources within and outside the Ministry. Data from three previous agricultural census and trade reports from the Bureau of Statistics cover a wide range of agricultural information to be regularly updated.

Field, S. P., Kumar, N. and Prasad, M. 1996. A Review of the SCEP Socio-Economic and Agronomic Program 1993–1995. SCEP Technical Report No. 10, Soil and Crop Evaluation Project, Suva.

The report contains a review of five socioeconomic surveys in various parts of Fiji and 16 agronomic trials on various research stations in Fiji.

Fleming, E. M. 1996. Research Options for High-Value Agricultural Exports in South Pacific Island Nations, Research Report 10, International Service for National Agricultural Research, The Hague, 206 pp.

The history and prospects of high-value exports are analysed for ten South Pacific countries, including Fiji. The report highlights the special problems faced by small countries in carrying out agricultural research to promote agricultural export development. Prospects for sustained export success are influenced by a variety of factors that are specified in the report.

Singh, J. 1996. A survey of market vendors in a rural township: could more schooling assist rural market vendors? *Journal of Pacific Studies*, 19:159–172.

The author investigated the effects of attainment of basic schooling on income earnings of market vendors in Labasa. A statistically significant association is reported.

Anon. 1997. The kava phenomenon. *Trade Forum* 3(3), May/June 1997.

A symposium in Hawaii was told that in 1996 sales of kava capsules in USA hit a record US\$14 million with about 350 000 annual prescriptions. It is estimated that about 1.3 million people in Europe are currently using kava capsules (Laitan 100, Kavain, Neuronika and Antares 120). Demand is growing in Europe. Satisfying European demands would require between 1000 and 1400 tons of kava a year. This equates to 6000 tons to 7000 tons of green Pacific kava. Add USA and other parts of the world and the

demand would be around 9000 tons to 10000 tons of green Pacific kava a year. The data indicate the potential of kava in the global market, especially from the herbal and pharmaceutical industries.

Ministry of Agriculture, Fisheries, Forests and ALTA, Fiji. 1997. *Fiji Islands: Harvesting the Potential of the Agriculture Sector*. Suva.

A description is given of the agricultural sector in the Fijian economy for use as an investment guide. Sections are included on the government's agricultural investment policy, investment priority areas, investment approval process, finance, doing business in Fiji, land and the environment, taxation, government and trade contacts, overseas missions of the Fijian government and air cargo rates

Reddy, M. and Yanagida, F. F. 1998. Fiji's sugar industry at the crossroads. *Pacific Economic Bulletin*, 13(1), 72–88.

The authors present an analysis of what they consider to be the two major threats facing the sugar industry in Fiji. They are the loss of the relatively high-priced market in the countries of the European Union and the expiry of land leases on which 73 per cent of sugarcane is currently grown. The need to raise productivity is stressed, and major changes in the industry will be needed for this to be achieved. No change is considered to be effective without a longlasting solution to the land tenure problem.

AGRICULTURAL EXTENSION, EDUCATION, INFORMATION AND RESEARCH TECHNIQUES

1930–1939

Parham, B. E. V. 1937 Agricultural demonstration stations. *Fiji Agricultural Journal*, 8(3), 30–32.

The trend by indigenous Fijians to individualism and independence of effort had brought progress and problems associated with land tenure, exemption from communal services and maintenance of a household apart from the village. Challenges existed in efficient land use, soil conservation and the substitution of permanent land occupation for the 'wasteful' methods of shifting cultivation, its 'accompanying evils' of dissipated energy and soil erosion, and difficulties in transport and marketing. Demonstration stations and agricultural sub-stations were viewed as a useful means of overcoming these problems and meeting

challenges. The author describes these stations with a specific description of the Nanduna Demonstration Station on the Waidina river. He claimed success for them during the two years of their operation in terms of improved cultivation methods.

Jack, H. W. 1939. Progress notes on the General Experiment Station, Sigatoka. *Fiji Agricultural Journal*, 10(3), 76–78.

