

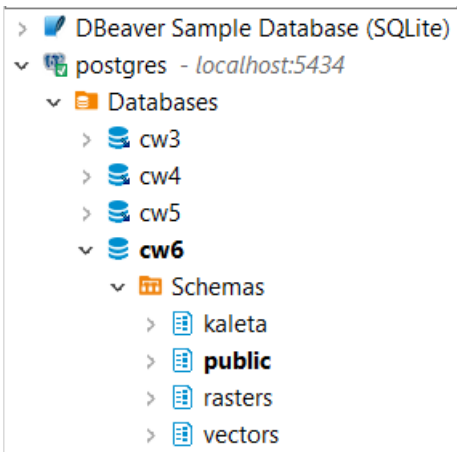
Nowa baza danych

```
create database cw6;  
CREATE EXTENSION postgis_raster CASCADE ;
```

```
C:\Program Files\PostgreSQL\16\bin>pg_restore.exe -d cw6 -p 5434 -U postgres -Fc -v C:\cw6\postgis_raster.backup
```

Struktura bazy danych

```
ALTER SCHEMA schema_name RENAME TO kaleta;
```



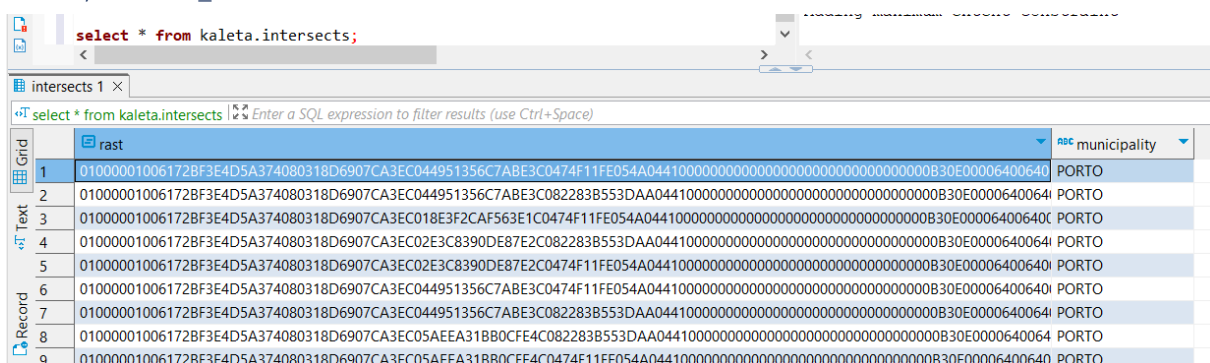
Ładowanie danych rastrowych

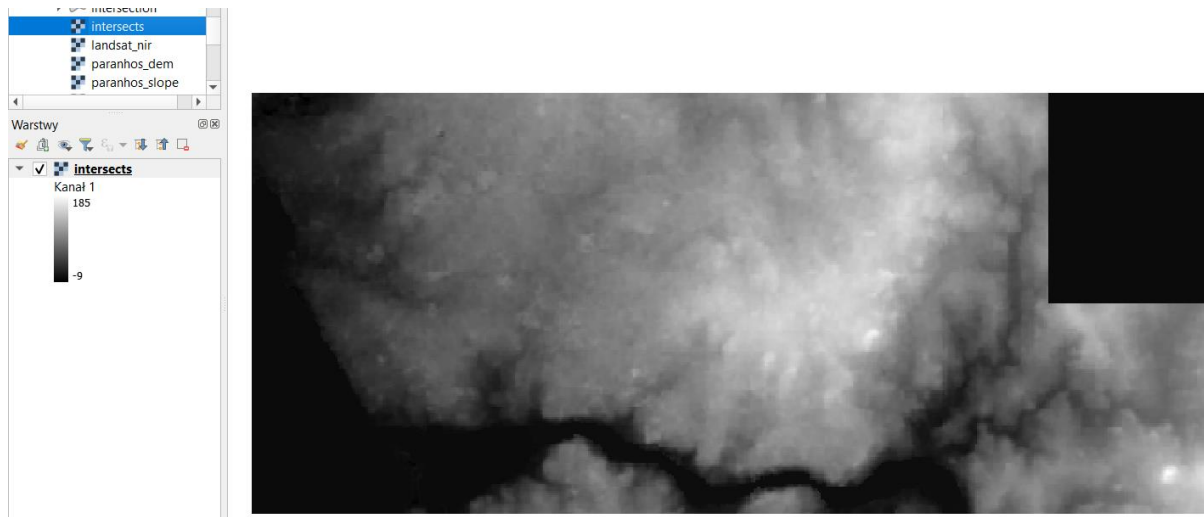
```
C:\Program Files\PostgreSQL\16\bin>raster2pgsql.exe -s 3763 -N -32767 -t 100x100 -I -C -M -d C:\cw6\srtm_1arc_v3.tif rasters.dem |
psql -d cw6 -p 5434 -h localhost -U postgres
Processing 1/1: C:\cw6\srtm_1arc_v3.tif
```

```
C:\Program Files\PostgreSQL\16\bin>raster2pgsql.exe -s 3763 -N -32767 -t 128x128 -I -C -M -d C:\cw6\Landsat8_L1TP_RGBN.tif rasters.landsat8
| psql -d cw6 -h localhost -U postgres -p 5434
```

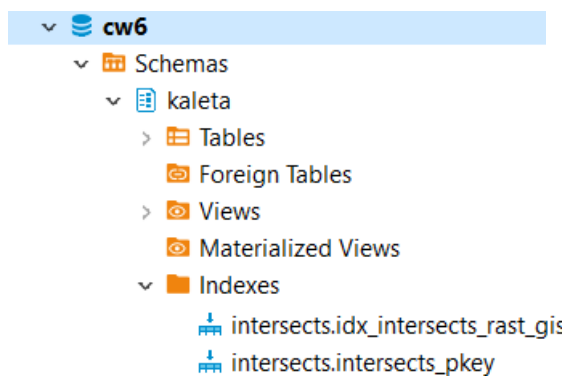
Tworzenie rastrów z istniejących rastrów i interakcja z wektorami

