Use of Photo Mosaics as a Base for Range Resource Inventory in the Hashemite Kingdom of the Jordan

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In the United States a topographic map is usually made from aerial photographs as a base for the type map and overlay used in range inventory work. Such a map produces an excellent base for the type map, field work and resulting management plan.

The range areas of Jordan are very flat, types are large and uniform, and there is no cadastral land survey. Small contour intervals would be needed on topographic maps, rendering costs excessive. Photographic mosaics were tested on a million acres and, for conditions existing in Jordan, were found to cost about one-tenth that of topographic maps. Since there is very little change in elevation there is slight vertical distortion on mosaics.

In the present program the entire range area totalling some 25 million acres will be covered by photo mosaics to provide base maps for range inventory and land classification work.

Specifications for Mosaic Production

An area showing high priority for range resource development was chosen for the test area. The following specifications were found to be satisfactory for mosaic production:

1. Vertical aerial photographs at 1:25,000 scales, with 9" x 9" format.
2. Lay-out to conform with the Palestine grid.
3. Sheet size, 60 cms. x 60 cms., without margin and butt joined.
4. Index sheet provided with scale of 1:1,000,000 showing the lay-out of the sheets in relation to the Palestine grid.
5. Sheets numbered by reference to the last three figures of the grid coordinates of the sw. corner of each sheet. Eastings followed by northings, for example, 315-155, etc.
6. Photographic mosaics constructed by mounting together separate photographs of the area. These were controlled for scale and orientation to 1:250,000.
7. Scale uniform throughout. Points of detail positioned as accurately as possible.
8. Registration of overlay provided by four crosses on each mosaic. These were positioned centrally so as to be 20 cms. apart and 20 cms. from the nearest edge of the mosaic sheet.

Information shown on each mosaic was as follows:

On the face of the mosaic:
1. Sheet number in top right hand corner and North arrow point in bottom righthand corner.
2. Main drainage lines of wadis (dry stream drainages), perennial rivers and streams with names. Annotation in black broken line  - - - - , printed so as to obscure the minimum detail.
3. Main roads shown as two solid lines _________ and desert tracks by black dotted line . . .
4. Villages with over 500 population shown as a cross-hatched area with name and symbol in black.

On the back of each sheet.
Main heading: “The Hashemite Kingdom of Jordan. Land classification Survey.”

Supplemental: Sheet number grid information, nine-sheet index, scale, location diagram, interpretation diagram.

Five copies of each sheet were printed on semi-matte, double-weight paper mounted on linen. The sheets prepared for the test area were not made to fold but subsequent contracts will specify two mounted linen copies to fold in quarters for field use. In addition, two non-folding unmounted copies are made as master copies of each sheet and printed on a non-distorting medium such as Pagra Bromide paper with aluminum base. All copies were specified to be of good uniform tone and quality. Registration between overlay and the master mosaic was not allowed to exceed 1 mm. between the center of two adjacent registration marks.

Specifications for Range Type Overlay

Transparent overlays corresponding with and fitting over each 1:25,000 mosaic sheet were made. Each type was identified by a range type number and shown by a continuous red line. The numbers used were standard range type numbers such as are used in the United States, except that different photographic patterns of the same type were designated by symbols A, B, C, etc. For example, Type 4 was separated into classes 4A to 4F.

These classifications or variations are not shown on the final type overlay. The ground inventory is used to determine differences in type designation. These variations in the photo interpretation key were shown because the overlays were to be made in London by draftsman unfamiliar with Jordan.1

A photographic interpretation key for range types was prepared

1. Aerial photographs shown in the Range Type Identification Key were taken by Hunting Aerosurveys Ltd., London, England.
Range Type Interpretation Key

**Type 1B. Grass Plain**

- **Land Form**: Flat or very gently rolling. Generally just above the level of wadis proper.
- **Aspect**: Grassland without much stone, although bands of stone may alternate with non-stony ones. Usually slight slope.
- **Vegetation**: Mainly perennial grasses, grasslike and herbs.
- **Aerial Photo Characteristics**: Medium grey tone, often with conspicuous reticulation indicative of banded structure referred to under aspect.

**Type 4A. Wadi Bottoms**

- **Land Form**: Bottoms of wadis level, often bordered by ridges formed by water flow.
- **Aspect**: Usually with good cover of perennial vegetation and little bare ground.
- **Vegetation**: Perennial herbs and shrubs.
- **Aerial Photo Characteristics**: Light tone, dotted, reticulate mottled with medium grey indicating presence of vegetation.

