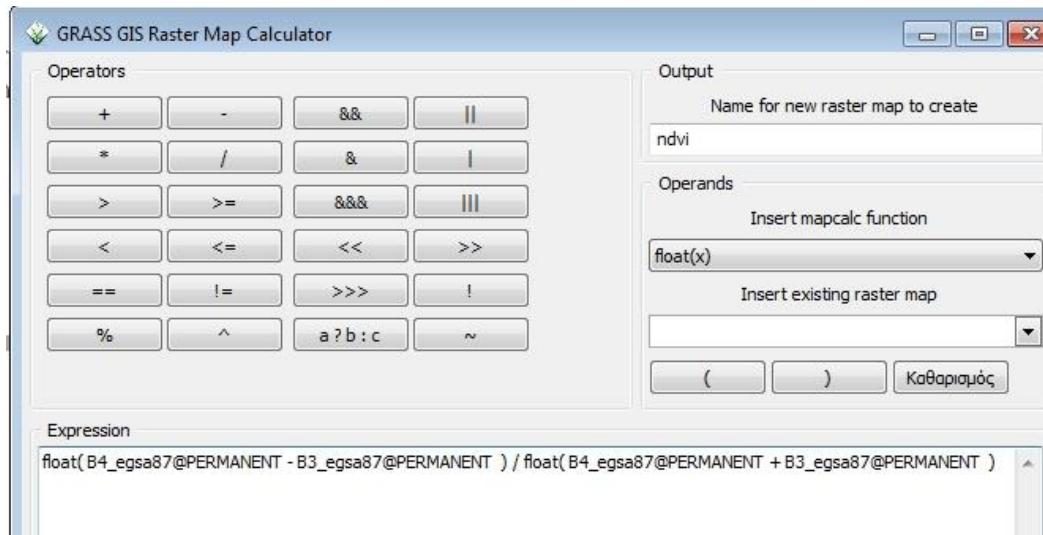


## ΠΡΑΞΕΙΣ ΕΙΚΟΝΩΝ

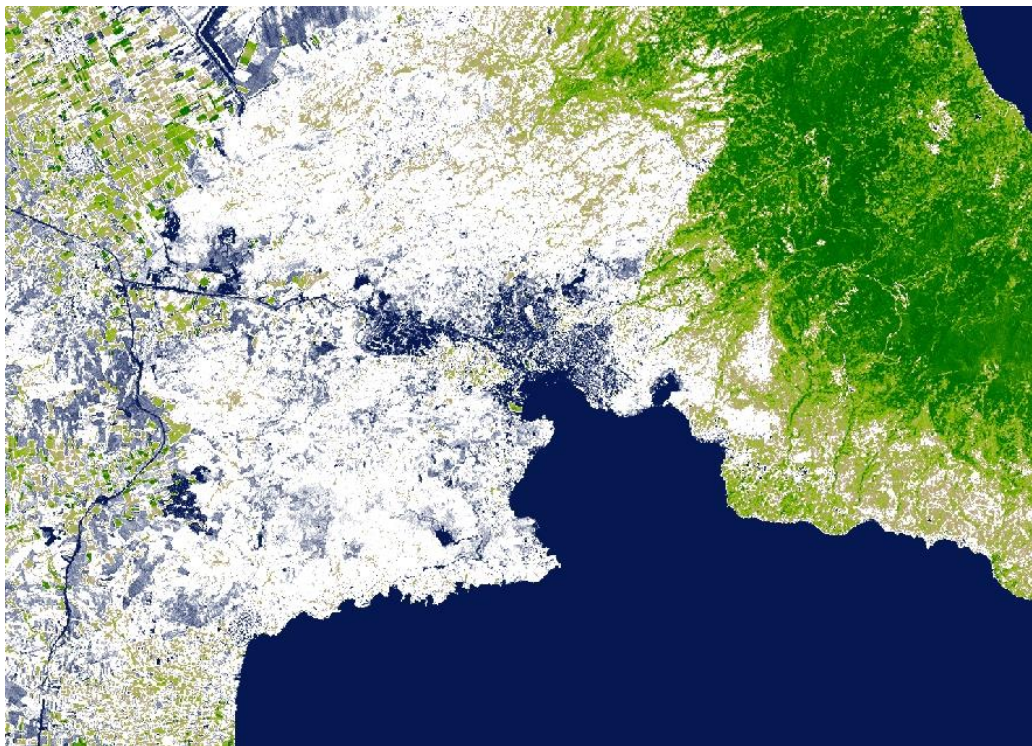
### 1) ΔΕΙΚΤΕΣ ΒΛΑΣΤΗΣΗΣ

#### Δημιουργία δείκτη βλάστησης – NDVI- σε δορυφορικές εικόνες Landsat TM

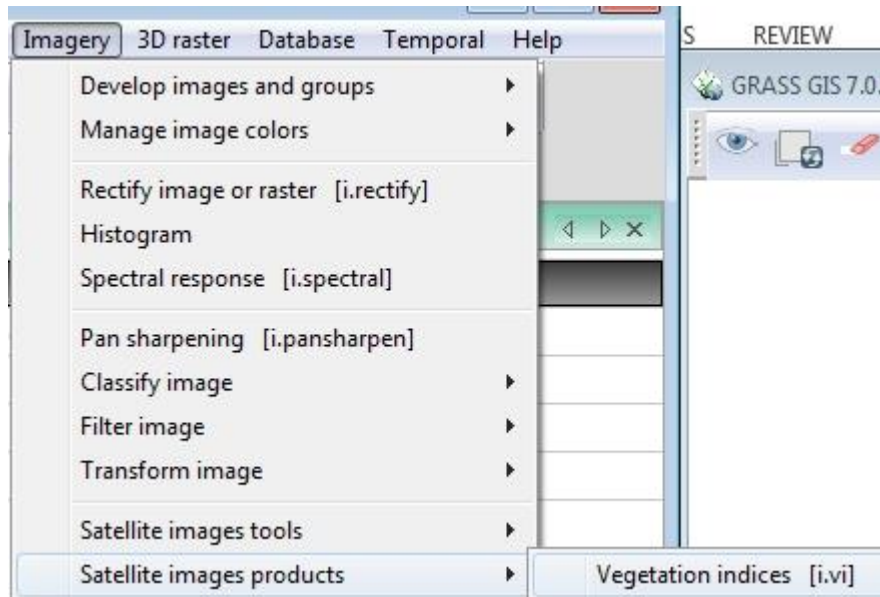
Επιλέξτε: Raster – Raster map calculator. Χρησιμοποιείστε την έκφραση «B4-B3/B4+B3». Για να έχετε πραγματικές τιμές βάλτε την function **float ()** στον αριθμητή και παρονομαστή.



