

JESS INTERIM REPORT ON
AERIAL PHOTOGRAPHY INTERPRETATION

JESS Report No. 13

Prepared by:

Eric Trump, Resource Management and Research
Associates in Rural Development, Inc.
110 Main Street, Fourth Floor
P.O. Box 1397
Burlington, VT 05402
U.S.A.
Under AID contract number AFR-0134-C-00-5047-00.

Date: 29 June 1987

CONTENTS

| <u>Section</u> | <u>Page</u> |
|--|-------------|
| <u>Acronyms and Abbreviations</u> | i |
| <u>Preface</u> | ii |
| I. <u>Executive Summary</u> | 1 |
| II. <u>Introduction</u> | 2 |
| III. <u>New Aerial Photography</u> | 3 |
| IV. <u>Land-Use and Vegetation Analysis and Categories</u> | 4 |
| V. <u>General Observations</u> | 8 |
| A. <u>Semi-Urban Areas</u> | 8 |
| B. <u>Changes in Position of the River Channel and Other Hydrographic Features</u> | 8 |
| VI. <u>Further Interpretation</u> | 9 |

ACRONYMS AND ABBREVIATIONS

| | |
|-------|---|
| AID | U.S. Agency for International Development |
| ARD | Associates in Rural Development, Inc. |
| GSDR | Government of the Somali Democratic Republic |
| JESS | Jubba Environmental and Socioeconomic Studies |
| JuDAS | Jubba Development Analytical Studies |
| LRDC | Land Resources Development Centre |
| MJVD | Ministry of Jubba Valley Development |
| RMR | Resource Management and Research |
| USAID | U.S. Agency for International Development |

PREFACE

The Jubba Environmental and Socioeconomic Studies (JESS) are jointly funded by the Government of the Somali Democratic Republic (GSDR) and U.S. Agency for International Development (AID), project number 649-0134, and are part of a larger project, the Jubba Development Analytical Studies (JuDAS) project. Technical assistance and management for JESS are being provided to the Ministry of Jubba Valley Development (MJVD) by Associates in Rural Development, Inc. (ARD), of Burlington, Vermont, under AID contract number AFR-0134-C-00-5047-00.

This interim report on interpretation of new 1:10,000-scale aerial photographs taken by Resource Management and Research (RMR) in March 1987 is one of many working reports to be produced during Phase II of JESS, a two-year period of intense field studies. Mr. Eric Trump of RMR was employed on a subcontract basis to organize the photographs and interpret certain land uses in the Jubba Valley in order to compare current land uses to those found in previous aerial photographs of the valley. Mr. Trump arrived in Mogadishu on 22 March and departed on 6 May 1987.

During the course of his consultancy, Mr. Trump worked closely with Dr. R. Murray Watson of RMR and Dr. Ian Deshmukh, the JESS ecologist. He would like to acknowledge the assistance given him by MJVD, AID and ARD. Members of the JESS team were also very helpful and particular thanks go to the team leader, Dr. Gus Tillman, for the use of his office throughout the consultancy.

I. EXECUTIVE SUMMARY

The main objectives of this consultancy were to:

- interpret new aerial photographs of the Jubba Valley, and
- map the results at a scale of 1:50,000.

Land-use and vegetation categories were mapped, and the categories selected were compatible with those used in JESS aerial census work.

The new aerial photography was compared with 1983/1984 aerial photographs at 1:30,000 scale, and changes in land-use and vegetation noted. The position of the river channel was also compared in the two sets of photographs. Finally, the general status of semi-urban areas was compared in the two sets of photographs (the photo-interpretation consultant was assisted by the JESS socioeconomic team in this work). Unfortunately, the earlier 1960 aerial photographs were not available, and thus, required comparisons with this photography could not be made.

Comparisons between the 1983/1984 and 1987 aerial photography indicate that:

- urban areas have shown very little change in size, with the exception of Luuq;
- the destruction of trees is occurring at a rapid pace; and
- there have been no changes in the course of the Jubba River channel.

It should be noted that the final set of 1:50,000 land-use maps produced during this consultancy should be considered a separate annex to this report. They are being kept on record at the JESS offices in Mogadishu. Ultimately, they will form part of the data set for the JESS final reports.

II. INTRODUCTION

As part of JESS' ecological and socioeconomic studies, aerial photographs are being used for a variety of analyses. The use of past and current aerial photography, in combination with aerial census work and on-the-ground surveys of vegetation, wildlife and socioeconomic conditions, should provide a valuable data set for MJVD and other institutions to use in drawing conclusions for planning and development purposes. The integration of aerial photography into JESS' work program has been directed in the field by the team's ecologist, Dr. Deshmukh, who has worked closely with RMR and the photo-interpretation consultant.