An account is given of the progress made in developing a research station in the Sigatoka Valley, following a recommendation in the Stockdale report. An impressive range of both annual and perennial crops had already been planted.

Jack, H. W. 1943. Chemical services in Fiji. *Fiji Agricultural Journal*, 14(1), 33–35.

The Department of Agriculture provided services to farmers using its chemical laboratory. Details are given of the services provided and staffing of the laboratory.

1940–1949

Jack, H. W. 1941. Agricultural education of Fijians. *Fiji Agricultural Journal*, 12(2), 32–35.

Various facilities had been constructed for training young Fijians in agriculture by this time. Details are provided on those facilities operated by the Department of Agriculture and provincial training, with a strong practical emphasis.

Parham, B. E. V. 1946. Agricultural training schemes. *Fiji Agricultural Journal*, 17(4), 112.

Brief details are provided on the agricultural training schemes available to Fijian farmers, offered by the Department of Agriculture and provincial institutions. The onset of war had heightened the need to increase local food production and training schemes were viewed as an important contributor to this aim in the early post-war years. A feature of the schemes at this time was the strong practical orientation given to them.

1950–1959

Lamont, N. 1952. Koronivia: The Principal Agricultural Station of Fiji. *Fiji Agricultural Journal*, 23(3/4), 108–118.

The paper begins with an account of the special nature of tropical problems. This is followed by the history of Koronivia and its development in terms of fencing, drainage, dairy construction, accumulation of dairy stock, piggery and poultry constructions, and rice improvement program. A special section is included on crop rotation studies undertaken at the station. A brief coverage is made of other crop improvement work carried out, including that on tree crops and grasslands.

Mason, R. R. 1953. Agronomical investigations, 1953: progress notes from the agricultural stations. *Fiji Agricultural Journal*, 24(3/4), 66–67.

The investigations on which reports are made include the status of research into rice production at Koronivia and Sigatoka. Rice varieties, planting methods and fertiliser application are covered. Other crops being researched include bananas and sugarcane. There are brief notes on rotations and machinery use.

Mason, R. R. 1953. Koronivia Agricultural Station. *South Pacific Commission Quarterly Bulletin*, 3(4), 22.

The Koronivia Agricultural Station is described and details are provided of its development. There are sections on livestock and crop investigations undertaken.

Hartley, R. L. 1955. Young farmers' clubs of Fiji. *South Pacific Commission Quarterly Bulletin*, 5(2), 25–27.

The young farmers' clubs movement developed in Fiji from 1950. Details are provided of a model program.

Parham, B. E. V. 1955. Notes on agricultural research. *Fiji Agricultural Journal*, 26(1), 26–27.

Various research projects had been undertaken with assistance from Colonial Development and Welfare research funds. These are described along with research work undertaken by the Department of Agriculture.

Payne, W. J. A. 1955. Sigatoka Agricultural Station. South Pacific Commission Quarterly Bulletin, 5(2), 8–10.

A brief account is given of the development of Sigatoka Research Station from 1927. Details are provided on soils and climate. The farming system being developed is described and information is provided on plantings of arable crops, pasture and fodder crops, tree crops and the nursery.

Hartley, R. L. 1958. The Koronivia Farm Institute. Bulletin No. 33, Fiji Department of Agriculture, Suva, 34 pp.

The Koronivia Farm Institute was opened in 1954. The author describes the two-year course in general and tropical agriculture that was offered at the Institute, located at the principal agricultural research station at Koronivia.

1960–1969

Hackett, E. J. F. 1961. Student-farmer scheme launched in Fiji. South Pacific Commission Quarterly Bulletin, 11(3), 25, 68.

A new three-year course was introduced at Navuso Agricultural School for student-farmers. Some illustrations of the school are included.

Department of Agriculture, Fiji 1965. The Fiji Farmer, 1(1), 1–16.

The Fiji Farmer was a new publication to fill the gap left by the withdrawal of the Fiji Agricultural Journal in 1962. Its aim was as a supplement to extension services to provide articles of general interest to farmers in Fiji. More scientific papers were to be published by the Department in the form of occasional papers.