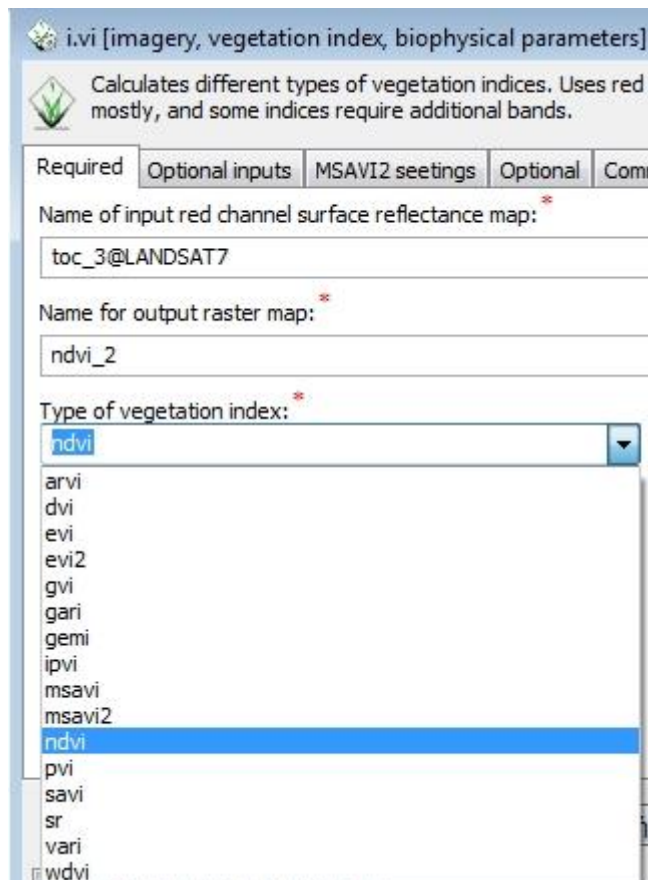
Στην τελική εικόνα βάλτε στο “set color table” την επιλογή NDVI.



**Εναλλακτικά** για τον υπολογισμό δεικτών βλάστησης επιλέγετε από το μενού: “Imagery – Satellite images products-Vegetation indices”



Εισάγετε το κανάλι στο κόκκινο (τιμές ανάκλασης στο έδαφος) και επιλέγετε τον δείκτη βλάστησης.



