Land Resource Study

# 29 Land resources of central Nigeria Agricultural development possibilities Volume 2 A The Jos Plateau Executive Summary

Land Resources Development Centre, Ministry of Overseas Development

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# Agricultural development possibilities
# Volume 2A The Jos Plateau
# Executive Summary

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# Volume 2A The Jos Plateau

# Executive Summary


**Land Resources Development Centre**
**Central Nigeria Project Team**
**(ed. I D Hill)**

(J G Bennett, A Blair Rains, P N Gosden, W J Howard, A A Hutcheon, W B Kerr, J E Mansfield, L J Rackham, A W Wood)


**Land Resource Study 29**


Land Resources Development Centre, Ministry of Overseas Development,
Tolworth Tower, Surbiton, Surrey, England KT6 7DY
1978

## LAND RESOURCES DEVELOPMENT CENTRE*

The Land Resources Development Centre of the Ministry of Overseas Development assists developing countries in mapping, investigating and assessing land resources, and makes recommendations on the use of these resources for the development of agriculture, livestock husbandry and forestry; it also gives advice on related subjects to overseas governments and organisations, makes scientific personnel available for appointment abroad and provides lectures and training courses in the basic techniques of resource appraisal and development.

The Centre works in close cooperation with government departments, research institutes, universities and international organisations concerned with land resources assessment and development planning.

## CENTRE DE DEVELOPPMENT DES RESSOURCES DE LA TERRE*

Le Centre de Développement des Ressources de la Terre (l'un des organismes scientifiques du Ministère britannique de Développement Outremer) apporte son aide aux pays en voie de développement en matière de cartographie, recherche et évaluation des ressources de la terre et fournit des recommandations quant à l'exploitation de ces ressources pour le développement de l'agriculture, l'élevage et la sylviculture. Le Centre conseille également, dans les domaines annexes, gouvernments et organismes outremer, se charge de trouver du personnel scientifique pour les postes a pourvoir à l'étranger et organise des conférences et des stages de formation sur les techniques de base relatives à l'évaluation et la mise en valeur des ressources.

Le Centre travaille en étroite coopération avec services gouvernementaux, instituts de recherche, universités et organismes internationaux s'occupant d'évaluation des ressources de la terre et de plans de développement.

*The name of the former Land Resources Division was changed to Land Resources Development Centre in June 1978.

*L'ancienne Division des Ressources de la Terre (Land Resources Division) a été renommée Centre de Developpement des Ressources de la Terre (Land Resources Development Centre) en juin 1978.

# List of volumes

Title: Land resources of central Nigeria: agricultural development possibilities. LRDC Central Nigeria Project Team (Eds I D Hill and J R D Wall)

| | |
|---|---|
| Volume 1A | The Bauchi Plains, Executive Summary |
| Volume 1B | The Bauchi Plains |
| Volume 2A | The Jos Plateau, Executive Summary |
| Volume 2B | The Jos Plateau |
| Volume 3A | The Jema'a Platform, Executive Summary |
| Volume 3B | The Jema'a Platform |
| Volume 4A | The Benue Valley, Executive Summary |
| Volume 4B | The Benue Valley |
| Volume 5A | The Kaduna Plains, Executive Summary |
| Volume 5B | The Kaduna Plains |
| Volume 6A | The Kano Plains, Executive Summary |
| Volume 6B | The Kano Plains |
| Volume 7 | An atlas of resource maps |

## NOTICE TO READERS

This report is derived from a draft issued to the Nigeria Federal and State authorities in 1977.

Readers concerned purely with administrative or policy decisions in relation to agricultural development will find in this volume a summary of the types of development considered and a brief account of the locations of the various development possibilities. There is also an introductory précis of the whole of the Executive Summary.

The attention of readers is drawn to the section in Part 1 on the use of the present report and other associated documents on the Jos Plateau issued by LRDC.

Readers requiring more detailed information and discussion should consult Volume 2.B.

Throughout this report the word 'agriculture' has been used in a broad sense to include crop production, range management and forestry.

# Contents



TEXT MAPS

## SEPARATE MAPS (in separate folder)

1 Land systems - the Jos Plateau

2 Present land use - the Jos Plateau

3 Areas with minimum environmental limitations to crop production - the Jos Plateau

4 Agricultural development possibilities - Jos Plateau

## MICROFICHES (inside back cover of B volume)

HILL I D, ALFORD M, RACKHAM L J & TULEY P (1974) Interim report on the landforms, soils and vegetation of the Jos Plateau. Volume 1, Landforms and soils. Volume 2, Climate and vegetation. Volume 3, The map units. Miscellaneous Report 153.

# Précis

This report summarises agricultural development possibilities in an area referred to as the Jos Plateau. The area, shown on the accompanying Separate Maps and on Text Map 2.2b, in relation to administrative boundaries, falls mainly within Plateau State. It is part of a much larger area in which land resources surveys have been undertaken as part of a British technical cooperation programme - see Text Map 2.1.

The Jos Plateau has particular advantages of climate as compared with other parts of Nigeria for certain types of agricultural development. Crops such as vegetables and Irish potatoes can be grown and there are especially favourable conditions for cattle production.

There are also particular disadvantages on the Jos Plateau for agricultural development. The large area disturbed by mining and the presence of deep active gullies present severe limitations to agricultural development.

These factors have been taken into account and the different types of agricultural development identified in consultation with State and Federal authorities are as follows:

1. Establishment of integrated agricultural development projects

2. Establishment of large mechanised farms

3. Improvement of traditional grazing

4. Establishment of grazing reserves

5. Establishment of cattle ranches and dairy farms

6. Forestry development for timber production

7. Forestry development for production of timber and poles

8. Establishment of new forest reserves for erosion protection

9. Minesland reclamation

10. Erosion control

The areas suitable for the different types of development are shown on Separate Map 4, on Text Maps 2.3 to 2.8 and in Table 2. Some areas are suitable for more than one type of development, so there may be a number of agricultural development options in one area. It must be emphasised that the various development possibilities have been assessed on environmental criteria: no attempt has been made to rank them on the basis of socio-economic or political factors.

The development options are often mutually exclusive and always interrelated. For example, the establishment of an integrated agricultural development project may utilise land traditionally used for grazing: the displaced cattle will move to surrounding areas in which the rangeland may be already marginal when, unless alternative grazing is provided, cattle production over much of the region would be affected, as the herds are nomadic. Thus a decision to undertake a specific type of agricultural development cannot be made by one department in isolation.

Areas in which the limitations to the growth of maize, millet, sorghum, gorundnuts, yams and potatoes are at a minimum are shown on Separate Map 3 and in Table 3. Although the information is generalised it is relevant to 'Operation Feed the Nation'.

The conclusions are based on extensive field work by a team of nine scientists over a period of seven years. There is therefore a large amount of information on present land use, farming systems, rangeland, forestry, landforms, soils and natural vegetation, which is contained in supplementary reports. Consequently, detailed surveys for development projects undertaken in future should not require an extensive reconnaissance phase.

# List of LRDC reports on the Jos Plateau

A full list is given below of the report of the Jos Plateau issued by the Land Resources Development Centre. They contain information for the specialist and are obtainable only with the agreement of the Nigerian Government. Selected specialist reports are reproduced as microfiches inside the rear cover of the present report.

BAWDEN M G & RACKHAM L J (1969) The physiography of the basement land province: interim report on the land resources of central Nigeria. Miscellaneous Report 75.

POSNETT N W, REILLY P M & WHITFIELD P (1971) Nigeria. Volumes 1-3. Land Resource Bibliography 2.

HILL I D, ALFORD M, RACKHAM L J & TULEY P (1974) Interim report on the landforms, soils and vegetation of the Jos Plateau. Volume 1, Landforms and soils. Volume 2, Climate and vegetation. Volume 3, The map units. Miscellaneous Report 153 (microfiches inside back cover).

BLAIR RAINS (1975) Livestock production in the Central Nigeria Project area. Miscellaneous Report 198.

HOWARD W J (1975) Rehabilitation of tin mining land on the Jos Plateau. Miscellaneous Report 213.

JONES R G B (1975) Central Nigeria Project: report on a soil conservation consultancy to study soil erosion problems on the Jos Plateau. Land Resources Report 6.

HOWARD W J (1976) Land resources of central Nigeria. Forestry. Land Resource Report 9.

GOSDEN P N (1978) Land resources of central Nigeria. Farming systems. Land Resource Report 17.

BLAIR RAINS A (1978) Land resources of central Nigeria. Rangeland and livestock production. Land Resource Report 18.

MANSFIELD J E. (in preparation) Land resources of central Nigeria. The interpretation of environmental data in terms of limitation to crop growth. Land Resource Report 22.