1970–1979

Nalo, C. 1974. Facing the future: Fiji's rural youth leaders learn new skills. South Pacific Commission Quarterly Bulletin, 24(1), 37–39.

The rising tide of unrest among rural youth is the source of concern dealt with in this article. Rural youth leaders are seen as a way to combat this troublesome trend. It is argued that there is a need to develop among young people a sense of active involvement and voice in the decisions made in rural communities.

Vernon, A. J. 1974. A bibliography of agriculture in Fiji: Part 1. Fiji Agricultural Journal, 36:33–42

The bibliography provides major sources of information about agriculture in Fiji from 1800 to 1905. Bibliographic details are given of all the relevant serials published in Fiji. The list includes: the Royal Fiji Gazette, the Blue Book, the Journal of the Legislative Council, Annual Reports of the Department of Agriculture, bulletins published by the Department of Agriculture, Fiji Planters Journal, the Transactions and Proceedings of the Fiji Society, and various journals issued by the Department of Agriculture such as the Fiji Agricultural Journal.

1980–1989

Pacific Information Centre 1981-present. South Pacific Bibliography. University of the South Pacific, Suva.

This bibliography superseded the Pacific Collection Accession Lists of the University of the South Pacific Library Vols 1–8, 1975–1982.

Coolen, P. and Beal, G. 1984. Information and Knowledge Exchange among Agricultural Research, Dissemination and Producer Systems in Selected South Pacific Island Nations: Fiji. Institute of Culture and Communication, East-West Center, Honolulu.

The main topic for discussion in this monograph is the transfer of information on agricultural research in Fiji to the users of research results. Background information is provided on agriculture in Fiji, the Ministry of Agriculture and Forests and its goals, and roles of extension and dissemination of information. Constraints to the flow of agricultural information are identified and key issues are discussed. Conclusions and recommendations are drawn on marketing, linkages and misperceptions between and within systems, needs and problem identification, technical information, systems operation and maintenance, job and role descriptions, subject matter specialists, support coordination, monitoring, planning for extension manpower, and interaction with alternative dissemination systems.

James, K. 1985. An account of agricultural education in Fiji 1865–1925. Suva.

International Service for National Agricultural Research 1988. The Planning and Management of Agricultural Research in the South Pacific: Report of a Workshop, 5–16 October 1988. Institute for Research, Extension and Training in Agriculture, Alafua, CABI, 91 pp.

The workshop was attended by 35 directors of agriculture and agricultural research managers from 11 countries (including Fiji) in the South Pacific. Staff members of the Institute for Research, Extension and Training in Agriculture (IRETA) and the School of Agriculture from the University of the South Pacific (USP) also participated. The workshop provided an introduction for senior policy makers and practising research managers to key concepts and tools for strengthening the planning and management of agricultural research in the context of the South Pacific. It was designed to be an intensive learning experience based on a mixture of formal lectures, management case studies and exercises and small working group discussions. This report contains the papers and summaries of the main presentations made at the workshop. A wide range of topics are covered, from strategic planning and project design to human resource management issues, such as motivation and leadership. Some of the main papers were: working to strengthen national agricultural research systems (H. Elliott); resource commitments to agricultural research in the South Pacific, preliminary findings (L. Fernando); the scope for improved management in the South Pacific (E. Solofa); the future role of agricultural research in the South Pacific (R.G. Ward); research planning and management in Fiji (P. Sivan); planning and managing regional research activities, the IRETA experience (L. Fernando); a strategy for improving extension services in a South Pacific country, some lessons for agricultural research (T. F. Wendt); information management for agricultural research in small-scale agriculture at the University of the West Indies (L. A. Wilson and R. Singh); the future role of agricultural research in the South Pacific: whither IRETA? (D. Osbourne); what is good research management? (L. Fernando); and designing agricultural research projects for external assistance (N. Amerasinghe).

