Landuse Classification For Tsukuba Central Area: A Supervised Alos Avnir-Data Approach

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1. **Introduction** : Scientific pattern recognition continues to grow in usefulness as more and more satellite data sources emerge. One such available data is the 4-band ALOS AVNIR data from JAXA. This work aims at utilising this 15m-resolution data to carry out a supervised land use classification for the Tsukuba central-east area using GPS-collected ground truth data.

2. **Methodology** : 98 GPS ground truth points were collected from the Sakura, Tsukuba Centre and Tsukuba University areas that were used to train a set of signatures for 4 land use categories. Figure 1 shows the study area extent and distribution of the ground truthing data
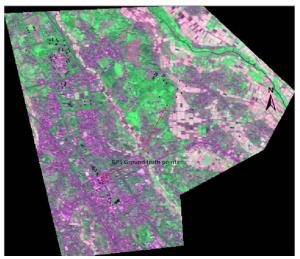

Figure 1 Tsukuba centre & sakura study area and GPS points

collected. A supervised classification was run in Erdas Imagine 9.1 and accuracy assessment done using 100 equalized random points with Google earth reference data.

3. **Results and Discussion:** Figure 2 shows the results of the classification process and the 100 random reference points. Slightly over 50% of the study area is built-up. And as expected much of the agricultural land is located in the Sakura region and occupies 26% of the area. Grassland/Park and forested area occupy 11 and 13% respectively.

Overall accuracy assessment is 79% with a statistical Kappa value of 0.72. Table 1 below shows the breakdown of the classification
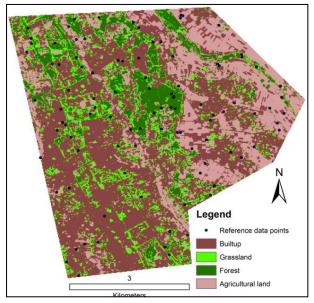

Figure 2 Land use classifications for Tsukuba centre & Sakura area

accuracy assessment. Generally the producers' accuracy is satisfactory and so too is the users' except for grassland. This can be attributed to confusion between green rice fields and plain grass as their reflective signatures are almost the same and the classification procedure could not tell them apart. The absence of bands 5 and 6 in the ALOS AVNIR data also plays a negative role in the final accuracy as they are important in classifying and analyzing vegetation stress.

4. **Conclusion:** Further work needs to be done to establish the impact of the absence of bands 5 to 7 in the ALOS AVNIR data on the overall classification procedure as the number of layers in an Erdas Imagine classification influences the overall quality of the procedure.

Table 1 Classification acuracy assessment results					
Class Name	Reference Totals	Classified Totals	Number Correct	Producers Accuracy	Users Accuracy
Builtup	29	25	23	79.31%	92.00%
Grassland	22	25	16	72.73%	64.00%
Forest	20	25	19	95.00%	76.00%
Agriculture	29	25	21	72.41%	84.00%
Totals	100	100	79		