

LECTURE – 09

SPATIAL ANALYSIS (GEOPROCESSING IN QGIS)

Course Instructor:

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Content

- Spatial Analysis
- Spatial Analysis Tools in QGIS
 - Buffers
 - Convex Hull
 - Intersect
 - Union
 - Symmetrical Difference
 - Clip
 - Difference
 - Dissolve

Spatial Analysis

- Spatial analysis uses spatial information to extract new and additional meaning from GIS data.
- It can answer important queries related to vector data:
 - which houses are within the 100 year flood level of a river?
 - where is the best place to put a hospital so that it is easily accessible to as many people as possible?
 - which learners live in a particular suburb?

Spatial Analysis Tools in QGIS

■ Geoprocessing Tools

- Buffers
- Convex Hull
- Intersect
- Union
- Symmetrical Difference
- Clip
- Difference
- Dissolve

Buffers

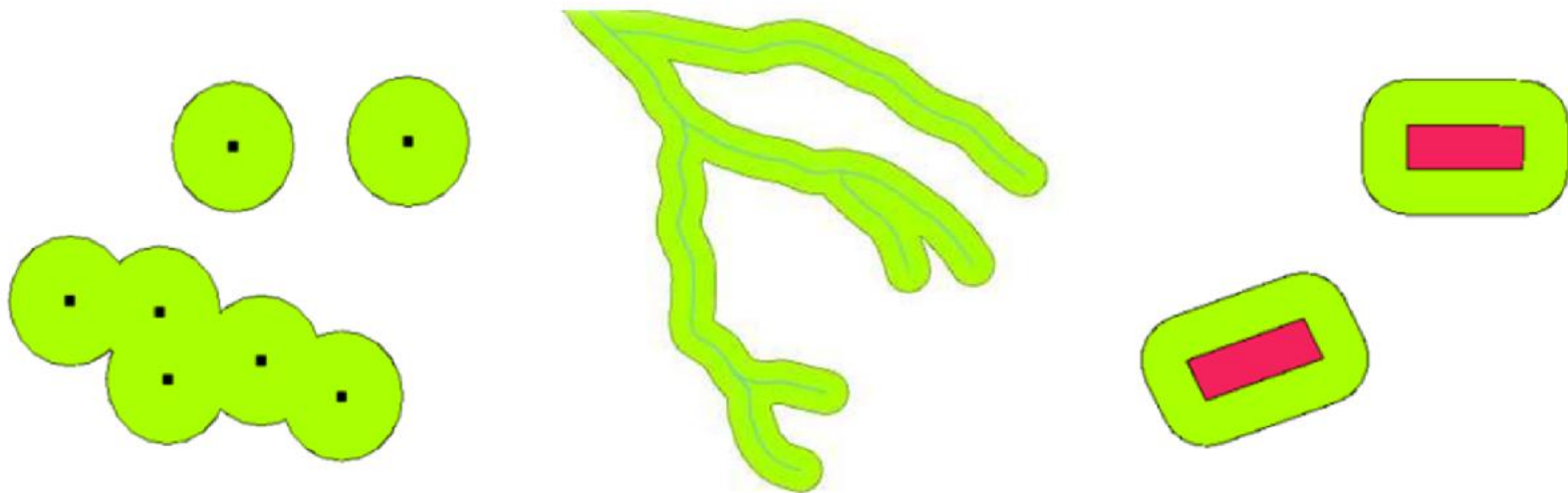
■ Buffers

- It creates an equal zone around specific features at a specified distance.
- A buffer zone is any area that serves the purpose of keeping real world features distant from one another.
- Buffer zones are often set up to protect the environment, protect residential and commercial zones from industrial accidents or natural disasters, or to prevent violence.
- Common types of buffer zones may be greenbelts between residential and commercial areas, border zones between countries, noise protection zones around airports, or pollution protection zones along rivers.

Buffers

■ Buffers

- In a GIS Application, buffer zones are always represented as vector polygons enclosing other polygon, line or point features (as shown in the figure below)



(a) A buffer zone around vector points.