Overton, J. 1988 The adoption of rice by village Fijians. In: Overton, J. ed., Rural Fiji. Institute of Pacific Studies, Suva, pp. 147–164.

This chapter deals with the impact of green revolution technologies in rice production in Fiji. Fijian farmers are studied according to whether they are individual non-village farmers, village farmers or members of village group farms. Problems and prospects for the adoption of high-yielding rice varieties are discussed. It is pointed out that Fiji is unlike many countries that have adopted a green revolution approach in rural development in that rice is non-indigenous and a staple for only one-half the population. Nevertheless, it is observed that there are early and tentative signs of successful adoption.

Walton, P. 1989. Information needs for crop protection in the Pacific region. In: Harris, K. M. and Scott, P. R. ed. Crop Protection Information: An International Perspective. Proceedings of an International Crop Protection Conference Information Workshop held at CAB International, Wallingford, U.K.

The abundance of crop protection information available for the Pacific islands is discussed. Access to a Pacific plant protection information system (PPPIS) within the Plant Protection Service of the South Pacific Commission enables new computer technology to manage integrated databases of plants of the region, pests, control procedures (e.g. biological, resistant varieties, pesticides), quarantine regulations, legislation and literature. The ppPIS will make such information readily accessible and integrate its activities with an agricultural information network already established and operated by trained staff.

1990–present

Currie, W. J. 1993. A study to strengthen research/extension/information linkages for the support of agriculture in the South Pacific. *Journal of South Pacific Agriculture*, 2(2), 1–3.

A study was conducted to identify the preferred methods of agricultural information flow in the countries of the South Pacific region and understand the constraints on that flow. The links were studied between agricultural research and other agricultural services and the link between these and information sources. This study included 6 South Pacific nations: Cook Islands, Kiribati, Fiji, Solomon Islands, Tonga and Vanuatu. The

objective of the project was to develop proposals to improve information dissemination, alleviate constraints where possible and assess the effect on existing systems working in the region.

Kern, R. 1993. Communication failures in systems for generating and transfer of agriculture technology in the South Pacific. *Journal of South Pacific Agriculture*, 2(1), 21–24.

Activities include participating in review teams in Papua New Guinea, Solomon Islands, Fiji and Western Samoa for the International Service for National Agricultural Research, and six subsequent research and consultative activities in those countries plus Tonga. The paper is based on seminars conducted with scientists in the Fiji Association of Agriculture and the East-West Center, updated to include additional observations in 1991 and 1992.

Ola-Roberts, N. 1994. Interim and final reports on the documentation of materials in the South Pacific Commission Agriculture Library in Suva, Fiji (Crop Protection in the South Pacific; RAS/86/037), for the periods November 1992 to December 1993 and January to August 1994. South Pacific Commission, Suva, 22 pp.

This publication contains an update on materials collected and catalogued on the library maintained by the South Pacific Commission in Suva.

South Pacific Commission/German Biological Control Project and the Ministry of Agriculture, Fisheries and Forests 1994. Seminar/Workshop on Rapid Rural Appraisal (RRA), Knowledge Attitude Practice (KAP)—Survey and Agricultural Economics Nadi, Fiji, April 11–16, 1994. South Pacific Commission/German Technical Cooperation Agency, Suva, 76 pp.

This report on the seminar/workshop on rapid rural appraisal contains little new in terms of the methodology of rapid rural appraisal. However, it is of some interest because of its specific application to meeting the information needs of researchers working on biological control.

Standing Committee on Agricultural Information Networking in the Pacific 1994. Third seminar on agricultural information networking in the Pacific and PAIS workshop, Apia: resource materials. South Pacific Commission, Noumea.

Dowling, A. J. and, Kumar, D. 1995. Structure and Procedures of the Research Division, and its Relationship with other Divisions within MAFFA. SCEP Technical Report No. 8, Soil and Crop Evaluation Project, Suva.