# Part 1

# Part 1 Introduction

## PREFACE

In June 1968 the Nigerian Government asked the British Government to investigate the land resources of parts of each of the six northern states of Nigeria. The investigations have been undertaken by the Land Resources Development Centre (then the Land Resources Division) of the British Government's Ministry of Overseas Development.

The project area covers approximately 230 000 $km^2$ (90 000 $mi^2$). Its western and eastern boundaries are marked approximately by 7° and 10° longitude and it extends from south of the Benue Valley northwards to the border with the Niger Republic (see Text Map 2.1).

Fieldwork was completed in 1976, and a draft of this report was distributed to the Nigerian Federal and State authorities in the following year. The results of the surveys and the draft reports for the Bauchi Plains, Jos Plateau, Jema'a Platform and Benue Valley were discussed in detail at a seminar held in Kaduna in February 1978. This seminar was opened by the Hon Mr Zakariya B Gaiya, Commissioner of Agriculture, Kaduna State and was attended by senior officials from Federal and State ministries and by staff members from several universities. Permission was subsequently received to publish this report for international distribution.

The many background and specialist reports on which the recommendations of the study are based are listed on p.xi. Some are reproduced as microfiches inside the rear cover of this report.

## OBJECTIVES

The objectives of the project were to investigate and describe the land resources with particular reference to their agricultural potential. More specifically, at the request of State and Federal authorities, an assessment has been made of the area's suitability for the growth of annual rainfed crops, maize, millet, sorghum, yams, rice, groundnuts and cotton together with its rangeland and forestry potential. Agricultural development in the more suitable areas has been considered in the context of improving and expanding existing agriculture and establishing new large-scale, capital-intensive schemes.

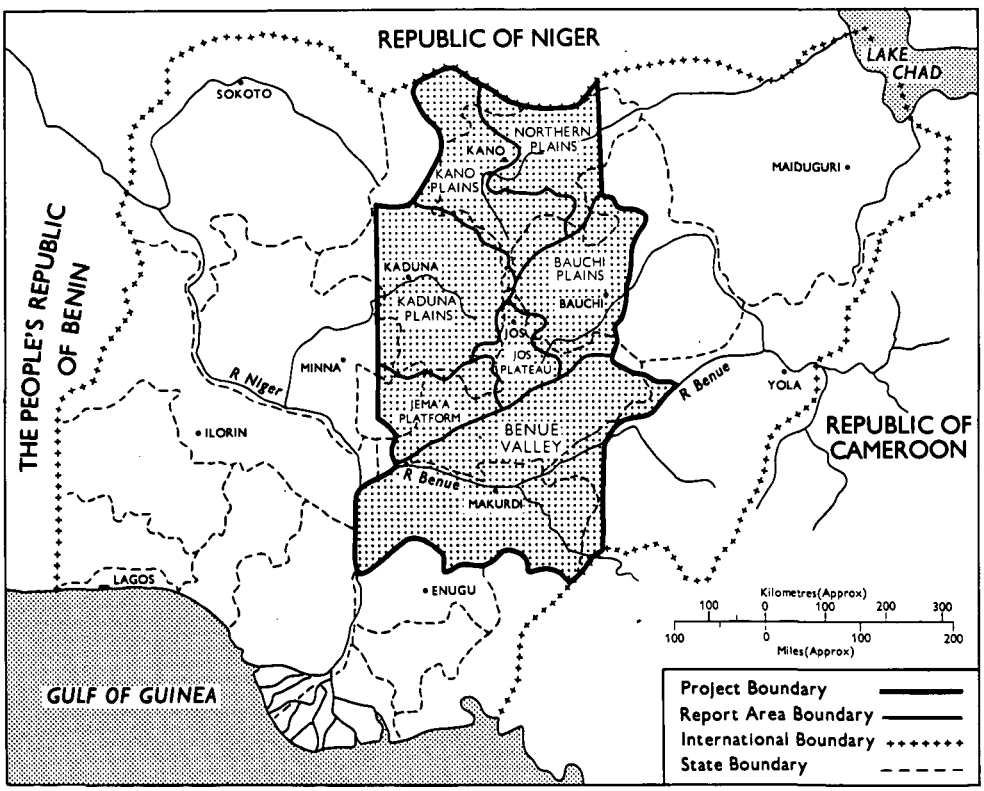
## METHODS

From a study of aerial photographs the area was divided into units with similar landforms. Ground investigations of the soils and vegetation within these units, linked with climatic studies, enabled areas with the same pattern of climate, landform, soil and vegetation to be defined. Such areas are called land systems. These land systems are identified by numbers, are shown in Separate Maps 1 - 4 which accompany this report and are referred to whenever development possibilities are discussed.

The environmental data for each land system were interpreted in terms of suitability for various crops, grazing and forestry. This information, taken in association with studies of present land use was used to identify a number of development possibilities. More details of the methods used are contained in the reports listed on page xi.

TEXT MAP 2.1

LOCATION OF CENTRAL NIGERIA PROJECT

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## FIELDWORK AND TEAM COMPOSITION

Fieldwork started in January 1969 and continued until December 1976. Details of the progress of fieldwork have been given in six-monthly progress reports issued by the Land Resources Development Centre.

The project team is listed below, by scientific discipline

| | |
|---|---|
| Agriculture | P N Gosden (1974-77), J E Mansfield (1973-77) |
| Ecology | R M Lawton (1975), R Rose-Innes (1975-77), P Tuley (1969-72), Mrs M Alford (1970-75) |
| Forestry | W J Howard (1973-76) |
| Rangeland | A Blair Rains (1974-77), C R C Hendy (1975) |
| Geomorphology | M G Bawden (1968-73), L J Rackham (1970-77), Mrs J A Jones (1970-73) |
| Soil science | J G Bennett (1973-77), I D Hill (1969-76), A A Hutcheon (1969-77), W B Kerr (1974-77), J R D Wall (1976-77), A W Wood (1971-75) |
| Soil erosion | R B Jones (1975) |

Agricultural economics consultant R Moyle (1975)

## REPORTING

As the project area is so large it has been divided into six major physiographic regions, the Bauchi Plains, the Jos Plateau, the Jema'a Platform, the Benue Valley and the Kaduna and Kano Plains. These physiographic regions are shown on Text Maps 2.2a and 2.2b in relation to state boundaries. Each region has been reported on separately.

The agricultural development possibilities in each region are discussed in separate volumes of this Land Resource Study: the six volumes are listed on page v.

Environmental data collected during the survey for each of the major physiographic regions is contained in a series of reports published by this Centre ; those relating to the Jos Plateau are listed on page xi. The list also includes reports dealing specifically with rangeland and forestry for the whole project area.

## USE OF THE REPORTS

### Land Resource Study. Volume 2A, The Jos Plateau, Executive Summary

This summary will be of use to administrators in deciding development possibilities. Following discussions with Federal and State authorities, the report has been structured so that it can be used in three ways:

1. Selection of areas for a particular type of agricultural development
2. Selection of areas for increasing the production of a given crop
3. Selection of types of agricultural development within particular administrative units

