

APPLICATION OF LANDSAT TM 5 IMAGES TO SUPERVISED AND NON-SUPERVISED CLASSIFICATIONS IN THE NORTHEASTERN REGION OF ARGENTINA (SOUTH AMERICA). CREATING PROXIES TO AUTOMATIC NATURAL RESOURCES MONITORING IN MID-DETAIL SCALES

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This paper deals with Landsat TM 5 satellite images. They were employed in supervised and non-supervised digital automatic classifications. Several algorithms were used as well as several common programs, commonly related to many digital image process works. Our study testing area was located at the east side of the inter-tropical latitude of Chaco Province which was early deforested on XIX and XX centuries. So, this area embraces about 7.000 km². Large sectors of soya bean, indian corn, sugar-cane, lucerne, vegetables and extensive cotton agriculture commodities are the principal resources for men there. Training sites were defined and distinguished among natural and anthropic ones. Ten classes were finally adopted after many test performing with 6, 7, 8, 9, 10, 11, 12, 13 and 14. The images employed were Landsat TM 5 226/79 and 227/79. The images were acquired at the wet period March (summer). These serve us in order to largely improve contrast between landscape elements. Previous field recognition of the area was done and it results very helpfully during computational works. Several algorithms were used. K-means, IsoData (non-supervised), Maximum Likelihood, Improved Maximum Likelihood and Neural Net Analysis (supervised). In order to improve the result we used automatic post-processes algorithms too. A good discrimination was observed in cattle-rising activities and forest units as well as deforested sectors. Incipient erosion processes of desertification and soil degradation was determined. Water bodies as well as the newest incipient reorganization drainage system (starting on 3,000 to 6,000 years B.P.) were clearly remarked. Mangroove forests follows joint to small rivers were outstandingly outlined by automatic process. Main elements of geomorphology were appropriately appointed too. Special discrimination was performed into floodable areas related to rainy periods. The final cartography were plotted and compared with false colored compositions 4/5/3. Once we have spectrally characterized our primary testing region, then we extrapolated algorithms to north and south adjoining region (embedded into the same scenes). The geomorphologic landscape is equal in these areas because they constitute the same morphological unit. We found that the proxies used in the pilot area result clearly positive using the same parameters into the north and southwards areas. However, and this point is crucial, we tested that the last general rain was uniform in all the area. The method results of great utility to peer rural land management. The scales that varying about of 1:75.000 up to 1:100.000 -according to the pixel spatial resolution of Landsat TM 5 sensors- have resulted very appropriate in supervised and non-supervised classifications at east inter-tropical Argentina region. All the algorithms used showed adequate resolution and class discrimination. Neural net algorithm analysis gave best results in these tests.