This report outlines agricultural research policy and gives an overview of activities, research stations, and finance and budgeting of the research division of MAFF. Staffing is discussed in terms of organisation (established and unestablished), career opportunities, duties and responsibilities, staff deployment, gender and ethnic balance, and qualifications. Reporting is discussed in terms of annual work plans, research reports and MAFF annual reports, the transfer of results and recommendations, and reporting as a means of appraising staff performance. Technical and specialist service activities are described and assessed. Finally, the institution is assessed in respect of meeting the objectives of SCEP.

Hart, P. B. S., Giltrap, D. and Leslie, D. M. 1995. Systems for transferring agricultural information and predicting plant performance and suitability in Pacific Island agro-ecological zones. *Journal of South Pacific Agriculture*, 2(1), 5–15.

A description is given of the analogue and matching systems used to transfer agricultural information and predict plant suitability and performance in agroecological zones of Pacific island countries, including zones found in Fiji.

Morton, J. R. 1995. How to lay out, maintain and record a randomized block trial. PRAP Leaflet No. 1, Pacific Regional Agricultural Programme, Suva.

Morton, J. R. 1995. Basic handling and preparation of data for analysis. PRAP Leaflet No. 2, Pacific Regional Agricultural Programme, Suva.

Morton, J. R. 1995. The analysis of variance. PRAP Leaflet No. 3, Pacific Regional Agricultural Programme, Suva.

Nagatalevu, M. M. and Foraete, H. 1995. Experiences with Participatory Rural Appraisal in Fiji. Paper presented at the National Workshop on 'Participatory Methods', PRAP Project 11, Soil and Crop Evaluation Project/International Board for Soil Research and Management, Suva.

Rogers, S. 1995. Planning for On-Farm Research: Report and Papers from the First Annual Meeting of Cooperators, Apia, Western Samoa, 4–10 April 1995, PRAP Report No. 1, Pacific Regional Agricultural Programme, Suva.

Dowling, A. J., Singh, J. M. and Puran, K. 1996. SCEP: Annual Research Plan 1996. SCEP Technical Report No. 17, Soil and Crop Evaluation Project, Suva.

The research plan for 1996 is outlined and a schedule of activities is presented. Details are provided on 10 on-farm and 12 off-farm activities involving people from the research and extension divisions of MAFF. In addition, seven specialist activities are outlined.

Kronen, M. 1996. A primer on participatory methods based on papers presented at the Fiji National Workshop on Participation, Koronivia, Fiji, 13–14 September 1995, PRAP Report No. 2, Pacific Regional Agricultural Programme, Suva.

The focus is on creating awareness among staff of the Ministry of Agriculture, Fisheries, Forests and ALTA and related institutions about participatory methods and to explain how these methods can best be used to promote agricultural development. Examples from Tonga and Western Samoa are also included. Another major chapter presents background information on methodological approaches and their application in the context of Fiji.

Kronen, M. 1996. Logical framework training kit [multimedia], PRAP Project No. 11, Pacific Regional Agricultural Programme, Suva.

Kronen, M. 1996. Participatory learning and action (PLA): the first steps towards change—training extension workers and farmers in the South Pacific [VHS/PAL]. Pacific Regional Agricultural Programme, Suva.

This is a training video on PLA with accompanying notes, for use by researchers, extension workers and farmers in the South Pacific. It concentrates on the methodological approach of PLA, which is described in the context of the planning process. A checklist is provided for planning and preparing field surveys, and a six-step procedure is outlined. The composition of an action plan is spelt out.

Morton, J. R. 1996. On the use and misuse of zero controls: a note on trial design. PRAP Leaflet No. 8, Pacific Regional Agricultural Programme, Suva.

Morton, J. R. 1996. The misuse of multiple range tests. PRAP Leaflet No. 9, Pacific Regional Agricultural Programme, Suva.

Taukei, P. 1996. New crop development in Fiji: a case study on development of the traditional crop dalo or taro (*Colocasia esculenta*) as a potential 'new crop' for export markets. In: RIRDC New Crops Proceedings 1996. RIRDC Research Paper No. 97/21, First Australian New Crops Conference, Vol. 1.

