AREA SAMPLING FRAME CONSTRUCTION FOR AN AGRICULTURE INFORMATION SYSTEM WITH LANDSAT-II DATA

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Submitted by:

William H. Wigton
Mathematical Statistician
New Sample Survey Techniques
USDA - Statistical Reporting Service
Washington, D.C. 20250

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16. Abstract

Included in this report is a list of Landsat images of Nicaragua, and an evaluation of each. We don't have complete coverage, but it is enough to start. An analysis plan is specified that will make use of CCT's. This procedure will improve an existing area frame.

To use LANDSAT data only to develop an area frame would require imagery with resolution to find field boundaries and small reads. This will be difficult in most areas for LANDSAT I or II imagery.

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IMAGERY

The following images have been received and reviewed. Most images have serious cloud problems. In most of Central America the winter months are the only months where it is possible to get cloud free imagery, but even then a cloud-free image is rare. We can piece images together, but still we do not have total country coverage. The following images are available so far.

LANDSAT I IMAGERY OF NICARAGUA

Number	Scene ID	Date	Clouds	70mm Center Coordinates	
1	1154-15385	Dec. 24, 1972	20%	N12-27	W86-54	1/2 image good,clouds & water
2	1154-15391	Dec. 24, 1972	10%	N11-30	W87-15	1/8 image good,water
3	1190-15391	Jan 29, 1973	5%	N11-40	W87-12	1/16 image good,water, clouds
4	1243-15335	Mar. 23, 1973	15%	N11-38	W85-59	5/8 image good water, clouds
5	1514-15354	Dec. 19, 1973	5%	N13-01	W86-59	Good image
6	1514-15361	Dec. 19, 1973	0%	N11-35	W87-19	1/16 image good,water
7	1585-15283	Feb. 28, 1974	15%	N11-41	W85-40	4/8 image good,water
8	1585-15290	Feb 28, 1974	5%	N10-15	W86-06	2/8 image good, water
9	1586-15335	Mar. 1, 1974	15%	N13-06	W86-51	3/4 image good, clouds
10	1586-15341	Mar. 1, 1974	0%	N11-41	W87-11	1/8 image good, clouds
11	1602-15284	Mar. 18, 1974	50%	N10-18	W84-44	1/2 image good, clouds
12	1603-15284	Mar. 18, 1974	20%	N10-17	W86-07	1/4 image good, water, clouds

LANDSAT II IMAGERY OF NICARAGUA

1	2023-15215	Feb. 14, 1975	60%	N11-32	W85-41	not useful
2	2024-15271	Feb. 15, 1975	20%	N12-58-	W86-48	1/4 useful, clouds
3	2040-15160	Mar. 3, 1975	50%	N11-36	W84-14	not useful, clouds
4	2058-15150	Mar. 21, 1975	50%	N14-26	W83-29	not useful, clouds
5	2060-15263	Mar. 21, 1975	20%	N14-24	W86-26	1/2 image good, cloud puffs
6	2060-15270	Mar. 21, 1975	30%	N12-57	W86-44	1/2 image good, haze

LANDSAT II IMAGERY OF NICARAGUA

Scene ID	Date	Clouds	Center Coordinates	Comments
2022-15163	Feb. 13, 1975	50%	N13-09 W84-36	Parts useful, water, clouds
2023-15215	Feb. 14, 1975	95%	N11-32 W85-41	Not useful
2024-15271	Feb. 15, 1975	50%	N12-58 W86-48	Parts useful
2040-15145	Mar. 3, 1975	40%	N15-56 W86-	Not useful, water and clouds
2040-15151	Mar. 3, 1975	90%	N14-30 W83-32	Not useful
2040-15154	Mar. 3, 1975	2%	N11-29 W87-06	Not useful, hase (water 80%)
2040-15160	Mar. 3, 1975	80%	N11-36 W84-14	Not useful, cotton puffs (clouds)
2040-15163	Mar. 3, 1975	40%	N10-09 W84-34	Parts useful
2041-15212	Mar. 4, 1975	30%	N11-36 W85-23	Not useful, clouds
2041-15215	Mar 4, 1975	90%	N13-02 W85-20	Not useful, cotton puffs (clouds)
2043-15325	Mar. 6, 1975	0%	N12-56 W88-13	Parts useful, mostly water
2058-15144	Mar. 21, 1975	30%	N12-57 W86-44	Not useful, water, clouds
2058-15150	Mar. 21, 1975	90%	N14-26 W83-29	Not useful, cotton puffs (clouds)
2058-15153	Mar. 21, 1975	90%	N12-58 W83-50	Not useful
2058-15162	Mar. 21, 1975	35%	N10-05 W84-31	Parts useful, some clouds
2060-15263	Mar. 23, 1975	40%	N14-24 W86-23	Parts useful
2060-15270	Mar. 23, 1975	30%	N12-57 W86-44	Useful, some haze and clouds
2060-15272	Mar. 23, 1975	2%	N11-29 W87-06	Not useful, Haze (water 80%)
2061-15324	Mar. 24, 1975	90%	N12-58 W88-12	Not useful, open water and clouds
2077-15211	April 9, 1975	85%	N12-58 W85-23	Not useful, clouds

2077-15214	April 9, 1975	30%	N11-32	W85-44	Useful in parts
2078-15263	April 10, 1975	50%	N14-20	W86-30	Not useful
2078-15270	April 10, 1975	20%	N12-54	W86-51	Useful (good frame)
2078-15272	April 10, 1975	30%	N11-29	W87-11	Not useful, open water and clouds

ANALYSIS

As an initial step, I have ordered a color composite enlargement of frame 1514-15354 and an enlargement of bands 5 and 7. These enlargements will enable us to study what needs to be done to utilize LANDSAT data to build a frame. Several members of SRS-USDA will be in Nicaragua this month and at that time we can check coverage and specify details of the project.

FUTURE WORK

The CCT's will be ordered for the provience of Masaya. Ground enumeration data will be available for training so the whole area can be classified into crop types. Once this is done, software can be used to select areas. These areas can be grouped into homogeneous groups. This can be done with existing software.

One possible way it could work is to:

1. Divide the total area into N blocks of land.
2. Digitize these blocks on quadrangle maps.
3. Classify these areas and obtain the results.
4. Group the areas into homogeneous groups.
5. Use these homogeneous groups as strata for sample selection.

SOFTWARE

In-house software programs and documentations are available so that areas on a map can be digitized and registered to latitude and longitude. Also, LANDSAT data can be registered with in-house software to longitude and latitude. This means that digitized boundaries of fields can be changed to ID coordinates to be used as training data.

This entire process is also available on the ARPA Network through the Center for Advanced Computation (CAC) and University of Illinois, Champaign-Urbana. Total documentation is available for that also.