Przykład 1- ST_Intersects





Dodanie pkey, idx przestrzennego oraz raster constraints

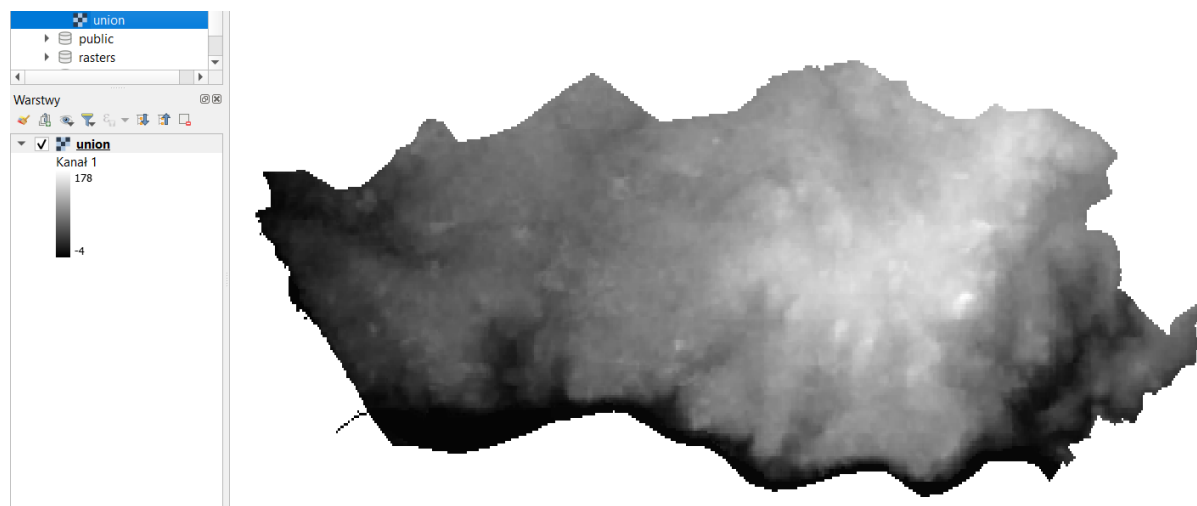
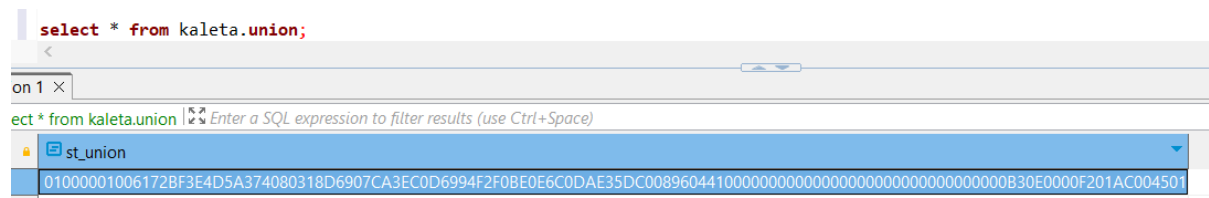


Przykład 2- ST_Clip

[illegible]



Przykład 3- ST_Union



Przykład 3- ST_Tile

[illegible]

Konwertowanie rastrów na wektory (wektoryzowanie)

Przykład 1- ST_Intersection

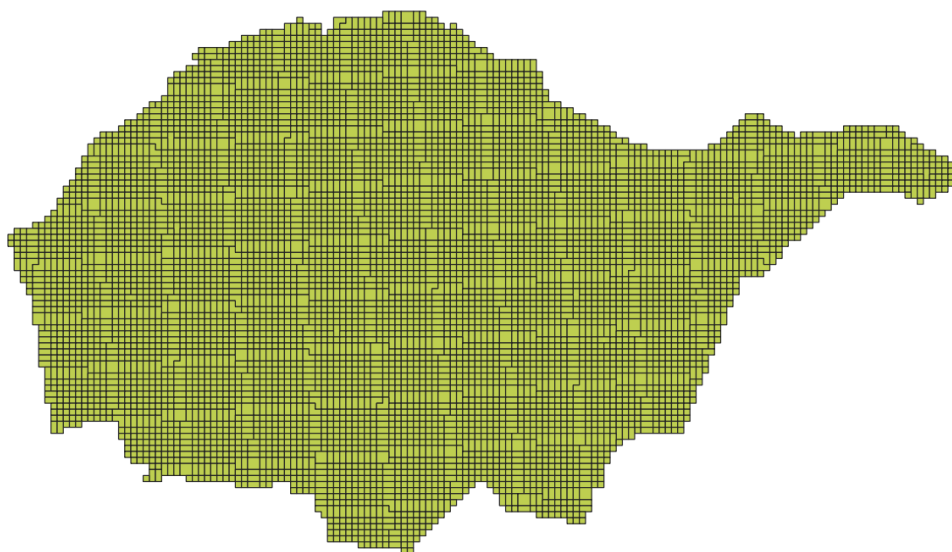
```
b select * from kaleta.intersection;
```

Intersection 1 X

```
select * from kaleta.intersection | Enter a SQL expression to filter results (use Ctrl+Space)
```

