# **Remote land survey**

#### Image enhancement III.

### Idrisi Taiga: vegetation indices

| Image Processing           | Reformat I    | Data Entry | Window List |
|----------------------------|---------------|------------|-------------|
| Restoration<br>Enhancement |               | ; 1        | <u>•?</u> • |
| Transformation             |               | •          | PCA         |
| Fourier Analysis           |               | •          | CCA         |
| Signature Development      |               | •          | TSA         |
| Hard Classifiers           |               | •          | COLSPACE    |
| Soft Classifiers /         | Mixture Anal  | ysis 🕨     | TEXTURE     |
| Hyperspectral Ir           | nage Analysis | i 🕩 🚽      | THERMAL     |
| Accuracy Asses             | sment         | •          | VEGINDEX    |
|                            |               |            | TASSCAP     |

choice

index



## Idrisi Taiga: TASSCAP module

(menu Image Processing / Transformation) calculates indices depending on vegetation biomass and moisture conditions, the result is several images: "Brightness" showing soil reflectance, "Moistness" humidity and "Greenness" is referred to asGreen Vegetation Index(Green Vegetation Index, GVI) and shows the vegetation cover

| TASSCAP - tassle        | ed cap transformation |        | the sensor from which the   |
|-------------------------|-----------------------|--------|-----------------------------|
|                         | O MSS                 | C ETM+ | <br>used images come        |
| Band 1 :                |                       |        |                             |
| Band 2 :                |                       |        |                             |
| Band 3 :                |                       |        | individual input channels   |
| Band 4 :                |                       |        |                             |
| Band 5 :                |                       |        |                             |
| Band 7 :                |                       |        |                             |
| Output prefix (can incl | lude path) :          |        | <br>entering an overlay for |
|                         | )K Close              | Help   | emerging images             |

## **Perpendicular Vegetation Index**

$$PVI = (PED - RED)_2 + NIR_{Mr} - NIR_{in})^2$$





## Idrisi Taiga: PVI

| Vegtation Index type:   | Red band:   | broo. tm-190-26-5. band3                   |        |
|---|---|--|--------|
| C Ratio   |   | Joine_un-100-20-0_bando                    |        |
|   | Infrared band:  | brno_tm-190-26-5_band4                     |        |
| C NBVI  | Output image:   |  | 12     |
| C TVI   |   | 1. Level                                   |        |
| C CIVI  |   |  |        |
| C TIV   |   |  |        |
|   |   |  |        |
| PVI     PVI   | Determination of the slo  | pe and intercept varies with the index. (  | Check  |
|   | Determination of the slo<br>HELP for details.   | ppe and intercept varies with the index. ( | Check  |
| © PVI<br>C PVI<br>C PVI2<br>C PVI3  | Determination of the slo<br>HELP for details.   | ppe and intercept varies with the index. ( | Check  |
| © PVI<br>C PVI<br>C PVI2<br>C PVI3<br>C DVI   | Determination of the slo<br>HELP for details.   | ope and intercept varies with the index. ( | Check. |
| © PVI<br>C PVI2<br>C PVI3<br>C DVI<br>C AVI   | Determination of the slo<br>HELP for details.   | pe and intercept varies with the index. (  | Check  |
| © PVI<br>C PVI2<br>C PVI3<br>C DVI<br>C AVI<br>C SAVI   | Determination of the slo<br>HELP for details.   | pe and intercept varies with the index. (  | Check  |
| © PVI<br>C PVI2<br>C PVI3<br>C DVI<br>C AVI<br>C SAVI<br>C TSAVI1   | Determination of the slo<br>HELP for details.   | ope and intercept varies with the index. ( |        |
| PVI     P | Determination of the slo<br>HELP for details.   | ope and intercept varies with the index. ( |        |
| PVI     PVI2     PVI3     DVI     AVI     SAVI     SAVI     TSAVI1     C TSAVI2     C MSAVI1     C MSAVI1   | Determination of the slo<br>HELP for details.<br>Intercept of the soil line:<br>Slope of the soil line: | ope and intercept varies with the index.(  |        |

to obtain these quantities we need to calculate a linear regression of pixels representing bare soil in the red and infrared bands

 NDVI calculation where we identify bare soil pixels (probably negative values)

2) On-screen digitization of points representing bare soil (at least 50 points covering soil variability - color, moisture...)



create delete save

| Digitize  | vector layers  |
|---|--|
| Name of layer to be created :<br><br>Symbol file for display :<br>Qual<br>Data Type<br>Integer Real | <ul> <li>Laver Type</li> <li>Point</li> <li>C Line</li> <li>Polygon</li> <li>Text</li> </ul> |
| ID or Value : 1<br>OK Close   | Flood Polygon  |

name created

#### 3)Converting a vector layer of points to a raster with the RASTERVECTOR module (Reformat menu)

|                                   | © Raster to vector           |                     |
|-----------------------------------|------------------------------|---------------------|
| Conversion option                 |                              |                     |
| Point to raster                   | C Line to raster             | C Polygon to raster |
| Vector point file :               | [                            |                     |
| Image file to be updated :        | Ī                            |                     |
| Operation type                    |                              |                     |
| Change cells to record the ide    | ntifiers of points           |                     |
| C Change cells to record the free | quency of points             |                     |
| C Change cells to record the pre  | sence of 1 or more point     | \$                  |
| C Change cells to record the sur  | n of the identifiers of poir | nts                 |

the resulting image (the "enhanced" one)

the file from which the image parameters are to be copied (e.g. NDVI)

R/V, V/R transfer options

vector file name

raster file to be "enhanced" after entering a new name, the INITIAL module will be started

| 📰 INITIAL - image initializati | ion                |      |   |
|--------------------------------|--------------------|------|---|
| Copy spatial parameters from   | n another image    |      |   |
| C Define spatial parameters in | dividually         |      |   |
| Output image:                  |                    |      |   |
| Image to copy parameters from: |                    |      |   |
| Output data type:              |                    | byte | • |
| Initial value:                 |                    | 0    |   |
| Ou                             | tput documentation |      |   |
| ОК                             | Close              | Help |   |

4) Extraction of values from RED and NIR bands, EXTRACT module (GIS Analysis / Database Query menu), you need to create 2 files, for each band separately

| EXTRACT - attribute value                                | es extraction   | 📧 🔑 defining raster (just  |
|--|---|--|
| Feature definition image:                                |   | created with points)   |
| Image to be processed:                                   |   |  |
| Summary type:<br>Min<br>Max<br>Total (sum)<br>Average    | <ul> <li>Range</li> <li>Population standard deviation</li> <li>Sample standard deviation</li> <li>All listed summary types</li> </ul> | the image from which the<br>information is to be obtained<br>(RED, NIR channels) |
| Output type:<br>Attribute values file:<br>Tabular output | Dutput documentation  | the name of the creation   |
| OK   | Close Help  | attribute file   |

5) Regression calculation by the REGRESS module (GIS Analysis / Statistics menu), PVI requires values from the NIR band as an independent variable

| REGRESS - regression                         | analysis                                   |   |                        |
|--|--|---|------------------------|
| File type:<br>C Image files                  | <ul> <li>Attribute values files</li> </ul> |   | , independent variable |
| Independent variable:<br>Dependent variable: |  |   | dependent variable     |
| ОК   | Close Help                                 | ] |                        |

6) Substitution of values to calculate PVI in the VEGINDEX module