The importance of taro within the subsistence component of Fijian farming systems is well known. A recent development, however, as been its rise in importance as an export cash crop. The history of its export development is outlined in this paper.

Walton, P. 1996. Directory of Agricultural Information Resource Centres in the Pacific 1996. Pacific Regional Agricultural Programme, Suva.

This directory reflects a major attempt to compile details on the sources of agricultural information in South Pacific countries, including Fiji. It covers 120 institutions from 20 countries in the Pacific region. These institutions are publishers, libraries, information centres and individual projects.

Walton, P. 1996. Guidelines for the Distribution of Agricultural Publications in the Pacific. PRAP Working Paper No. 96-4, Pacific Regional Agricultural Programme, Suva.

There are numerous institutions in the South Pacific that distribute and receive agricultural publications (publishers, libraries, information centres and individual projects). This set of guidelines is designed to assist them in distributing material more effectively to their clients.

Walton, P. 1996. National SDI Management Workshop, Keravat, East New Britain, Papua New Guinea, 28 October-1 November 1996, Pacific Regional Agricultural Programme, Suva.

Findings are presented of a workshop on the selective dissemination of information and designing a strategy to unlock available information resources to a wide audience. Details are provided on methods of search and retrieval from CD-ROM information bases (e.g. current contents on diskette).

Bachmann, L., Macedru, A., Kaiyanuayanu, I., Singh, S. B. and Naerecoko, E. 1997. The Use of Rapid Rural Appraisal (RRA): Test of RRA as a Survey Tool at the Example of Fiji's Central Division—Field and Methodological Findings, Fiji, July 1995. PRAP Working Paper 97–1, Pacific Regional Agricultural Programme, Suva.

The authors report on a training exercise in rapid rural appraisal in the Central Division led by a team of four MAFF staff and an expatriate trainer. The aim of the exercise was to find suitable means of conducting rapid rural appraisals in Fiji. Details are provided on the training exercise and information gleaned from it. The appraisal covered labour availability, farm classification and suitability of selection criteria, farm management, cropping and livestock activities, income and expenditure, and marketing.

Bachmann, L., Macedru, A., Kaiyanuayanu, I., Singh, S. B. and Naerecoko, E. 1997. Towards a Better Understanding of the Farming System: The Use of RRA as a Survey Tool at the Example of Fiji's Central Division—Field and Methodological Findings, Fiji, October 1995. PRAP Working Paper 97–2, Pacific Regional Agricultural Programme, Suva.

The training exercise to find suitable means of conducting appraisals in Fiji, reported above, provided useful experiences in applying the method that are recounted in this paper. Methodology is outlined and a number of research topics are covered. They include labour availability, crop activities and rotations, land tenure, fallow systems, farming practices, yield perceptions, sustainability of cropping activities, profitability of enterprises, marketing and adoption of improved technologies. Some recommendations are made, including the need to improve the farm management handbook and apply RRA measures.

Fairbairn-Dunlop, P. 1997. Pacific women's triple agricultural role: food security, informal trade and cash cropping. *Journal of South Pacific Agriculture*, 4(1/2), 139–144.

The author outlines the roles of agricultural research and extension and women's contributions in agriculture in South Pacific countries. She argues that the provision of micro credit services is insufficient, and that farming systems research needs to be tailored better to meet the research needs for women's activities in the informal sector.

Kronen, M. 1997. Participatory methods. Pacific Regional Agricultural Programme, PRAP Leaflet No. 11, Pacific Regional Agricultural Programme, Suva.

Kumar, J. 1997. Status of crop research in Fiji. *Journal of South Pacific Agriculture*, 4(1/2), 74–77.

Current crop research in Fiji is outlined, with specific details of research in the production of coconut, ginger, kava, taro, tropical fruits and vegetables. Work being undertaken in farming systems research and support services is outlined.