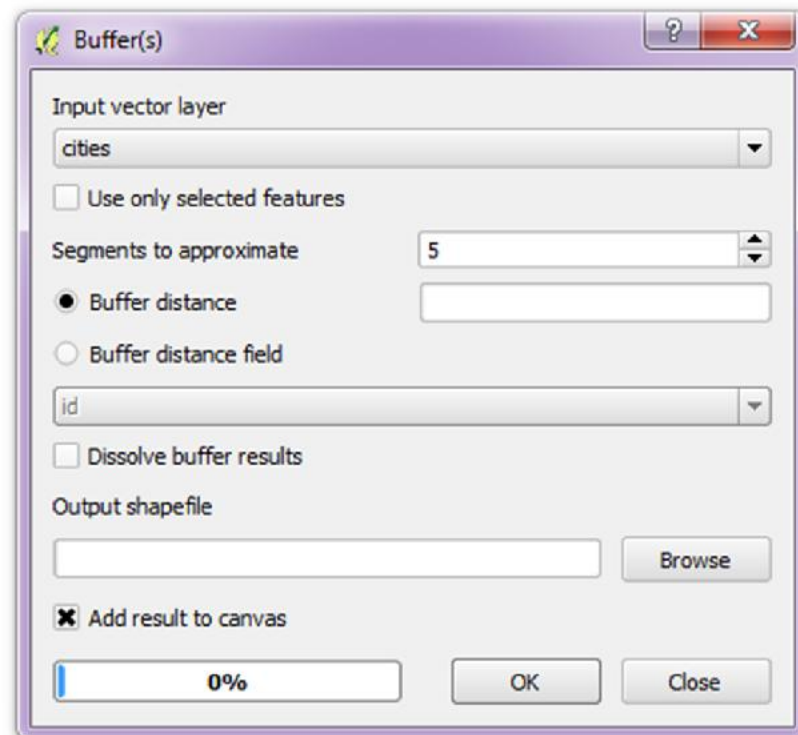
(b) A buffer zone around vector polylines.

(c) A buffer zone around vector polygons

Buffers

■ Command Path

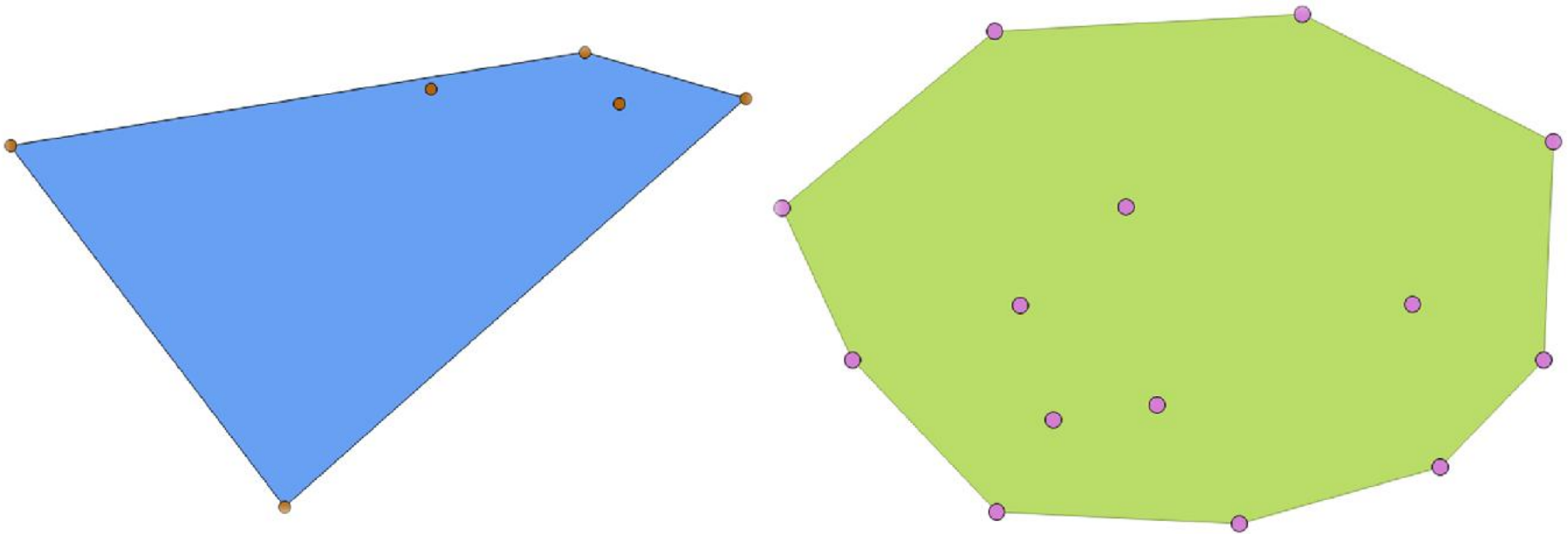
- Vector > Geoprocessing Tools > Buffer(s)