Prior to his departure for Somalia, Mr. Trump visited the photo-processing laboratory in the United Kingdom where the new aerial photographs were being printed. He was able to advise the laboratory on the most suitable type of paper for the prints. Samples of the prints were checked at the laboratory and found to be of good quality. The completed prints were then collected and taken to Mogadishu.

III. NEW AERIAL PHOTOGRAPHY

The new aerial photographs are contact prints at 1:10,000 scale. Two sets of prints were delivered to JESS by RMR, and they were received unsorted and without an index from the photo-processing laboratory. The photography covers a two-kilometer strip on each side of the Jubba River, and each strip is the width of one photograph. There is adequate overlap forward and backward for stereoscopic use, and the river appears on one side of all but a very few photographs. This river border permits easy reference for print orientation.

Flight lines follow the course of the river, and this may cause slight difficulties in matching river bends to the map. The photographs are not numbered consecutively through the length of the river, and they have alphabetic prefixes, which are also not consecutive. It was necessary to construct an index to the photographs, which was done by inserting photo numbers on the margins of the master maps. This should assist in rapid location of the photographs.

Photo-interpretation lines and symbols have not been removed from one set of photographs, although this can easily be done using methylated spirits (alcohol) and cotton wool. Felt-tip pens are good for marking the photographs, but should be used with caution as some (or even some colors) are indelible. People working with the prints are urged to experiment with new felt markers in a lower corner to see if the marks can be removed.

It is recommended that the aerial photographs be kept in their boxes when not in use. A well-ventilated room is best for storage, preferably with air conditioning, at least some of the time. With proper treatment, the prints should last 30 years.

It is also recommended that one complete set not be used, but maintained as a master or reference set. One working set of prints should be sufficient for use by the JESS field team and photo interpreters.

IV. LAND-USE AND VEGETATION ANALYSIS AND CATEGORIES

The main objectives of this consultancy were interpretation of the new aerial photography and production of a land-use and vegetation map. The results could then be compared with previous aerial photographs taken in 1983/1984 and 1960. The categories to be interpreted and mapped were selected after several discussions with the JESS ecologist, Dr. Deshmukh, and Dr. R. Murray Watson of RMR. A major consideration was ensuring compatibility with the categories used in the JESS aerial census work.

The mapping scale of 1:50,000 necessitated the suppression of much of the detail visible on the 1:10,000 prints. Many readily observed and measurable features either cannot be mapped or are reduced to lines at 1:50,000 scale.

The base maps were photo enlargements of the standard 1:100,000-scale map sheets. Enlargement to 1:50,000 does not produce the ideal base map as all line work is disproportionately enlarged together with other unnecessary details. Draft map sheets have the new data plotted in red. Plotting from aerial photographs to maps was carried out by constructing proportional grids, and although somewhat laborious, the suppression of unwanted detail was accomplished at this stage. Detailed transfer was done with proportional dividers.

Table 1. Land-Use and Vegetation Categories

| <u>Symbol</u> | <u>Category</u> |
|---------------|--|
| AI | abandoned irrigation |
| AR | abandoned rain-fed cultivation |
| B | bush-land |
| BG | bushed grassland |
| BT | bush-land thicket |
| BU | burnt areas |
| C | rain-fed cultivation |
| CI, MA, CO | perennial rain-fed (citrus, mango, coconut) |
| F | forest |
| G | grassland |
| IC | irrigated cropland (annotated BA, bananas; SU, sugar; CI, citrus; RI, rice; PA, papaya) |
| RC | refugee camp |
| RCA | area affected by refugee camp |
| RFCD | receding flood crops--depression (dhesheeg) |
| RFCR | receding flood crops--riverbank |
| SD | sand dunes |
| W | woodland |
| WG | wooded grassland |

Abandoned Irrigation (AI)

This category includes areas that were formerly irrigated and are still readily recognizable, even though long abandoned. The layout of canals and general leveling of the area can often be observed. Extensive grasslands occupy most of these areas, although some have dense bush-land. Most of it could probably be rehabilitated.

Abandoned Rain-Fed (AR)

These areas are formerly cultivated rain-fed areas where woody regeneration is proceeding. This category frequently appears as scattered small patches that are not easily mapped at 1:50,000 scale.