Morton, J. R. 1997. Analysing harvests of tree crops. PRAP Leaflet No. 10, Pacific Regional Agricultural Programme, Suva.

Morton, J. R. 1997. Some statistical designs and their uses. PRAP Leaflet No. 12, Pacific Regional Agricultural Programme, Suva.

Pacific Regional Agricultural Programme 1997. The use of rapid rural appraisal (RRA). PRAP Working Paper No. 97–1, Pacific Regional Agricultural Programme, Suva.

This report gives details of a comprehensive training exercise in RRA methodology as a survey tool for MAFF Central Division staff in July, 1995. Field and methodological findings are presented.

AGRICULTURAL PRODUCTION PRACTICES AND FARMING SYSTEMS

IRRIGATION AND WATER MANAGEMENT

1940–1949

Parham, W. L. 1942. Water-control methods for smallholders. *Fiji Agricultural Journal*, 13(1), 20–22.

Work had been carried out on demonstration farms of methods for smallholders to control water for rice production in Fiji. Results of this work are reported.

Vasey, C. R. and Bharat, S. 1946. Irrigation. *Fiji Agricultural Journal*, 17(2), 32.

An interesting example of rice irrigation at Votualalai in the province of Nadroga and Navosa is described.

1950–1959

Cassidy, N. G. and Singh, S. A. 1955. The importance of flooding of rice. *Fiji Agricultural Journal*, 26(1), 6–10.

Experimental evidence is presented to demonstrate the importance of flooding rice. The practicality of using natural rainfall to do this is assessed.

Whitehead, C. E. 1957. Flood mitigation and control. *Fiji Agricultural Journal*, 28(1/2), 19–22.

The flood catastrophe in western and north-western Viti Levu and Vanua Levu in 1956 is argued to be a grim reminder of the need for flood mitigation and control. The extent of animal losses is assessed and the case is put for a long-term plan of operation covering upstream and downstream engineering, land treatment and agricultural practices.

1980–1989

Spriggs, M. J. T. 1980. Taro irrigation in Oceania: a call for more research. *South Pacific Bulletin*, 30:15–18.

The author observes the dearth of existing knowledge and current practices in irrigating taro, despite its importance in ancient farming systems. Few people now realise how widespread the irrigation of taro was in the recent past, or still was at the time of writing. Some areas for further research are suggested to redevelop the practice. While the focus is on New Caledonia and Vanuatu, there are some references to Fiji.

Watling, J. 1984. Irrigated terrace cultivation of dalo at Nawaikama, Gau, Domodomo, *Fiji Museum Quarterly*, 2:21.

An account is given of examples of the irrigation of taro at three locations in Fiji.

1990–present

Asian Productivity Organization 1995. Agricultural water management technology in Asia and the Pacific: Report of an APO Seminar, 12–16 July 1994, Colombo, Sri Lanka. Asian Productivity Organization, Tokyo.

A summary is made of the conference findings, 5 resource papers and 12 country papers. The resource papers are: (1) status of irrigation management in Asia and the Pacific; (2) current developments in applying water management technologies; (3) investments in irrigation; (4) operation and maintenance of irrigation facilities; and (5) water users' associations: issues and prospects. The country papers relate to agricultural water management technology in China, Fiji, India, Indonesia, Iran, South Korea, Malaysia, Nepal, Philippines and Sri Lanka.

Prakash, K. 1995. Irrigation project doubles vegetable yields, IRETA's South Pacific News, September 1995.

The Sigatoka Valley Rural Development Project, which cost \$10 million and was half-sponsored by the Asian Development Bank, ended in 1993. An area of 309 ha, or 20 per cent of the total cultivated land in the valley, was irrigated and grown with vegetables. Yields increased together with an increase in quality; also, irrigation allowed off-season production.

CULTURAL PRACTICES AND FARMING SYSTEMS

1930–1939

Parham, W. L. 1937. The Fijians as agriculturalists. *Fiji Agricultural Journal*, 8(3), 15–17.