Convex Hull

■ Convex Hull

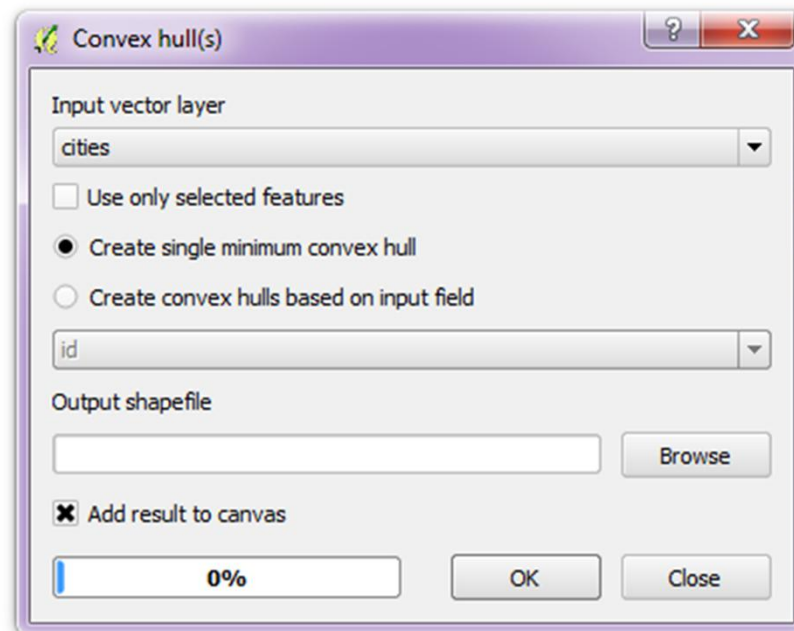
- It creates the smallest possible convex polygon enclosing a group of objects



Convex Hull

■ Command Path

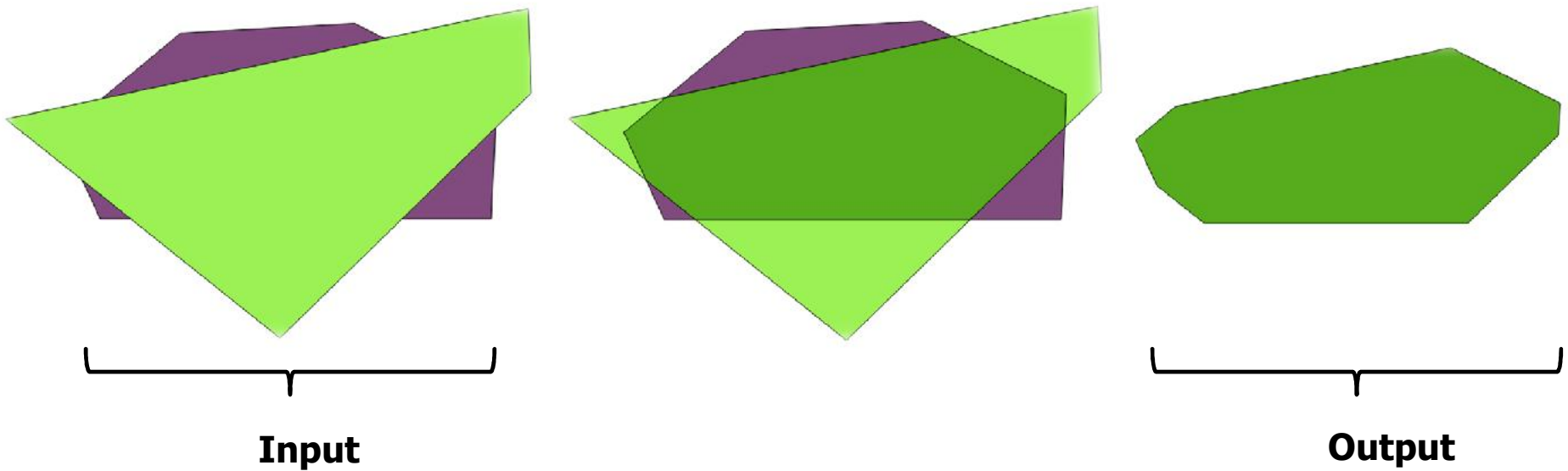
- Vector > Geoprocessing Tools > Convex hull(s)