Data in the key as presented in this article cover only that portion of Jordan included in the test area of 1,000,000 acres. Types smaller than 100 acres were not shown on the type 1 overlay. Ground inventory crews change type designations, distinguish sub-types, and make corrections in location of type lines necessary.

**Major Regions of Jordan**

The country of Jordan is divided into seven major regions:

1. **Northern and Eastern Desert**
   - The largest uniform region of the country, comprising the great
Type 8 B. Lava (black)

Usually undulating, rarely level.

Bare, stony ground, usually entirely covered with stones up to 12 in. in diameter (seldom smaller than 3 to 4 in.).

Sparse, mainly annual herbs.

Dark grey with a coarsely mottled appearance. Lighter grey may occur: (1) where stones are small; (2) in the western parts of lava areas where higher rainfall results in lichen growth on stones.

Drainage: Many “mud pan” basins.

Type 8 C. Flint Desert

Gentle, undulating, never quite flat.

Bare ground covered with erosion pavement of angular shiny flints, often showing circular fractures.

Sparse, mainly annual herbs. Scattered perennials occur in drainage channels.

Dark to medium grey tone with drainage showing as pale grey lines.

Drainage: Very marked, well developed, making a fernlike pattern.

Type 11. Bare Ground (mud flat)

Low-lying flat areas or “mud pans.”

Bare, smooth, water-deposited, fine silty soil without stones.

None.

A region of sandstone mountains overlying granite with limited drainage. Considerable vegetation in the broad steep-sided wadis.

4. Wadi Araba and the Dead Sea

The escarpment area from the edge of the Jordan Plateau to the bottom of the Wadi Araba—Dead Sea geological rift which runs from the Gulf of Aqaba north to the Dead Sea.

5. Brush Vegetation

The western edge of the Jordan Plateau from Naqb Ishtar on the south to about Jiza on the north. Predominant vegetation consists of woody perennials and includes very little cultivated land.

2. Southeastern Sandstone Desert

A region of low rainfall and very limited vegetation. It is the only area in Jordan containing drifting sand. Conditions approach a real desert.

3. Southwestern Mountain Desert

A region of sandstone mountains overlying granite with limited drainage. Considerable vegetation in the broad steep-sided wadis.
Range Improvement and Management
Problems in Argentina

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Argentina is a land of paradox and inconsistency—old in its settlement, which predates the landing of the Pilgrims in New England by more than half a century, young in its stage of economic and agricultural development. It is a "white-man's country" both in climate and in population and the only part of South America with extensive fertile plains in the temperate zone (Whitbeck, et al. 1940). At least one-fourth of its more than one million square miles is a flat plain climatically suited to temperate-zone crops and livestock. This level plain, known as the Pampa, was once devoted entirely to Argentina's range livestock industry. Today, even though the Pampa still produces tremendous numbers of livestock, it is largely cultivated. A high percentage of the range sheep and wool are produced in Patagonia, the southerly plateau section of the country.

Beef cattle, mutton sheep, dairy and swine production are concentrated in the plains section. The higher, more arid portion, Patagonia, is better adapted to wool production. Many problems of grazing land and livestock management challenge the present-day range-livestock operator in Argentina.

The Pampa
Originally a grassy, level plain but now largely plowed and subject to some degree of cultivation, the Pampa is by far the most important region of Argentina. It is the heart of Argentina. The Pampa extends for some 500 miles north and south between the 30th and 40th parallels and reaches westward 400 miles in its broadest extremity from the Atlantic Ocean (Fig. 1). The level land so characteristic of the Pampa continues beyond the western boundary but the grass cover gives way to the xerophytic vegetation of the "monte" or brushland.

This vast area of fertile loess soil enjoys mild, temperate but irregular climate. Rainfall decreases from east to west and from north-east to southwest. For example, the city of Buenos Aires receives 1000 mm. of rain annually on the average, but only half that amount occurs in the southwestern part of the province. Rainfall occurs on 50 to 80 days annually, but these are poorly distributed. The summer months, January and February, are critical and in a dry year total annual rainfall may not equal one month's precipitation in a wet year. The average annual temperature for the province ranges from 13 to 17 degrees C. Prevailing wind, called "Pampiana," from the southwest is cool and dry.

Present-day grazing in the Pampa is largely by beef and dairy cattle and mutton-type sheep on artificial pastures or cereal crop rotations used in their establishment. Swine production, although correlated with dairying, has not yet taken full advantage of forage grazing possibilities. Both beef and dairy production are based entirely on grazed herbage. Steers of beef and dairy breeds are carried