This is an interesting assessment of the Fijians as agriculturalists. Their skills and weaknesses are outlined in the context of the rapidly improving communications system in Viti Levu. With new desires and burdens for the farmer, the Department of Agriculture identified a role for agricultural instruction in the homes. The author observes that 'the most spectacular evidence of Fijian skill is to be seen in the many and extensive terraces in some of the hill districts'. He felt that 'the Fijian is an expert gardener with a thorough inherited knowledge of the needs of every crop customarily grown'. He opines that an 'extraordinary point about the Fijian in agriculture is that it is the one activity in which he is and was an individualist'. Much of the reputation for laziness is ascribed to 'ignorance of his

habits whereas left to himself, the native can undoubtedly fend for himself. The author is convinced of the ability of Fijian farmers to apply themselves to learn so long as there is something worth learning.

Jack, H. W. 1938. Progress in field agriculture among Fijians. *Fiji Agricultural Journal*, 9(4), 3–6.

Details are provided on the agricultural activities and output of so-called 'exempted men'. The author observes that, for various reasons, the Fijian farmer fails to appreciate the value of regular rotation cropping and adopt inexpensive methods of soil conservation. This occurs when his farming energies become more restricted to smaller areas than those to which he is habitually accustomed.

Jack, H. W. 1939. Local food production. *Fiji Agricultural Journal*, 10(3), 65–68.

This article deals with government efforts to raise food production for the war effort. It is based on the premise that war has provided a greater need for food self-sufficiency by relying on local foods.

1940–1949

Harwood, L. W. 1940. Fijian independent farmers in the province of Cakaudrove. *Fiji Agricultural Journal*, 11(1), 9–11.

A description is provided of a group of independent farmers in Cakaudrove. Details are given on the land they farm and the foods they produce. The crops grown are mainly the staples of taro and yams, with little cassava produced. Kava is the only cash crop of any value. It is concluded that 'what they have done, with limited supervision and advice, is astounding when one considers the many difficulties which confront them'.

Vasey, C. R. 1946. Budding. *Fiji Agricultural Journal*, 17(3), 84.

An elementary description is given of the budding of fruit trees, and the different forms it can take.

1950–1959

Harwood, L. W. 1950. Observations on indigenous systems of agriculture. *Fiji Agricultural Journal*, 21(1/2), 3–8.

This paper was prompted by a claim that polycultural systems were preferable to monocultural systems. These two types of systems are summarised in the context of traditional agricultural practices in Fiji and other tropical countries. It is concluded that polycultural systems work satisfactorily in areas with little population pressure. However, they are unsuitable to areas that are closely settled or which require more intensive production methods.

Payne, W. J. A. 1950. Introduction to the problem of efficient land utilisation. *Fiji Agricultural Journal*, 21(3), 3–4.

The author expresses the opinion that the efficiency of arable farming in Fiji is debatable. He argues that pasture grass is the pivotal crop.

Dorrity, J. T. and Nield, J. 1954. Crop areas for period 1950–52. *Fiji Agricultural Journal*, 25(3/4), 60.

Brief statistics are provided on the production of major crops in Fiji during the period, 1950–52. A table is presented with crop areas, yields, estimated values paid to growers and export volumes by crop.

Harman, L. 1954. Fijian agriculture: Cakaudrove, 1953. *Fiji Agricultural Journal*, 25(3/4), 57–58.

Summaries are presented of statistics that were collected by field staff on areas planted to crops by district in Cakaudrove in 1953.

Mercer, A. D. 1954. Fijian agriculture—Western Division. *Fiji Agricultural Journal*, 25(3/4), 58.

Summaries are presented of statistics that were collected by field staff on areas planted to crops by district in Western Division in 1953.

Mercer, A. D. 1954. Crop rotation in the dry zone of Viti Levu. *Fiji Agricultural Journal*, 25(3/4), 59.

The author reports on the rotation needs for sugar and rice land in the dry zone. He observes that declining yields are forcing farmers to adopt improved farming practices.