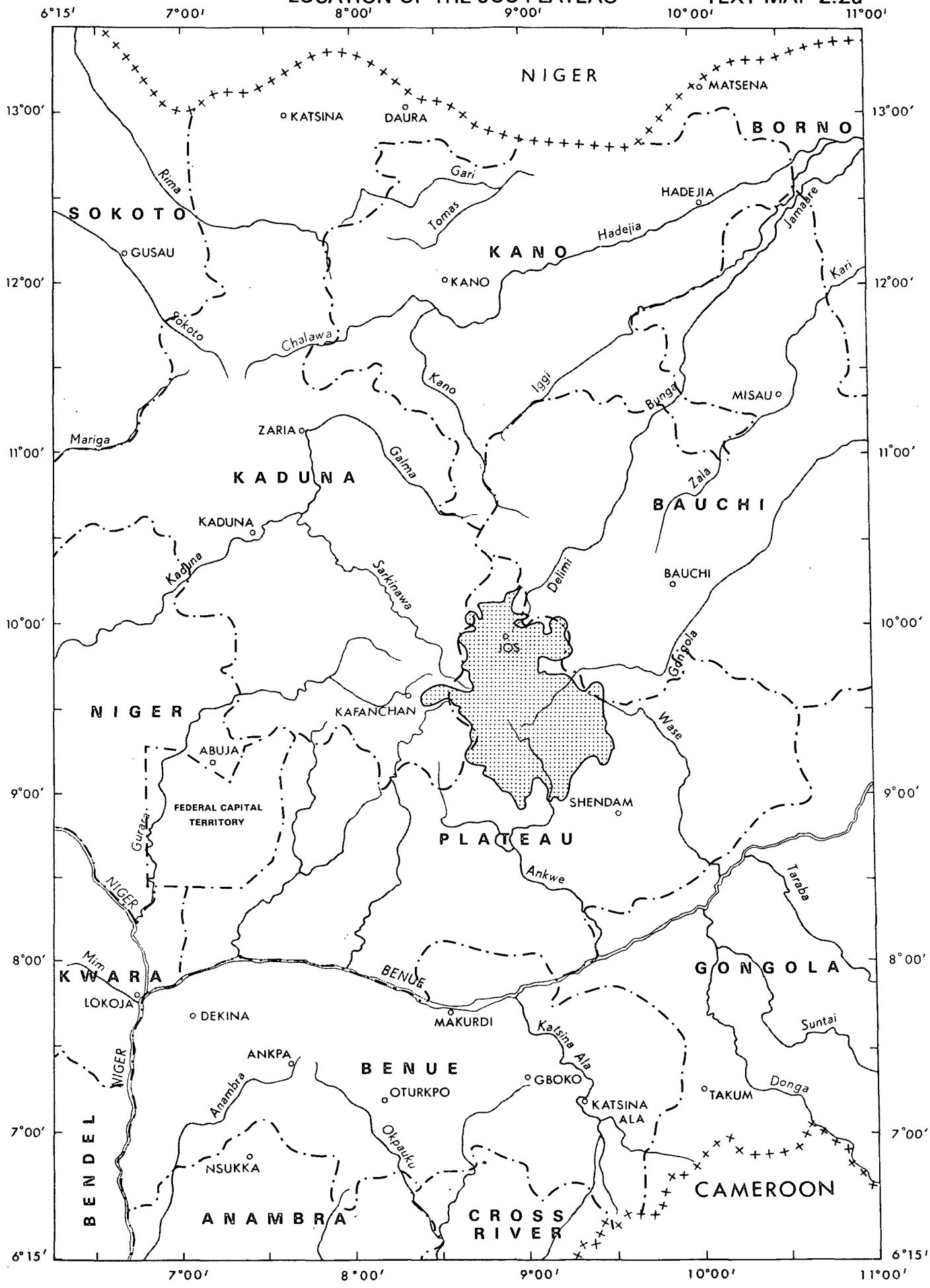
1. Selection of areas for a particular type of agricultural development
The types of development are summarised in Table 1 and discussed more fully in the main report. The areas in which the environmental limitations to particular types of development are at a minimum are shown on Text Maps 2.3 to 2.8. They can be located more specifically by reference to Table 2, where the areas are identified by land system numbers which are shown on the separate maps accompanying Volume 2B.

2. Selection of areas for the production of particular crops Areas in which the environmental limitations to the growth of particular crops are at a minimum are listed in Table 3 in relation to administrative units. They are identified more specifically by land system numbers which are shown on the separate maps.

3. Selection of types of agricultural development within particular administrative units Table 2 shows the location of particular types of development in relation to administrative units. Similarly Table 3 shows land systems for the production of specific crops in relation to administrative units. The administrative units are shown on Text Map 2.2b.

# LOCATION OF THE JOS PLATEAU

TEXT MAP 2.2a




Kilometres 20 0 20 40 60 80 100 120 140 Kilometres

Miles 20 0 20 40 60 80 100 Miles

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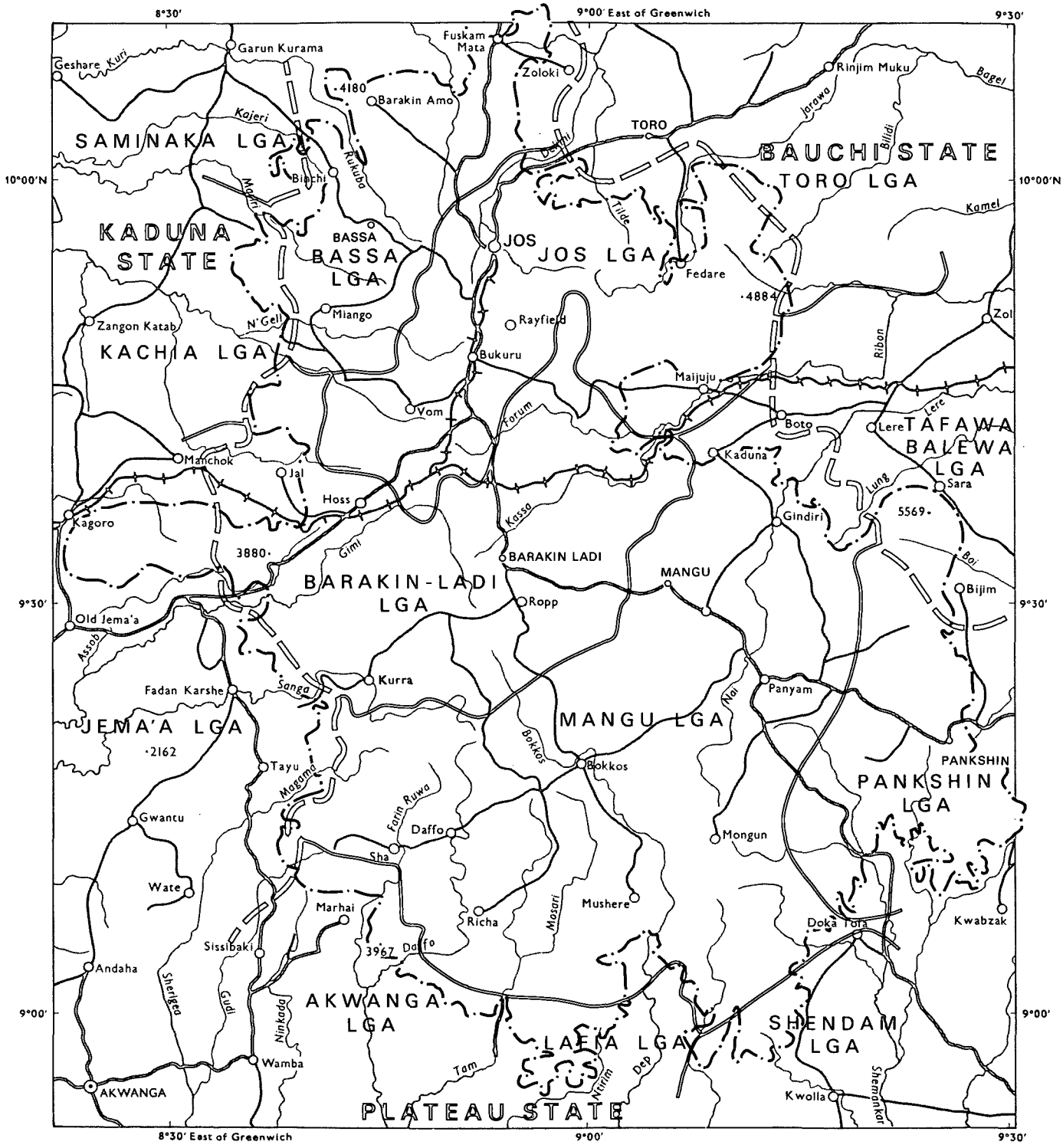
# POST-1976 ADMINISTRATIVE BOUNDARIES OF THE JOS PLATEAU

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Using the report in one or all of these three ways enables a number of agricultural developments to be identified. They have been assessed on environmental criteria and no attempt has been made to rank them in economic terms. The further action necessary to decide which of the development possibilities should be implemented is outlined in Part 2.

### Land Resource Study. Volume 2B, The Jos Plateau

This volume will be of use to technical and planning officers concerned with the formulation of plans or responsible for the implementation of planning decisions. It contains general information about the environment and more detailed environmental and present land use data in relation to development possibilities. It also contains a discussion of the various types of development and the areas in which these could be located.

### Land Resource Reports and Miscellaneous Reports

These reports are listed on page xi. Land Resource Reports 9, 17, 18 and 22 are for the use of technical and planning officers; they contain more detailed assessments of forestry, present land use, cattle production and limitations to crop growth than are contained in the Land Resource Studies. The remaining Land Resource Reports and Miscellaneous Reports should be of use to specialists concerned with the implementation of particular projects as they contain detailed environmental information.

## ADMINISTRATIVE UNITS

The boundaries of the new States announced in January 1976 have been derived from Federal Surveys 1:1 500 000 map of Nigeria (1976). Data have been referred to Local Government Areas in all States. The boundaries of these administrative units have been derived from the best available published maps.

## ACKNOWLEDGEMENTS

We wish to thank the staff of the Federal and State Ministries of Agriculture and Natural Resources for assistance during the project.

Thanks are also due to the Director and staff of the Institute for Agricultural Research, Ahmadu Bello University, for help and cooperation in all stages of the survey and to the staff of the International Institute for Tropical Agriculture, Ibadan, for technical advice.

# Part 2

# Part 2 Summary of agricultural development possibilities

## TYPES OF AGRICULTURAL DEVELOPMENT

Different types of agricultural development have been considered after reference to the Third National Development Plan 1975-80 and discussions with Federal and State authorities and the staff of research institutes in Nigeria. The definitions summarised in Table 1 are based on these discussions and experience of similar development projects in Nigeria. They are more fully discussed in Volume 2B.