	123 rid	geom	123 val
1	221	POLYGON ((-39604.86528035818 168624.02902255123, -39633.58795484908 168624.02902255123, -39628.6628 168626.5004, -39604.86528035818 168624.02902255123))	10,648
2	221	POLYGON ((-39574.553878279854 168624.02902255123, -39604.86528035818 168624.02902255123, -39604.86528035818 168629.03306, -39574.553878279854 168624.02902255123))	12,155
3	221	POLYGON ((-39786.73369282809 168594.3232286338, -39794.43786661896 168594.3232286338, -39786.73369282809 168595.42423341, -39786.73369282809 168594.3232286338))	9,248
4	221	POLYGON ((-39756.442229074977 168594.3232286338, -39786.73369282809 168594.3232286338, -39786.73369282809 168595.42423341, -39756.442229074977 168594.3232286338))	10,030
5	221	POLYGON ((-39726.11088867145 168594.3232286338, -39756.442229074977 168594.3232286338, -39756.442229074977 168599.5257794C, -39726.11088867145 168594.3232286338))	10,347
6	221	POLYGON ((-39695.79948659313 168594.3232286338, -39726.11088867145 168594.3232286338, -39726.11088867145 168603.38464741, -39695.79948659313 168594.3232286338))	10,126
7	221	POLYGON ((-39665.488084514815 168594.3232286338, -39695.79948659313 168594.3232286338, -39695.79948659313 168607.2435154, -39665.488084514815 168594.3232286338))	10,611
8	221	POLYGON ((-39635.1766824365 168564.61743471635, -39665.488084514815 168564.61743471635, -39665.488084514815 168611.10238, -39635.1766824365 168564.61743471635))	12,761
9	221	POLYGON ((-39604.86528035818 168624.02902255123, -39604.86528035818 168564.61743471635, -39635.1766824365 168564.61743471635, -39604.86528035818 168624.02902255123))	14,382

		<code>select * from kaleta.dumppolygons;</code>	
	dumppolygons 1 ×		
		<code>select * from kaleta.dumppolygons</code> Enter a SQL expression to filter results (use Ctrl+Space)	
	123 rid	geom	123 val
1	221	POLYGON ((-39665.488084514815 168624.02902255123, -39665.488084514815 168564.61743471635, -39635.17668243649 168564.61743471635, -39604.86528035817 168564.61743471635, -39604.86528035817 168564.61743471635, -39635.17668243649 168564.61743471635, -39665.488084514815 168624.02902255123))	12,761
2	221	POLYGON ((-39635.17668243649 168624.02902255123, -39635.17668243649 168564.61743471635, -39604.86528035817 168564.61743471635, -39604.86528035817 168564.61743471635, -39635.17668243649 168564.61743471635, -39635.17668243649 168624.02902255123))	14,382
3	221	POLYGON ((-39604.86528035817 168624.02902255123, -39604.86528035817 168564.61743471635, -39574.553878279854 168564.61743471635, -39574.553878279854 168564.61743471635, -39604.86528035817 168564.61743471635, -39604.86528035817 168624.02902255123))	14,090
4	221	POLYGON ((-40089.84771361128 168594.3232286338, -40089.84771361128 168564.61743471635, -40059.53631153295 168564.61743471635, -40059.53631153295 168564.61743471635, -40089.84771361128 168594.3232286338, -40089.84771361128 168564.61743471635))	10,625
5	221	POLYGON ((-39907.979301141364 168594.3232286338, -39907.979301141364 168534.9116407989, -39877.667899063046 168534.9116407989, -39877.667899063046 168534.9116407989, -39907.979301141364 168594.3232286338, -39907.979301141364 168534.9116407989))	8,601
6	221	POLYGON ((-39817.0450949064 168594.3232286338, -39817.0450949064 168534.9116407989, -39786.733692828086 168534.9116407989, -39786.733692828086 168534.9116407989, -39817.0450949064 168594.3232286338, -39817.0450949064 168534.9116407989))	10,102
7	221	POLYGON ((-39786.733692828086 168594.3232286338, -39786.733692828086 168534.9116407989, -39756.42229074977 168534.9116407989, -39756.42229074977 168534.9116407989, -39786.733692828086 168594.3232286338, -39786.733692828086 168534.9116407989))	11,050
8	221	POLYGON ((-39756.42229074977 168594.3232286338, -39756.42229074977 168534.9116407989, -39726.11088867145 168534.9116407989, -39726.11088867145 168534.9116407989, -39756.42229074977 168594.3232286338, -39756.42229074977 168534.9116407989))	10,046
9	221	POLYGON ((-39726.11088867145 168594.3232286338, -39726.11088867145 168534.9116407989, -39695.79948659313 168534.9116407989, -39695.79948659313 168534.9116407989, -39726.11088867145 168594.3232286338, -39726.11088867145 168534.9116407989))	9,908