Bush-Land (B)

Bush-land is characterized by shrubs of up to six meters in height and a canopy cover of more than 20 percent. Good grass cover may be present, and there are frequently tall emergent trees.

Bushed Grassland (BG)

Bushed grassland has grouped or scattered shrubs with a canopy cover of less than 20 percent.

Bush-Land Thicket (BT)

Bush-land thicket is an extreme form of bush-land, formed by a continuous, impenetrable stand of woody plants. There is no grazing in these areas.

Burnt Areas (BU)

Extensive areas had recently been burnt at the time of the 1987 photography. This would normally indicate good grass cover.

Rain-Fed Cultivation (C)

This category includes all land in the current rain-fed cultivation cycle, regardless of whether it is cultivated, fallow or recently cleared.

Perennial Rain-Fed (CT, MA, CO)

This component includes citrus (CI), mango (MA) and coconut (CO). Many of these crop areas are reduced to lines at 1:50,000 scale and, hence, are not readily mapped. They could be expressed as river lengths.

Forest (F)

Forest is defined as a closed stand of trees over seven-and-half meters in height. The Jubba Valley forests have now been reduced to scattered remnants, and considerable reduction has occurred since 1983/1984.

Grassland (G)

This category is dominated by grasses, and the canopy of trees and shrubs is less than two percent.

Irrigated Cropland (IC)

All irrigated cropland is included here, regardless of whether it is currently carrying a crop, fallow or recently prepared for irrigation. Large-scale bananas (ICBA), sugar (ICSU) and rice (ICRI) plantations fall in this category. Some citrus (ICCI) and papaya (ICPA) plantations are also mappable at 1:50,000.

Refugee Camps (RC) and Affected Areas (RCA)

The actual camp areas are outlined. The extent of the surrounding denuded areas is indicated if it falls within the two-kilometer strip, but extends well beyond the strip in most cases.

Receding Flood Crops--Depression (RFCD)

This category includes all "dhesheeg" cultivation, where the planting of crops follows closely on flood recession in depressions adjacent to the river that are filled by either over-bank flows or rains. Not all dhesheegs flood on a regular basis.

Receding Flood Crops--Riverbank (RFCR)

This category was established for compatibility with the JESS aerial census work. Although readily visible on the aerial photographs, this category proved to be not readily mappable at 1:50,000 scale and becomes only linear at this scale. This category could be expressed in river-length terms.

Sand Dunes (SD)

This category is necessary as the area surrounding the mouth of the Jubba River is mainly open sand dunes with sparse vegetation.

Woodland (W)

Woodland is defined as a stand of trees at least 18 meters in height. There may be shrubs interspersed with the trees. The canopy cover is greater than 20 percent, and grasses dominate the ground cover.

Wooded Grassland (WG)

Wooded grassland has grouped or scattered trees with a canopy cover of less than 20 percent.

V. GENERAL OBSERVATIONS

A. Semi-Urban Areas

The new aerial photographs of the semi-urban areas of Luuq, Buurdubo, Baardheere, Saakow, Bu'aale and Jilib were shown to the JESS socioeconomic team.

Comparisons with the 1983/1984 aerial photography indicated that:

- very little change in size had occurred in any of the semi-urban areas with the exception of Luuq, where considerable expansion to the south was noted; and
- much tree destruction had occurred in most areas.

During discussions, it was decided that selective enlargements of the new aerial photographs would be ideal for a detailed study of the semi-urban areas. Enlargements to a scale of 1:2,500 is recommended, and the socioeconomic team will delineate the areas required on photocopies of the aerial photographs. The new aerial photographs for the city of Kismaayo were also examined. These will facilitate detailed analytical work on the city and its environs.

B. Changes in Position of the River Channel and Other Hydrographic Features

Comparison with the 1983/1984 aerial photographs indicated that no changes in the position of the river channel have occurred during the intervening period. Most dhesheegs were dry and undergoing flood-recession cultivation during March 1987. At the time of the 1983/1984 photography, most dhesheegs were flooded.

VI. FURTHER INTERPRETATION

It was not possible to compare land-use, vegetation and hydrographic features with the 1960 aerial photography as this was not available in Mogadishu. It is recommended that access to the 1960 photo mosaics be arranged. They are now only available at the Land Resources Development Centre (LRDC) in London. Interpretation of these mosaics was carried out by Mr. Trump in 1985 for another project. A detailed comparison between the 1960, 1983/1984 and 1987 aerial photography is still deemed important for JESS.