The Jos Plateau has particular advantages of climate as compared with other parts of Nigeria for certain types of development. Crops such as vegetables and Irish potatoes can be grown and there are especially favourable conditions for cattle production.

There are also particular disadvantages on the Jos Plateau for agricultural development. The large area (316 $km^2$/122 $mi^2$) disturbed by mining and the presence of deep active gullies present severe limitations to agricultural development. These factors have been taken into account in the discussion of agricultural development on the Jos Plateau.

## ASSESSMENT OF AREAS FOR AGRICULTURAL DEVELOPMENT

Any particular form of development should result in increased agricultural production almost anywhere on the Jos Plateau, but to be most effective it should be located in areas where environmental and present land use limitations are at a minimum. In assessing whether an area is suitable for a particular type of development the following factors have been considered:

Climate
Size and distribution of the land system
Soil limitations to crop growth
Slopes in relation to erosion hazard
Distribution and intensity of present cultivation
Present farming systems
Existing extension coverage
Present grazing status and cattle movements
Existing forestry activities
Communications

TABLE 1 Types of agricultural development

| Type of development | | Summary definition of development |
|---|---|---|
| 1. Integrated agriculture | (a) In densely cultivated areas | Establishment of integrated agricultural development projects aimed at increasing existing agricultural production per ha by improving infrastructure (communications, supply of agricultural inputs, produce marketing, credit facilities and extension service coverage). Run by a semi-autonomous project authority and making use of self-help wherever possible. Allied to general improvement of social services. |
| | (b) In sparsely cultivated areas | As above but also able to increase production by increasing the area under cultivation and/or introducing 'mixed farming'. |
| 2. Mechanised farming | | Establishment of large mechanised farms ($\geq$ 1 000 ha) requiring a high level of management expertise and mechanisation of all stages of production from land preparation to harvest. Good planning and adequate conservation measures are essential. Limited to sparsely cultivated areas. |
| 3. Traditional grazing | | Improvement of traditional grazing including control of flock numbers, the elimination of unregulated pruning and the introduction of forage species into natural grassland. These measures, together with the establishment of grazing reserves and the allocation of grazing rights, are components of a suggested programme to be organised at inter-State level. Limited to sparsely cultivated areas. |
| 4. Grazing reserves | | Establishment of reserves in the major traditional wet and dry season grazing areas and along migration routes, with additional reserves within areas free or being freed of tsetse by the eradication programme. Provision of adequate water supplies, veterinary services and improved natural grassland, coupled with strict control of stock numbers. Limited to sparsely cultivated areas. |
| 5. Cattle ranches and dairy farming | | Establishment of ranches for 'growing out' cattle drawn from Fulani herd. Stock numbers restricted to 2 000 head until the viability of the ranch is established. Area not less than 1 600 ha per 1 000 head of cattle, with 1 500 ha for wet season and early dry season grazing and 80 ha for fodder grass to provide additional dry season roughage. Supplementary dry season feeding by cottonseed, cottonseed cake, groundnut cake, brewers grains or molasses as available. Limited to sparsely cultivated areas.<br>Establishment of dairy herds of not more than 100 milking cows. Total area not less than 250 ha, with 160 ha improved pastures for wet and dry season grazing and 36 ha to provide additional dry season feed, supplemented by locally available concentrates and crop residues. |
| 6/7. Production forestry | 6. Development for production of timber | Development financed and managed by Government and covering a few to 100 ha in one location, usually for sawn timber production for local use, alternatively by a commercial company at minimum annual planting rate of 400 ha for sawn timber or pulp. Confined to forest reserves. |
| | 7. Development for production of firewood and poles | (a) Production by State and Federal Departments in forest reserves. |
| | | (b) Production by farmers on small woodlots, backed by extension service. |
| | | (c) Extraction from areas of natural vegetation in forest reserves. |
| 8. Protection forestry, reservation to protect areas against erosion or strict conservation resources | | Protection of existing and establishment of new forest reserves in areas with slopes greater than 10% (6°) where conservation is required. |
| | | Protection required only in parts of area. |

These factors are considered within the framework of land systems. For convenience the land systems have been grouped according to the number of crop options, that is, the number of crops for which there are few environmental limitations. This grouping shown on Separate Map 3 gives an indication of the versatility of the land for crops.

It must be emphasised that the various development possibilities have been assessed on environmental criteria: no attempt has been made to rank them in economic terms.

## SUITABLE AREAS FOR PARTICULAR TYPES OF AGRICULTURAL DEVELOPMENT

The areas suitable for particular types of agricultural development are shown on Text Map 2.3 to 2.8 and given in Table 2 in relation to administrative units and land systems. The boundaries of both administrative units and land systems are shown in more detail on the separate maps.

## SUITABLE AREAS FOR PRODUCTION OF PARTICULAR CROPS

The areas in which the environmental limitations to the growth of certain crops are at a minimum are given in Table 3 in relation to administrative units and land systems shown on the separate maps. Although this information is generalised it is relevant to 'Operation Feed the Nation'.

## POSSIBLE AGRICULTURAL DEVELOPMENTS IN EACH ADMINISTRATIVE UNIT

The types of development possible in each administrative unit can be derived by reference to Table 2.

## ACTION PRIOR TO AGRICULTURAL DEVELOPMENT

Various agricultural development options have been set out in this report based on reconnaissance investigations of the environment and present land use. The further actions necessary to implement development are discussed below, but as both State and Federal Government agencies may be involved, coordination is important.

TABLE 2 Agricultural development possibilities in relation to administrative units and land systems on the Jos Plateau