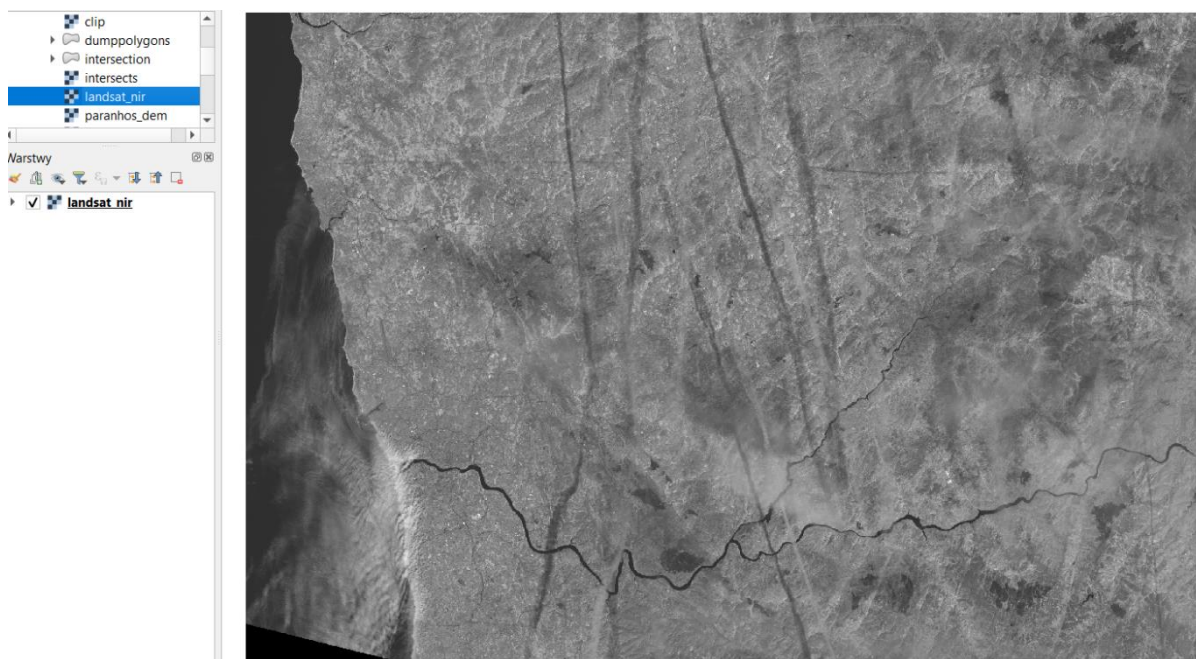
Analiza rastrów

Przykład 1- ST_Band

```
select * from kaleta.landsat_nir;

-- Enter a SQL expression to filter results (use Ctrl+Space)
select * from kaleta.landsat_nir where rast = 1;

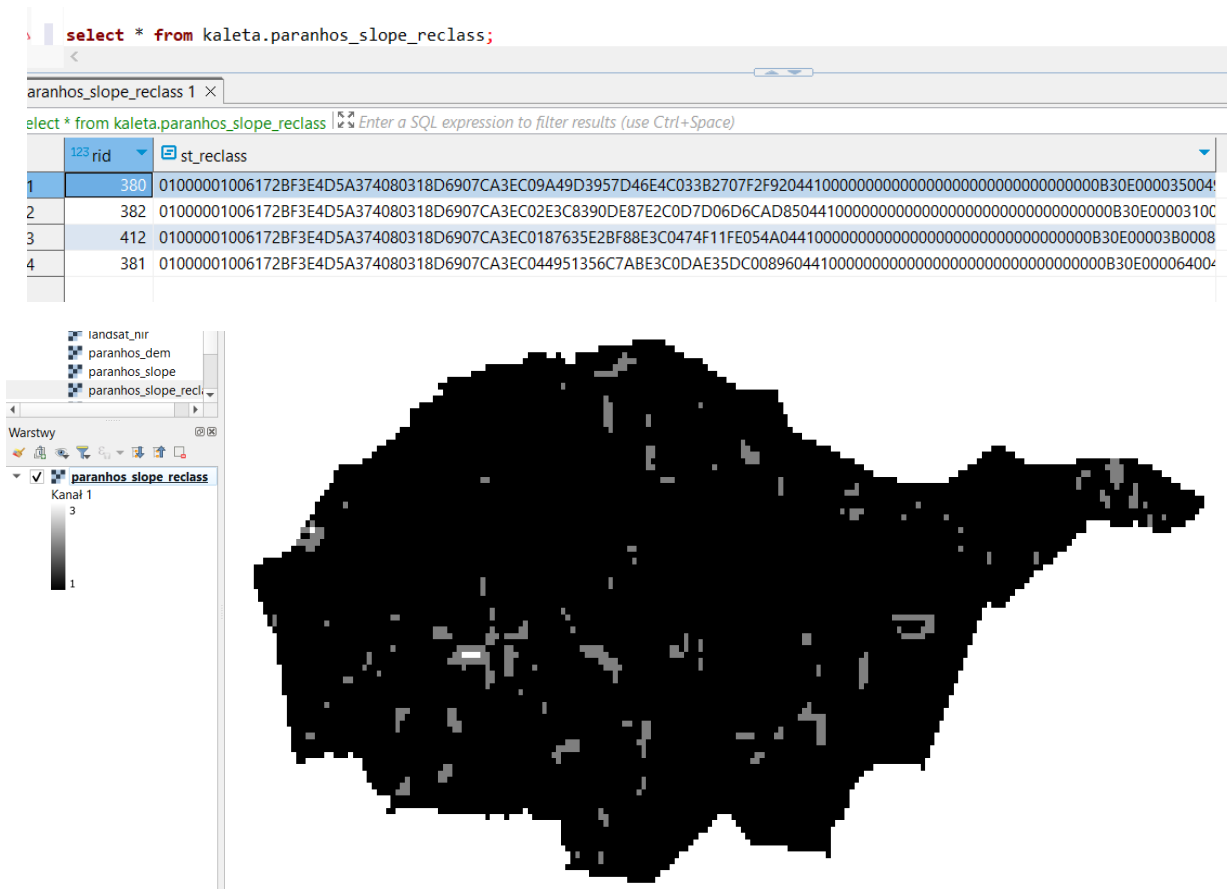
-- Enter a SQL expression to filter results (use Ctrl+Space)
select * from kaleta.landsat_nir where rast = 1 and rid = 1;
```