## 2) ΑΛΛΟΙ ΔΕΙΚΤΕΣ

### **Normalized Difference Water Index – NDWI**

This index is useful in mapping the water areas, displaying the differences in turbidity and vegetal content of the water, erratic soil or in measuring the water content of the vegetation. This index uses green spectral bands and near infra red (increases the spectral feedback of the soil humidity, of the rocks and plants and the water begins to absorb radiation from the surface layer). The dark color (values close to -1) represent the water crystal, the light color (values close to +1) represent dry land and intermediate colors (values close to 0) represent lands with intermediate humidity content. The formula for calculating this index is:

$$NDWI = (NIR - G) / (NIR + G) = (B4 - B2) / (B4 + B2)$$

### **Normalized Difference Moisture Index – NDMI**

Using this index the light colors represent excess of humidity and dark colors represent low humidity. It evaluates the different content of humidity from the landscape elements, especially for soils, rocks and vegetations (excellent indicator for dryness). Values higher than 0.1 are symbolized by light colors and they signal high humidity level. Low values (close to -1) symbolized by dark colors represent low humidity level. The formula for calculating this index is:

$$NDMI = (NIR - IR) / (NIR + IR) = (B4 - B5) / (B4 + B5)$$

### **Normalized Difference Burning Ratio – NDBR**

This index uses the bands where the spectral answer of non incendiary vegetation (near infrared) and incendiary ones (medium infrared) are the most visible. The difference in reflectance symbolizes the presence of chlorophyll before arson, and the lack of it after arson. The light colors (above 0.1) represent the lands with high risk of arson (woods, dry bushes) and the dark colors represent the lands without risk of arson (buildings made of stone or concrete, highways or roads, railroads etc.). The formula for calculating this index is:

$$NDBR = (NIR - MIR) / (NIR + MIR) = (B4 - B7) / (B4 + B7)$$

### **Normalized Difference Building Index – NDBI**

Using this index the light colors represent tilled land and building areas and dark colors represent forests. The values of NDBI vary according to the spectral signature from medium infra red and near infra red band. Light colors (positive values) symbolize lands with buildings and dark colors (negative values) symbolize other landscape elements. It is useful in mapping human settlements but also some elements of surrounding constructions. The formula for calculating this index is:

$$NDBI = (IR - NIR) / (IR + NIR) = (B5 - B4) / (B5 + B4)$$

## ΑΣΚΗΣΗ

Βάσει της παρακάτω περιγραφής δημιουργήστε λόγους καναλιών για τον εκτοπισμό:

- Αστικής έκτασης
- Οδικό δίκτυο
- Δασικών εκτάσεων & καλλιεργούμενων εκτάσεων

Χρωματίστε ανάλογα τις τελικές εικόνες για τον εύκολο εντοπισμό των χρήσεων/καλύψεων γης.

## ΛΟΓΟΙ ΚΑΝΑΛΙΩΝ LANDSAT 4-5-7

**TM3/TM4:** This ratio has defined barren lands and urban area uniquely. But it could not define water body, forests and croplands.

**TM4/TM3:** This ratio distinguished vegetation, water and croplands. It has enhanced forests, barren lands. Because forests or vegetation exhibits higher reflectance in near IR region (0.76 -0.90u m) and strong absorption in red region (0.63-0.69u m) region. This ratio uniquely defines the distribution of vegetation. The lighter the tone, the greater the amount of vegetation present.

**TM5/TM7:** This ratio separated land and water uniquely. Since soils exhibit strong absorption in the band 7 (2.08 -2.35u m) and high reflectance in band 5 (1.55 - 1.75u m), soil has been enhanced in this ratio. Land has appeared as lighter tone and water appeared as dark tone.

**TM2/TM3:** this ratio has distinguished croplands, barren lands sharply. But it hasn't separated croplands, forests and water body. Both forests and water body has appeared as lighter tone and barren land appeared has dark tone. It did not enhance urban area. Chlorophyll has strong reflectance in the band 2 (0.52 -0.60u m) region and strong absorption in the band 3(0.63 -0.69u m) region, vegetation has appeared as higher tone.

**TM3/TM2:** This ratio has separated forests and croplands. Because band 3 (0.63-0.69m m) is the red chlorophyll absorption band of healthy green vegetation and band 2 (0.52-0.69m m) is the reflectance band from leaf surfaces. This ratio can be useful to discriminate broad classes of vegetation. Croplands have appeared as lighter (brighter) tone and forests appeared as dark tone.

**TM3/TM5:** This ratio enhances barren lands, highways, street patterns within the urban areas and urban built-up or cemented areas. It could not enhance the clear water but it enhanced turbid water. This ratio is useful for observing differences in water turbidity. Barren lands, highways, urban and built-up areas have appeared as lighter tone and forests, water body and croplands appeared as dark tone.

**TM7/TM2:** This ratio has separated forests and croplands. But it could not separated forests from water body; both features have appeared as dark tone. It enhances highways, urban and built-up areas and croplands and all of them have appeared as lighter tone.