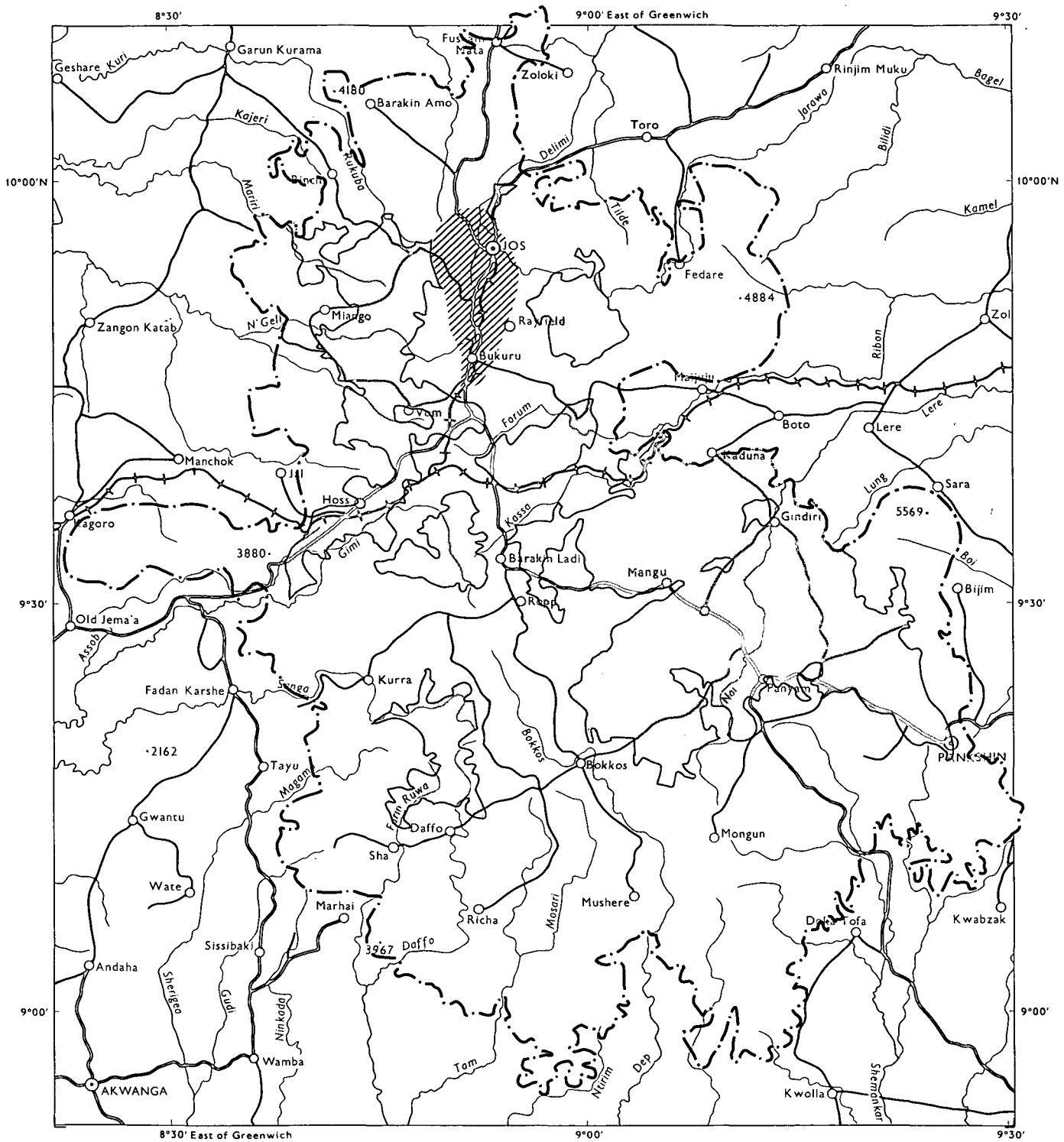
| Administrative unit | Land systems* suitable for different types of development | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1. Integrated agriculture | | 2. Mechanised farming | 3. Traditional grazing in | | 4. Grazing reserves | 5. Cattle ranches and dairy farms | 7. Firewood & poles production from | | | 8. Protection forestry | 9. Minesland reclamation | 10. Erosion control |
| | (a) In densely cultivated areas | (b) In sparsely cultivated areas | | (a) Intensively cultivated areas with at least 3 year fallow | (b) Less intensively cultivated areas | | | (a) Forest reserves | | (b) Farmers wood lots | | | |
| | | | | | | | | Name | LS | | | | |
| Plateau State<br>Bassa | LS113,114,121, 128<br>(1),(107) | | | LS107,108,113, 114,121,128<br>(1),(104),(118) | LS107,108,113, 114,121<br>(104) | | | Rumfan Governor Rukuba | (1) | LS103,107,113, 114,121<br>128 | LS1,2,101, 102,103,104<br>(110) | All land systems but particularly part of LS103, 106,107,108,110, 113,115,119,131 | All land systems |
| Jos | LS114,121 | LS110,113 | | LS107,108,113, 114,121 | LS110,113,119, 120 | LS119,120 | LS119,120 | Radung<br>Naraguta<br>Jarawa Hill<br>Rajin Bauna South | (104)<br>(1),(113)<br>(1),(2)<br>(110)<br>(1) | LS107,108,110, 113,115 | LS1,2,101, 104<br>(110) | All land systems but particularly part of LS103, 106,107,108,110, 113,115,119,131 | All land systems |
| Barakin Ladi | LS110,115, 122,129,131<br>(1) | LS112.116,122<br>(106),(119) | | LS110,115,122, 129,130,131<br>(1) | LS106,110,112, 119,120,122, 125 | LS112,119, 120,128<br>(110) | LS110,112,119, 120,122 | Rahama NE Escarpment<br>Assob<br>Bachit<br>Kurra Jekko | (1)<br>(1)<br>LS122<br><br>LS102<br>(1),(106) | LS110,112,115, 116,122,125, 129,131<br>(1) | LS1,102,103, 106 pts 118<br>(110) | All land systems but particularly part of LS103, 106,107,108,110, 113,115,119,131 | All land systems |
| Mangu | LS109,123,124, 128.129,130,131<br>(1),(2),(119) | LS109,130,131<br>(2) | | LS109,119,123, 124,125,127, 128,129,130,131<br>(1),(2),(118) | LS109,111,117, 119,125,126, 127,128,130, 131<br>(2) | LS109,111, 117,119 | LS109,117, 119 | Langai FR<br>Mongu FR<br>Richa FR | LS130<br>LS130<br>(1) | LS109,113,118, 119,123,124, 125,126,128, 129,130,131 | LS1,2,101, 102,103,105, 106,117,118, 119 | All land systems but particularly parts of LS112, 115,119,131 | All land systems |
| Pankshin | LS130<br>(2),(101),(117) | LS130 | | LS127<br>(2).(101),(117) | LS130<br>(2) | | | | | LS127,130<br>(2),(101),(117) | LS1,2,101, 102,103,105, 118 | All land systems but particularly parts of LS112, 115,119 131 | All land systems |
| Akwanga | | | | | LS111 | LS111 | | Marahai | LS(1), (111) | | LS1,102,111 | All land systems but particularly parts of LS112, 115,119,131 | All land systems |
| Shendam | | | | | | | | | | | LS1,102 | " | " |
| Lofia | | | | | | | | | | | LS1,103 | " | " |
| Bauchi State<br>Toro | | | | | | | | | | | LS1 | | " |
| Tafawa Balewa | | | | | | | | | | | LS1,101 | | " |
| Kaduna State<br>Saminaka | | | | | | | | | | | LS1,103,104 | | " |
| Kachia | | | | | | | | Chawal Escarpment<br>Rahama FR | LS103,128<br>(1) | | | | " |
| Jema'a | | | | | | | | North East Escarpment FR | LS(1) | | LS1,111 | | " |

* There Are no areas suitable for timber production on the Jos Plateau

≠ Land system (LS) numbers in brackets are unsuited to the type of development shown but are not differentiated on Separate Map 4 because of their small size

# AREAS SUITABLE FOR INTEGRATED AGRICULTURAL DEVELOPMENT PROJECTS

(based on environmental and present land use factors only)




Jos Metropolitan Area

Kilometres 10 5 0 10 20 30 Kilometres

Miles 10 5 0 10 20 Miles

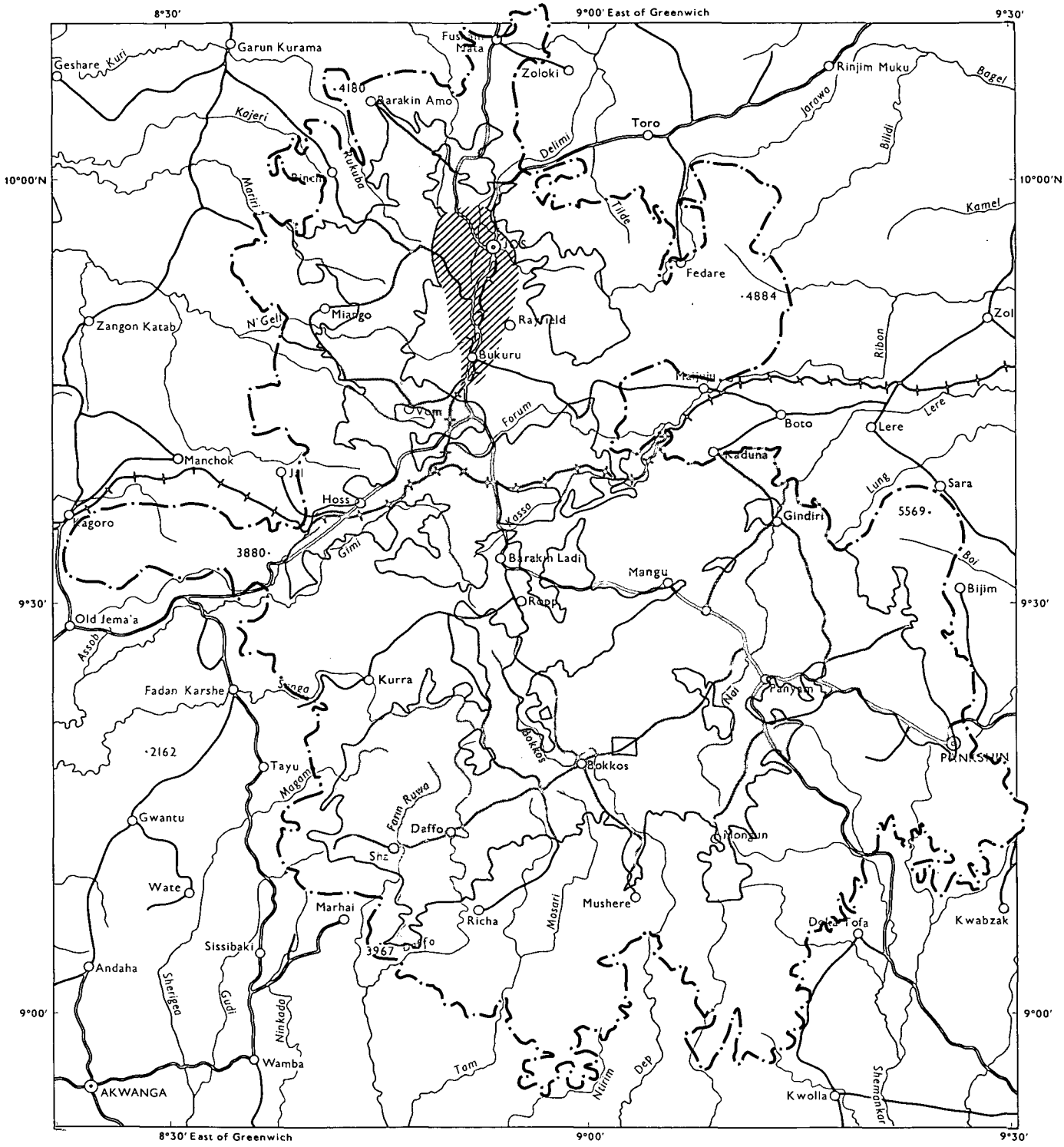
Boundary of Jos Plateau

D.O.S. 3251 C

Prepared by the Directorate of Overseas Surveys 1977

# AREAS SUITABLE FOR IMPROVEMENT OF TRADITIONAL GRAZING

(based on environmental and present land use factors only)