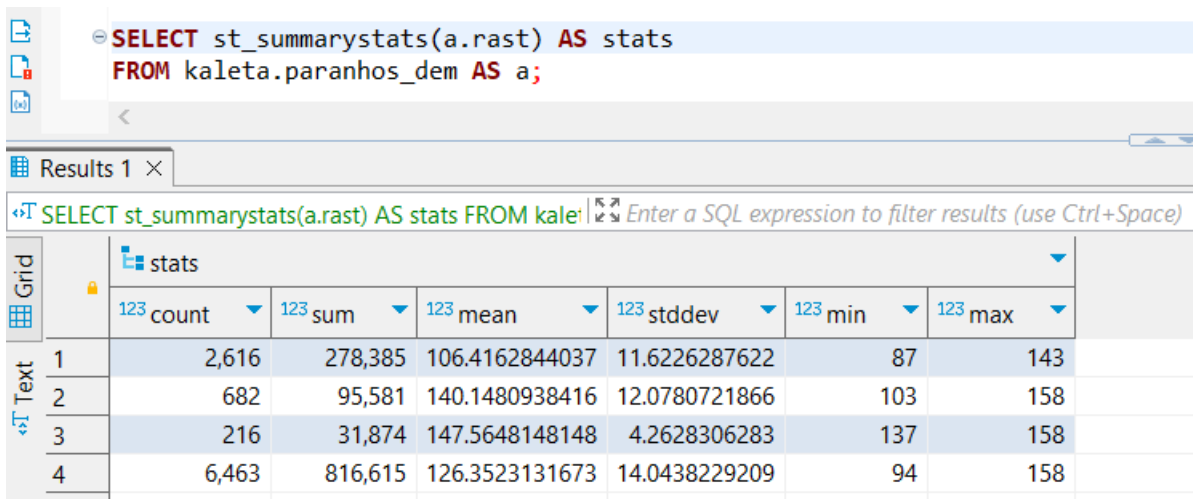
Przykład 2- ST_Clip

[illegible]

Przykład 4- ST_Reclass



Przykład 5- ST_SummaryStats



Przykład 6- ST_SummaryStats oraz Union

```
SELECT st_summarystats(ST_Union(a.rast))
FROM kaleta.paranhos_dem as a;
```

Results 1 ×

SELECT st_summarystats(ST_Union(a.rast)) FROM kaleta.paranhos_dem as a; Enter a SQL expression to filter results (use Ctrl+Space)

	st_summarystats
	123 count 123 sum 123 mean 123 stddev 123 min 123 max
1	9,977 1,222,455 122.5273128195 16.9080042027 87 158

Przykład 7- ST_SummaryStats z lepszą kontrolą złożonego typu danych

```
WITH t AS (
  SELECT st_summarystats(ST_Union(a.rast)) AS stats
  FROM kaleta.paranhos_dem AS a
)
SELECT (stats).min, (stats).max, (stats).mean FROM t;
```

Results 1 ×

WITH t AS (SELECT st_summarystats(ST_Union(a.rast)) FROM kaleta.paranhos_dem AS a) SELECT (stats).min, (stats).max, (stats).mean FROM t; Enter a SQL expression to filter results (use Ctrl+Space)

	123 min 123 max 123 mean
1	87 158 122.5273128195

Przykład 8- ST_SummaryStats w połączeniu z GROUP BY

```
WITH t AS (
  SELECT b.parish AS parish, st_summarystats(ST_Union(ST_Clip(a.rast, b.geom, true))) AS stats
  FROM rasters.dem AS a, vectors.porto_parishes AS b
  WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom, a.rast)
  group by b.parish
)
SELECT parish, (stats).min, (stats).max, (stats).mean FROM t;
```

Results 1 ×

WITH t AS (SELECT b.parish AS parish, st_summarystats(ST_Union(ST_Clip(a.rast, b.geom, true))) AS stats FROM rasters.dem AS a, vectors.porto_parishes AS b WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom, a.rast) group by b.parish) SELECT parish, (stats).min, (stats).max, (stats).mean FROM t; Enter a SQL expression to filter results (use Ctrl+Space)

	parish	123 min 123 max 123 mean
1	Bonfim	1 159 107.5658842668
2	Campanhã	0 178 74.6673221309
3	Paranhos	87 158 122.5273128195
4	Ramalde	48 108 77.5844444444
5	União das freguesias de Aldoar, Foz do Douro e Nevogilde	-4 83 34.6673548979
6	União das freguesias de Cedofeita, Santo Ildefonso, Sé, Miragaia, São Nicolau e Vitória	1 157 95.0027774104
7	União das freguesias de Lordelo do Ouro e Massarelos	-1 117 49.5005144033

Przykład 9- ST_Value

The screenshot shows the QGIS interface. At the top, the SQL console displays the following query:

```
SELECT b.name, st_value(a.rast, (ST_Dump(b.geom)).geom)
FROM
rasters.dem a, vectors.places AS b
WHERE ST_Intersects(a.rast, b.geom)
ORDER BY b.name;
```

Below the console, the results are displayed in a table titled "places 1". The table has two columns: "name" and "st_value". The data is as follows:

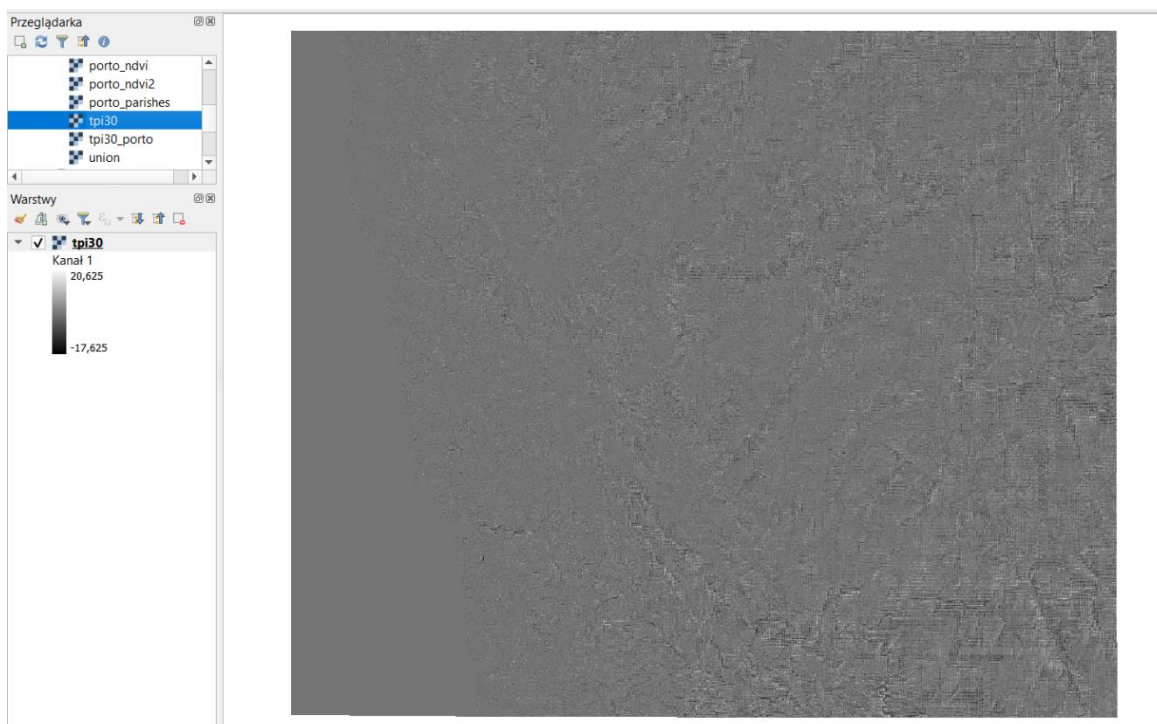
	name	st_value
1	Aldeia São Miguel	96
2	Alpendurada e Matos	145
3	Amarante	71
4	Baião	581
5	Cabeceiras de Basto	[NULL]
6	Castelo de Paiva	284
7	Celorico de Basto	227
8	Cinfães	405
9	Espinho	14

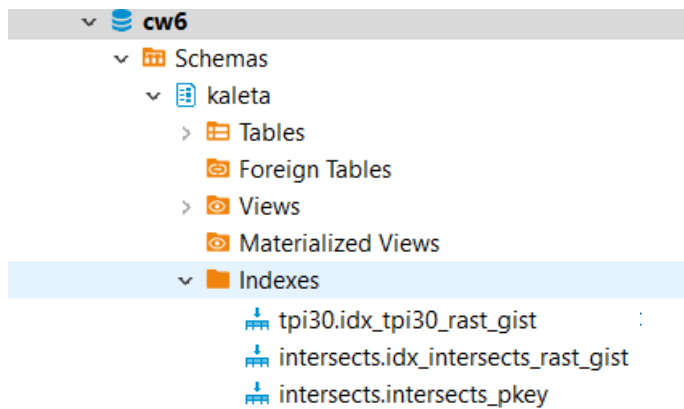
Topographic Position Index (TPI)

Przykład 10- ST_TPI

```

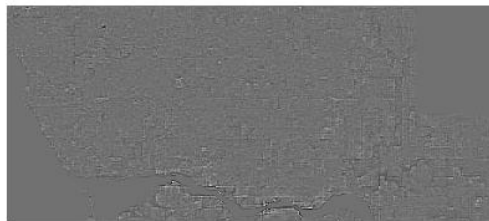
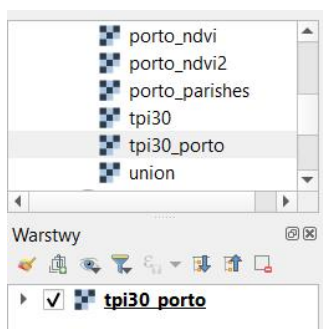
1 select * from kaleta.tpi30;
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1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
1021
1022
1023
1024
1025
1026
1027
1028
1029
1030
1031
1032
1
```