Jos Metropolitan Area

Kilometres 10 5 0 10 20 30 Kilometres

Miles 10 5 0 10 20 Miles

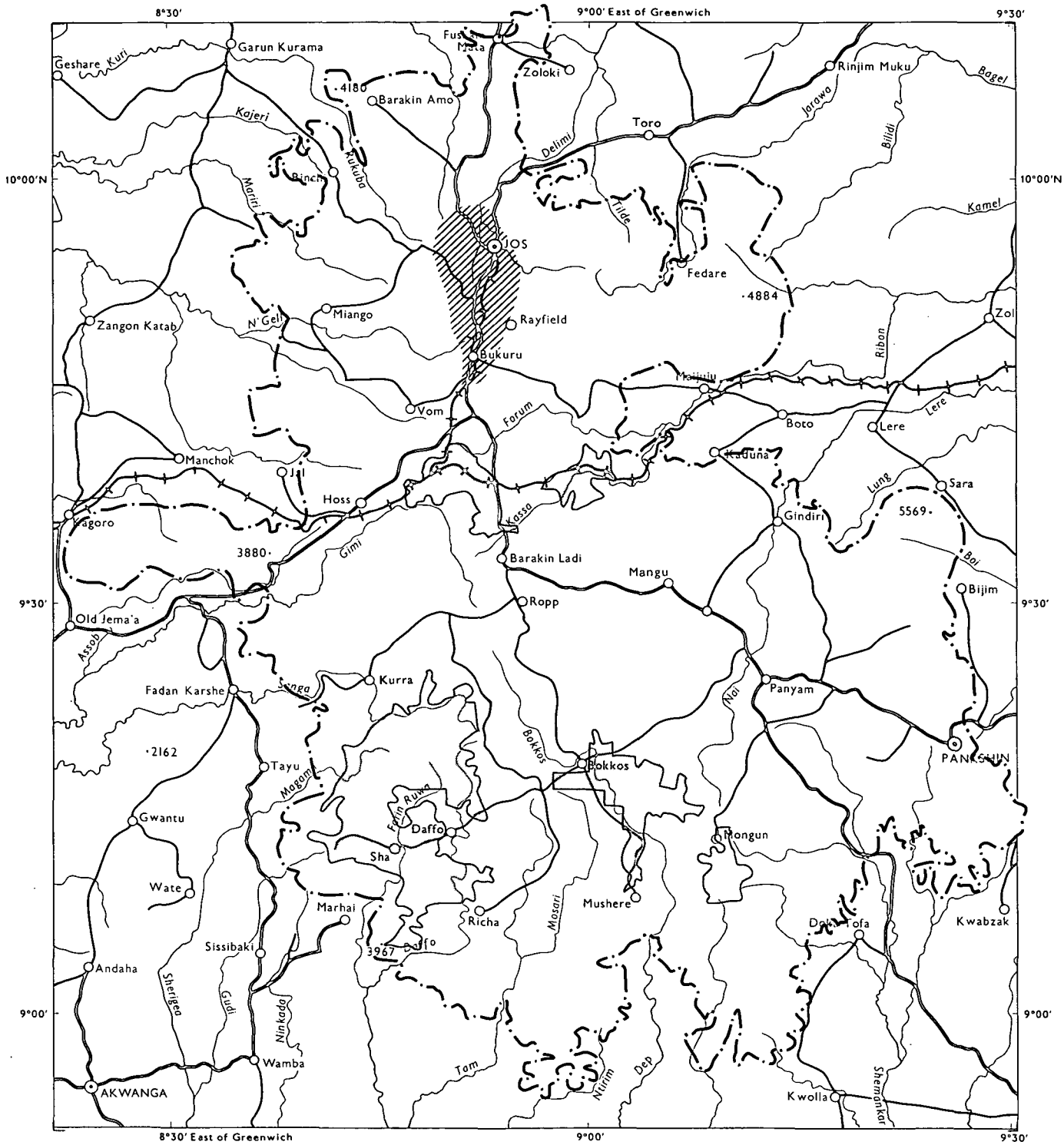
—·— Boundary of Jos Plateau



Prepared by the Directorate of Overseas Surveys 1977

# AREAS SUITABLE FOR ESTABLISHMENT OF GRAZING RESERVES

(based on environmental and present land use factors only)




Jos Metropolitan Area

Kilometres 10 5 0 10 20 30 Kilometres

Miles 10 5 0 10 20 Miles

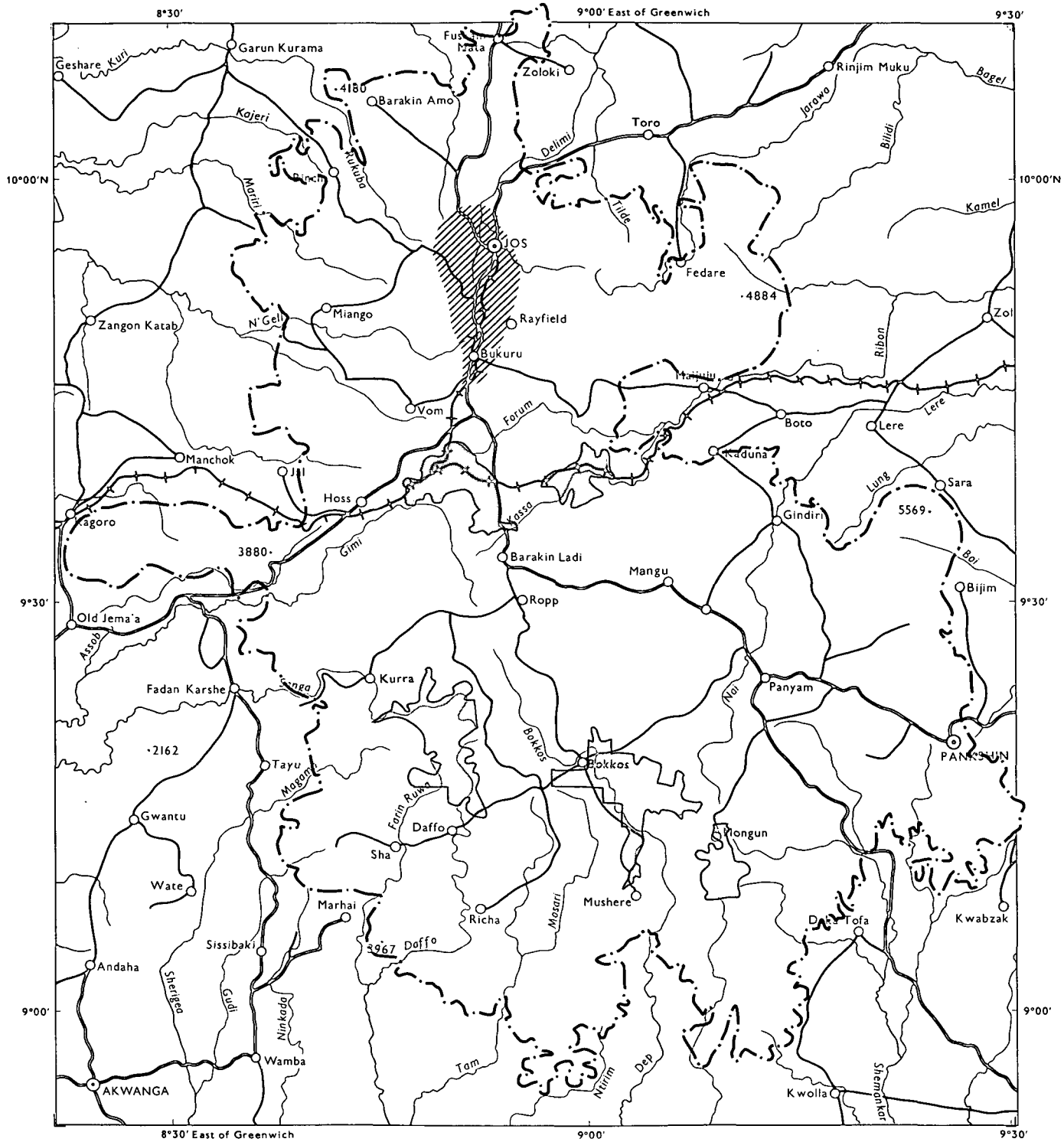
Boundary of Jos Plateau



Prepared by the Directorate of Overseas Surveys 1977

# AREAS SUITABLE FOR CATTLE RANCHES OR DAIRY FARMS

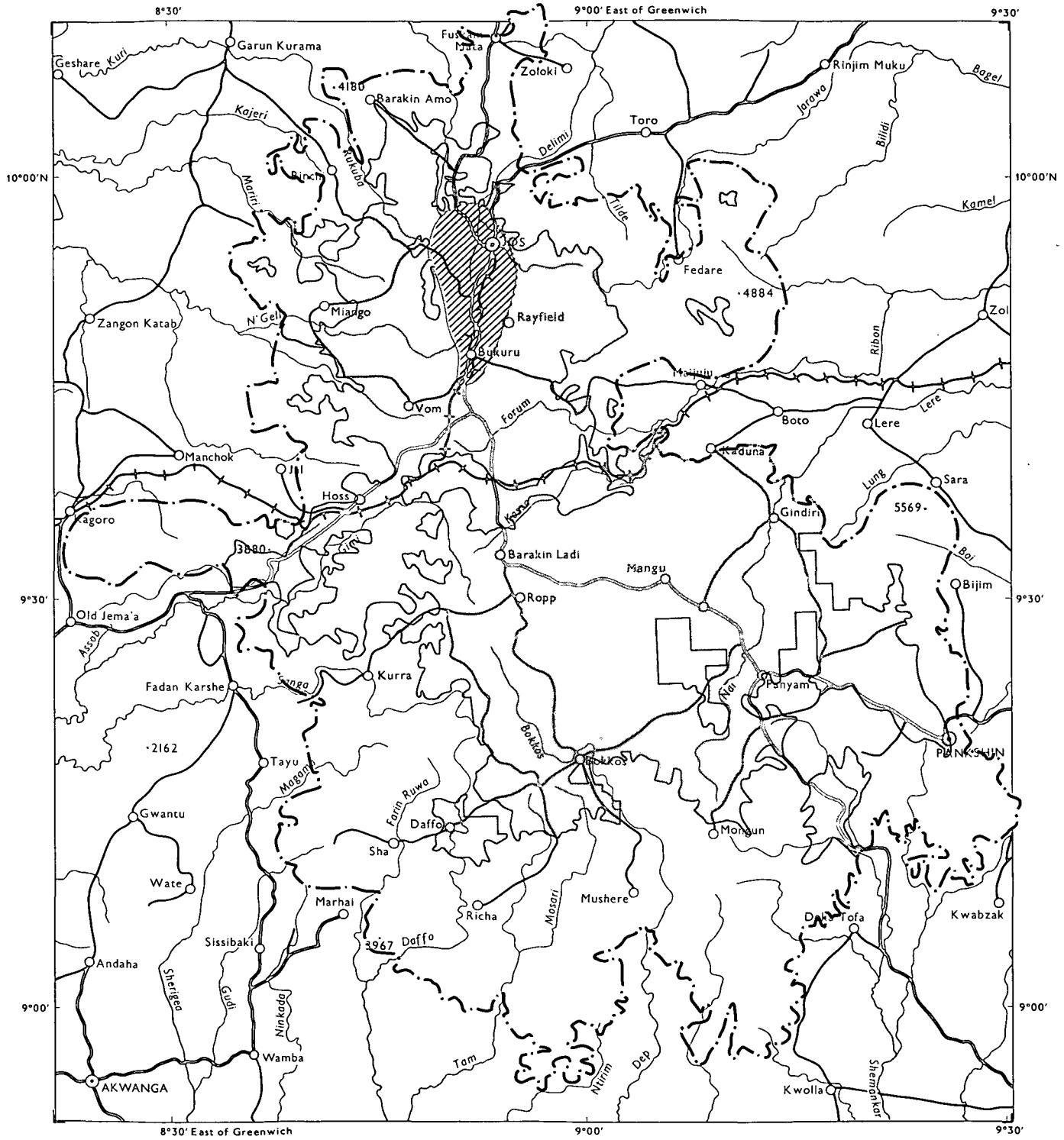
(based on environmental and present land use factors only)






Prepared by the Directorate of Overseas Surveys 1977

# FOREST RESERVES FOR PRODUCTION OF FIREWOOD AND POLES, AND AREAS REQUIRING EXTENSION FORESTRY




Jos Metropolitan Area

Kilometres 10 5 0 10 20 30 Kilometres

Miles 10 5 0 10 20 Miles

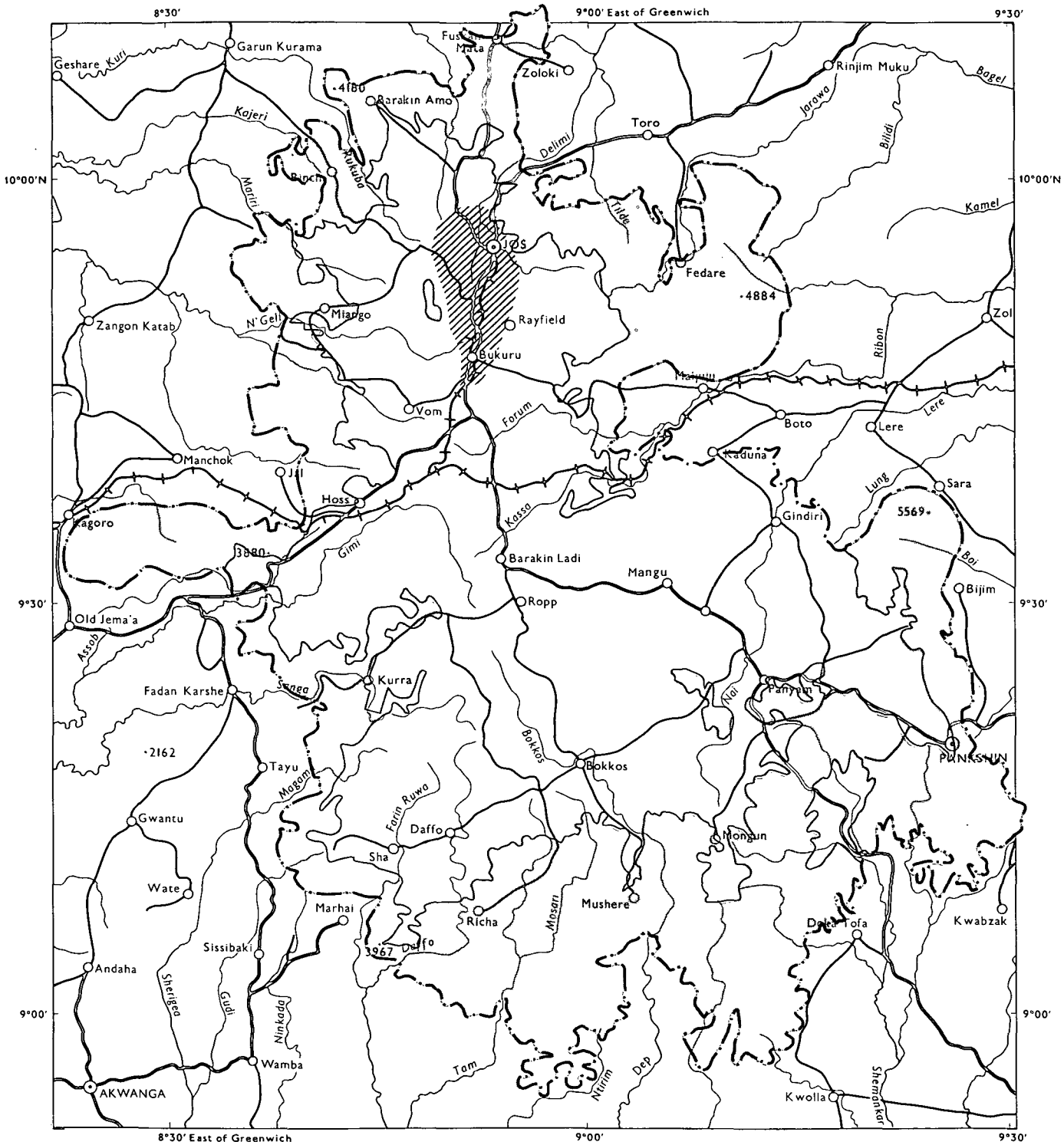
Boundary of Jos Plateau

LAND SYSTEMS SHOWN

D.O.S. 3251 G

Prepared by the Directorate of Overseas Surveys 1977

# AREAS REQUIRING RESERVATION OR STRICT CONSERVATION




Jos Metropolitan Area

Kilometres 10 5 0 10 20 30 Kilometres

Miles 10 5 0 10 20 Miles

—·— Boundary of Jos Plateau



Prepared by the Directorate of Overseas Surveys 1977

TABLE 3 Land systems with few limitations to the growth of particular crops in relation to administrative units