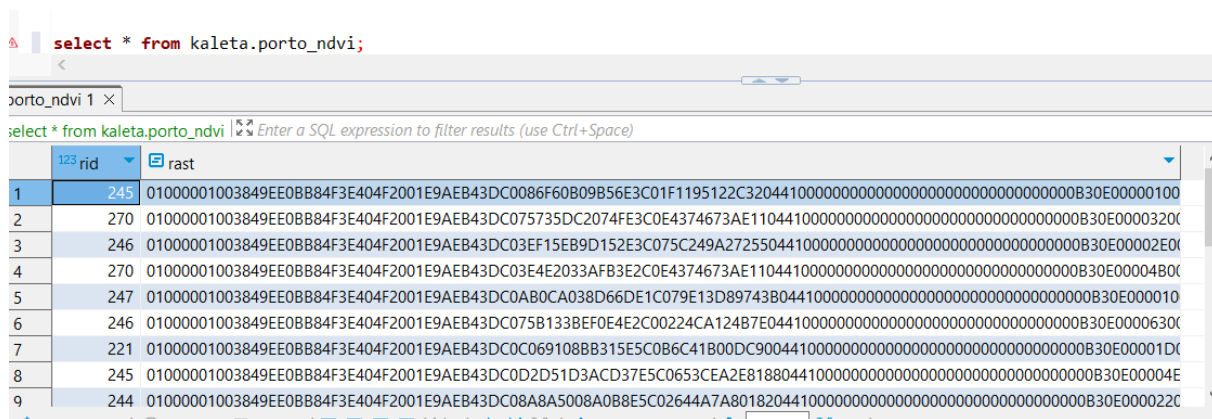
Problem do samodzielnego rozwiązania

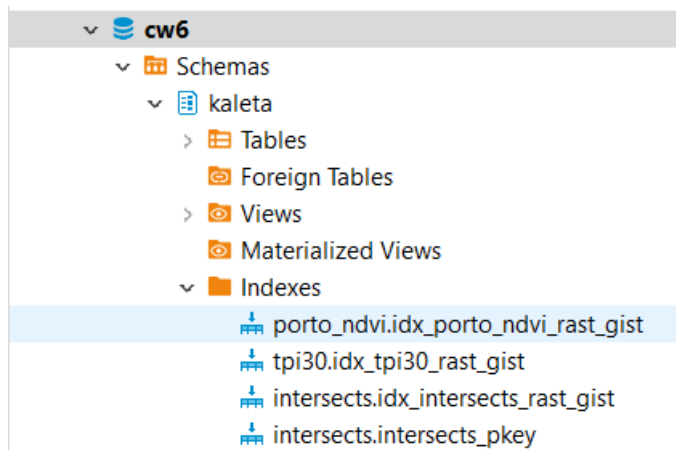
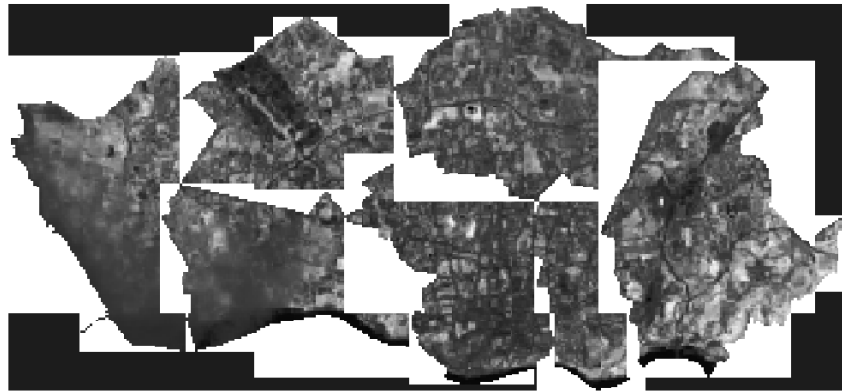
```
CREATE TABLE kaleta.tpi30_porto AS
SELECT ST_TPI(a.rast, 1) AS rast
FROM rasters.dem AS a, vectors.porto_parishes AS b
WHERE ST_Intersects(a.rast, b.geom) AND b.municipality ilike 'porto';
```














Algebra map

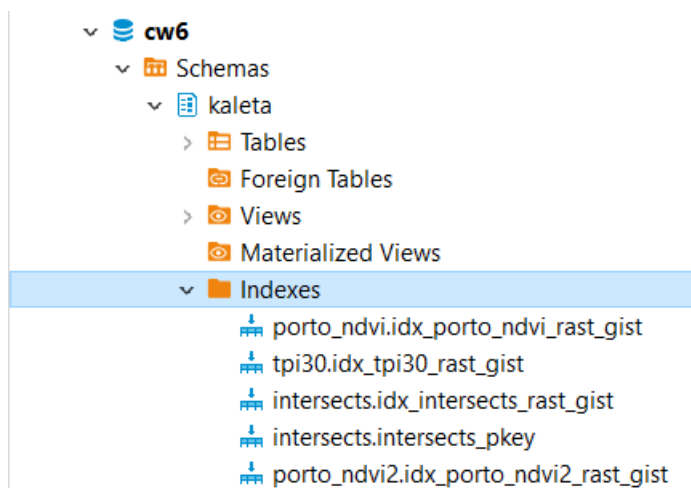
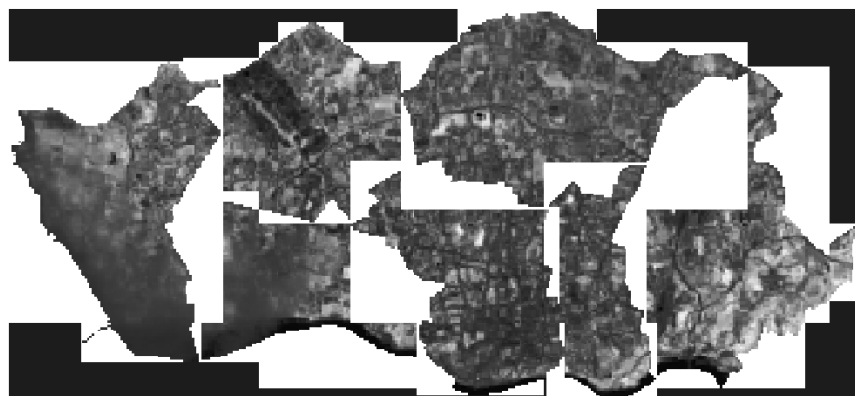
Przykład 1- Wyrażenie Algebra Map





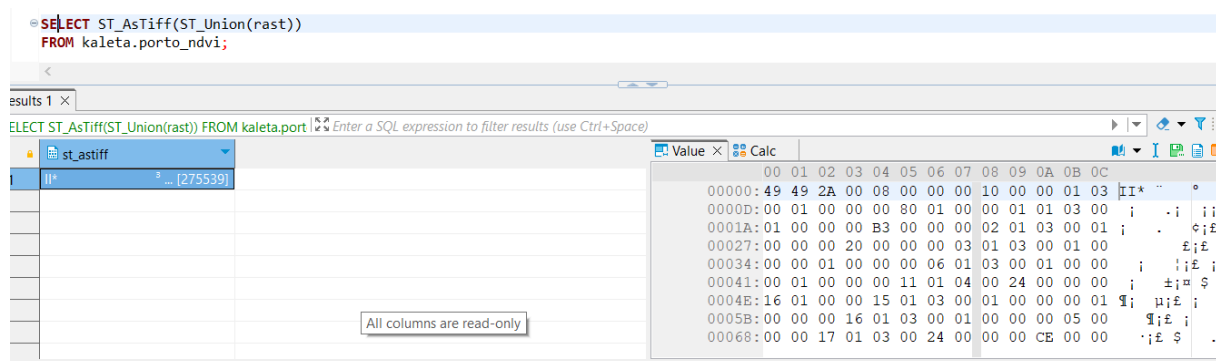
- ▼  **cw6**
 - ▼  Schemas
 - ▼  kaleta
 - >  Tables
 -  Foreign Tables
 - >  Views
 -  Materialized Views
 - >  Indexes
 - ▼  Functions
 - >  ndvi(in_float8, in_int4, variadic_text)
 - >  Sequences

[illegible]



Przykład 1- ST_AsTiff

Przykład 1- ST_AsTiff



Przykład 2- ST_AsGDALRaster

```
SELECT ST_AsGDALRaster(ST_Union(rast), 'GTiff', ARRAY['COMPRESS=DEFLATE', 'PREDICTOR=2', 'PZLEVEL=9'])
FROM kaleta.porto_ndvi;
```

results 1 ×

ELECT ST_AsGDALRaster(ST_Union(rast), 'GTiff', AF) Enter a SQL expression to filter results (use Ctrl+Space)

st_asgdalraster	Value
1	00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0000: 49 49 2A 00 08 00 00 00 11 00 00 01 03 00 01 II 0000F: 00 00 00 80 01 00 00 01 01 03 00 01 00 00 00 0001E: B3 00 00 00 02 01 03 00 01 00 00 00 20 00 00 0002D: 00 03 01 03 00 01 00 00 00 08 00 00 00 06 01 0003C: 03 00 01 00 00 00 01 00 00 00 11 01 04 00 24 0004B: 00 00 00 6A 01 00 00 15 01 03 00 01 00 00 00 0005A: 01 00 00 00 16 01 03 00 01 00 00 00 05 00 00 00069: 00 17 01 04 00 24 00 00 00 DA 00 00 00 1C 01 00078: 03 00 01 00 00 00 01 00 00 00 3D 01 03 00 01

```
SELECT ST_GDALDrivers();
```

Results 1 ×

SELECT ST_GDALDrivers() Enter a SQL expression to filter results (use Ctrl+Space)

st_gdaldrivers
1 (0,GTiff,GeoTIFF,t,t,"<CreationOptionList> <Option name='COMPRESS' type='string-select'>
2 (1,AAIGrid,"Arc/Info ASCII Grid",t,t,"<CreationOptionList>¶ <Option name='FORCE_CELLSIZE' typ
3 (2,DTED,"DTED Elevation Raster",t,t,"")
4 (3,PNG,"Portable Network Graphics",t,t,"<CreationOptionList>¶ <Option name='WORLDFILE' typ
5 (4,JPEG,"JPEG JFIF",t,t,"<CreationOptionList>¶ <Option name='PROGRESSIVE' type='boolean' de
6 (5,GIF,"Graphics Interchange Format (.gif)",t,t,"<CreationOptionList>¶ <Option name='INTERLAC
7 (6,USGSDEM,"USGS Optional ASCII DEM (and CDED)",t,t,"<CreationOptionList> <Option name=
8 (7,XYZ,"ASCII Gridded XYZ",t,t,"<CreationOptionList> <Option name='COLUMN_SEPARATOR' ty

Przykład 3- Zapisywanie danych na dysku za pomocą dużego obiektu (large object, lo)

```
select * from tmp_out;
```

tmp_out 1 ×

select * from tmp_out Enter a SQL expression to

lo_id
1 54,297

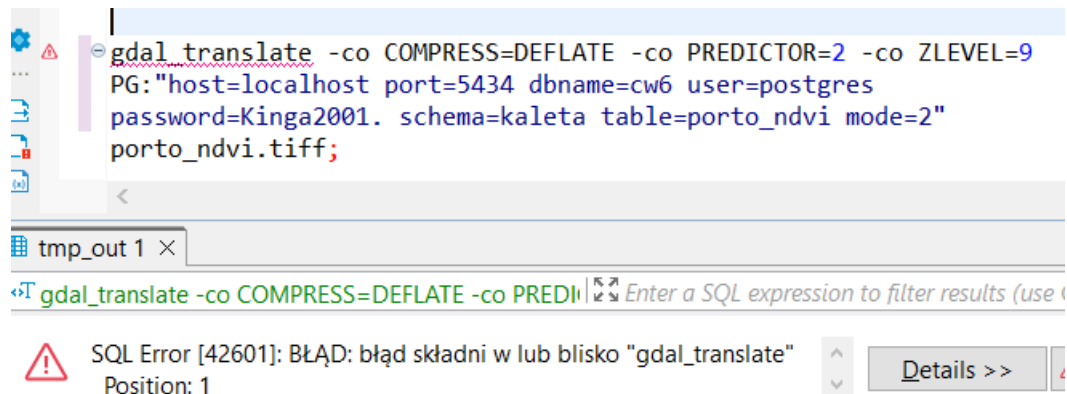
```
SELECT lo_export(lo_id, 'G:\myraster.tiff') --> Save the file in a p
FROM tmp_out;

--SELECT lo_unlink(lo_id)
--FROM tmp_out; --> Delete the large object.
```

tmp_out 1 ×

SELECT lo_export(lo_id, 'G:\myraster.tiff') FROM tmp; Enter a SQL expression to filter results (use C

Przykład 4- Użycie Gdal



Publikowanie danych za pomocą MapServer

Przykład 1 – Mapfile