| Administrative unit | Land systems with few limitations to the growth of | | | | | |
|---|---|---|---|---|---|---|
| | Maize | Millet | Sorghum | Groundnuts | Yams | Potatoes |
| Plateau State | | | | | | |
| Bassa | | LS113,114,121, 128 | LS128 | LS113,114 | LS108,113,121, 128 | LS113,114,121, 128 |
| Jos | LS110,115 | LS110,113,114, 115,121,128 | LS110,115,128 | LS110,113,114, 115 | LS108,110,113, 115,120,121, 128 | LS110,113,114, 115,121,128 |
| Barakin Ladi | LS109,110,115, 116,122,129, 130 | LS109,110,114, 115,116,122, 128,130 | LS109,110,112, 115,116,122, 128,129,130 | LS109,110,114, 115,116,122, 129,130,131 | LS109,110,112, 115,116,120, 122,125,128, 129,130,131 | LS109,110,112, 114,115,116, 122,125,128, 129,130,131 |
| Mangu | LS109,117,123, 124,129,130 | LS109,128,130 | LS109,117,123, 124,128,129, 130 | LS117,129,130, 131 | LS109,117,123, 124,125,126, 128,129,130, 131 | LS109,117,123, 124,125,126, 128,129,130, 131 |
| Pankshin | LS117,123,130 | LS130 | LS117,123,130 | LS117,130 | LS117,123,130 | LS117,123,130 |
| Akwanga | - | - | - | - | - | - |
| Shendam | - | - | - | - | - | - |
| Lafia | - | - | - | - | - | - |
| Bauchi State | | | | | | |
| Toro | - | - | - | - | - | - |
| Tafawa Balewa | - | - | - | - | - | - |
| Kaduna State | | | | | | |
| Saminaka | - | - | - | - | - | - |
| Kachia | | LS128 | LS128 | | LS128 | LS128 |
| Jema'a | - | - | - | - | - | - |

## Coordination of agricultural development

Although obvious, it must be emphasised that any form of agricultural development will profoundly affect existing forms of agricultural activity. For example, initiating an integrated agricultural development project, as outlined previously, will influence the amount of land available for grazing: the consequent displacement of nomadic pastoralists may affect rangeland 100 miles away.

Decisions on agricultural development are usually taken initially by a professional committee. Details vary but at the state level the committee includes the Permanent Secretary MANR, the Planning Officer, Chief Agricultural and Veterinary Officers, Chief Irrigation Engineer and Chief Conservator of Forests. At the federal level the committee includes the Permanent Secretary MANR, the Planning Officer and the Directors of the Departments of Agriculture, Livestock and Forestry.

It is very important that these committees should consider the interrelationships of the various forms of agricultural development. A decision to undertake a specific type of agricultural development cannot be made by one department in isolation.

To ensure coordination of agricultural development between States and between State and Federal Government programmes, a representative from the Federal MANR should attend State MANR committees. To ensure coordination of agricultural activity with overall development policy a representative from the Ministry of Finance and Economic Planning should also attend.

Once the MANR Planning Committee has approved a particular agricultural development on technical grounds, final approval for implementation is usually the responsibility of the Ministry of Economic Planning.

## Sequence of actions prior to development

The further actions necessary to implement development are listed in sequence and summarised in Table 4, and further discussed below. They represent the successive applications of more intensive studies to test the feasibility of the options indicated by the reconnaissance surveys.

TABLE 4 Sequence of actions prior to development

| Action | Information available |
|---|---|
| 1. Decide<br>(i) Type of agricultural development<br>(ii) Type of crop whose production should be increased<br>(iii) Area for development | Results of Central Nigeria Project ie agricultural development options determined from environmental factors. Economic information from Nigerian sources |
| 2. Undertake preliminary socioeconomic studies | " |
| 3. Review decision from 1. | Results of Central Nigeria Project and studies from 2. |
| 4. Undertake more detailed environmental and socio-economic studies | " |
| 5. Final decision on implementation of development | Results of Central Nigeria Project and studies from 2 and 4. |

**Decision on type of development, type of crop, or the area for development**

A decision on the types of agricultural development required or on the type of crop whose production should be increased should be taken by State or Federal MANR Planning Committees in the light of the overall agricultural policy laid down in the Third National Development Plan. Relevant information has been provided in this report and attention is again drawn to the section on the use of the report.

***Socioeconomic studies***

In order to complement the reconnaissance environmental investigations, preliminary socioeconomic studies are required. This involves the collection of data on inputs and outputs, prices and costs, systems of tenure, credit and marketing, social structures and group interrelationship, personal values and capacities, and attitudes to risk and migration. Analysis of this data

will enable alternative crops, farming systems or projects to be compared in terms of their social and economic consequences for individual farmers and communities. Similar studies are required where development is to be undertaken by companies or government corporations.

These studies could be made either by the Planning Units in the State or Federal Ministries of Agriculture and Natural Resources, or by external agencies.

### Review of decisions

It is important that there should be a formal review of the decision to implement a proposal for development, based on the reconnaissance environmental information and the preliminary socioeconomic data.

### Detailed environmental and socioeconomic studies

Once decisions about the development options have been made on the basis of reconnaissance studies, more detailed investigations of environmental and socioeconomic factors are necessary. Frequently these studies are undertaken by consultants. It is important that there should be coordination of the consultants' activities so that there is no unnecessary duplication of effort.

This coordination could most effectively be done by the Federal Department of Agriculture, possibly through its Land Resources Division keeping a register of all agricultural surveys and development projects in progress.

### Final decision on implementation

If the results of the more detailed surveys indicate that development should proceed, the decision is usually made by the MANR Planning Committee in conjunction with the Ministry of Economic Planning. In the case of developments affecting more than one Ministry, responsibilities need to be clearly defined and a project authority designated.

## CONSTRAINTS ON AGRICULTURAL DEVELOPMENT

The Third National Development Plan, 1975-80, discusses the constraints on agricultural development as follows:

"The constraints are several but the most serious are

i Shortage of qualified manpower in key areas
ii Inadequate supplies of agricultural inputs
iii Inadequate extension service
iv The poor condition of feeder roads and other transport facilities
v Inadequate or lack of effective supporting services such as farm credit, marketing facilities, etc
vi The problem of land ownership imposed by the land tenure system in most parts of the country
vii The problem of diseases and pests
viii The problem posed by labour shortage in the rural areas in consequence of rural-urban migration
ix Lack of appropriate or complete packages of technology for many food crops
x Drudgery in farm work and low returns from agriculture which forces rural youth to migrate to urban areas rather than go into farming"

Interviews with farmers in 8 villages scattered throughout the Jos Plateau (See Separate Map 2) confirmed that these factors are indeed constraints to agricultural development. Those factors for which data is available are discussed below and more fully by Gosden (1978)

i. Shortage of qualified manpower in key areas and iii. Inadequate extension services

1. The ratio of field agricultural extension workers to farming families ranges from 1:1300 in Jos Division to 1:790 in Pankshin Division. Existing integrated rural development projects in Nigeria are aiming at a ratio of 1:400.

2. There is one range management officer based in Jos. Although there are three assistants they are based in Wase, off the Jos Plateau.

3. With any extension service whether it be for crop production, pasture improvement, forestry or soil conservation there is a conflict between the need to encourage and advise the population and the need for policing to eliminate malpractices. The two functions should be kept separate and policing done by special inspectors. Jones (1975) has suggested having a special soil conservation inspectorate.

iv. The poor condition of feeder roads and other transport facilities

Reference to the legend of Separate Map 1 shows the length of main road, secondary roads and track in each land system on the Jos Plateau though the figures must be considered in relation to the total area of each land system. They show that in most parts of the Jos Plateau there is an adequate network of roads and tracks.

viii. The problem posed by labour shortage in the rural areas in consequence of rural urban migration

Gosden (1978) has produced farming calendars for a number of localities on the Jos Plateau that show that shortage of labour is a common restraint to production, particularly at weeding time. Lack of money at this time prevents additional labour being hired, even if this is available.

**Additional constraints**

1. The lack of effective farmers organisations which would enable farmers to request and benefit from more effective extension advice, bulk purchases of inputs and handling of produce, credit facilities and tractor hiring units.

2. The low level of soil fertility is a severe constraint to production. This is partly due to inherently low soil fertility, and partly to intensive cultivation over the past 70 years with little addition of fertiliser.

3. Disturbance by mining. This not only renders large areas (316 $km^2$/ 122 $mi^2$) virtually useless for agriculture but often triggers off gullying and erosion. This has been fully discussed by Jones (1975).

# Publications of the Land Resources Development Centre

These publications have a restricted distribution and are not available to booksellers. The Centre makes a report on each completed project. The report is published as a Land Resource Study or Technical Bulletin only with the consent of the government concerned.

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