Intersect

■ Intersect

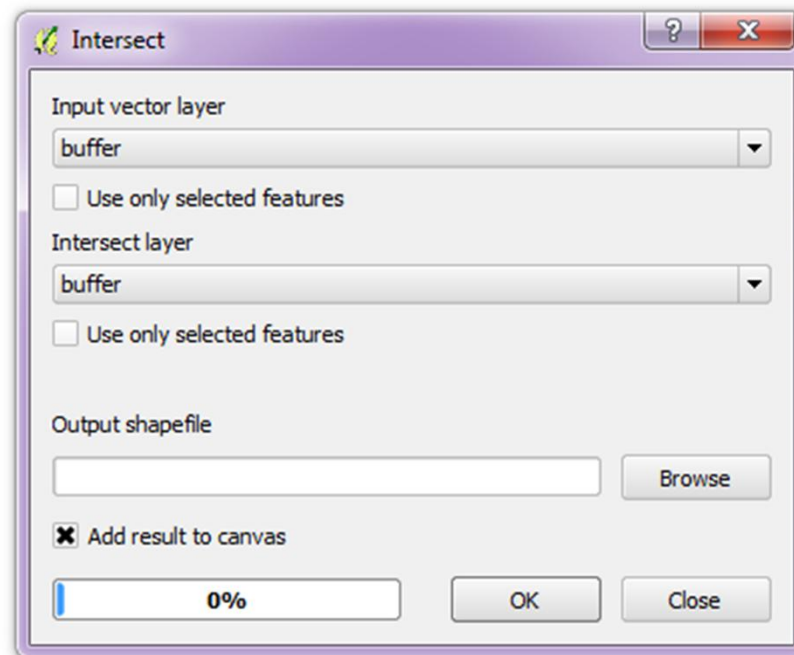
- It creates new layer based on the area of overlap of two layers.



Intersect

■ Command Path

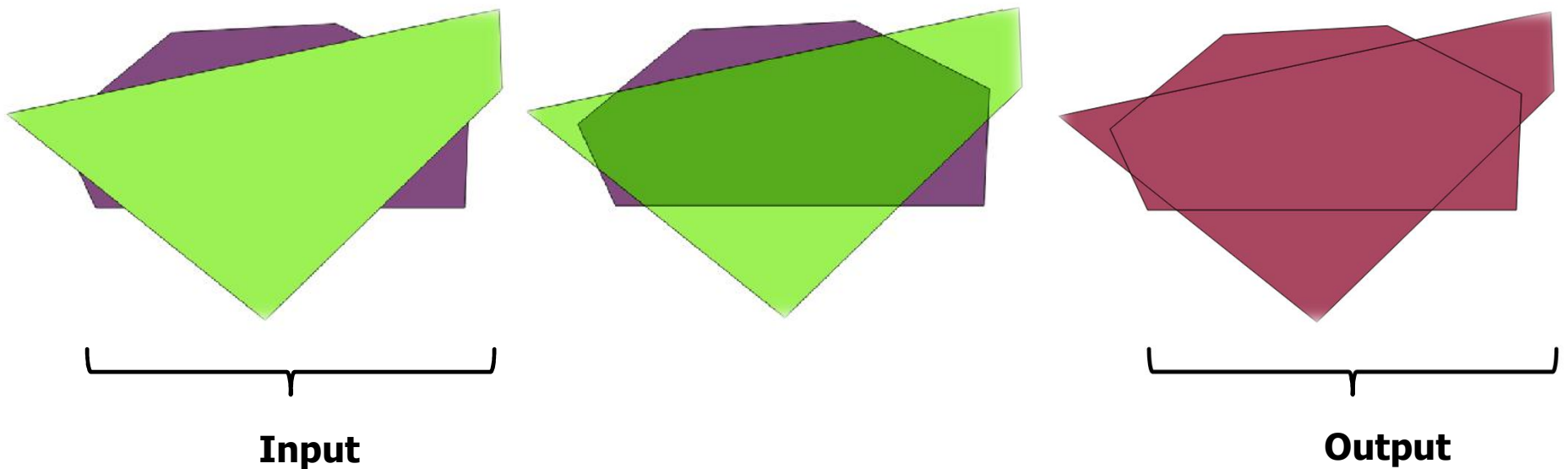
- Vector > Geoprocessing Tools > Intersect



Union

■ Union

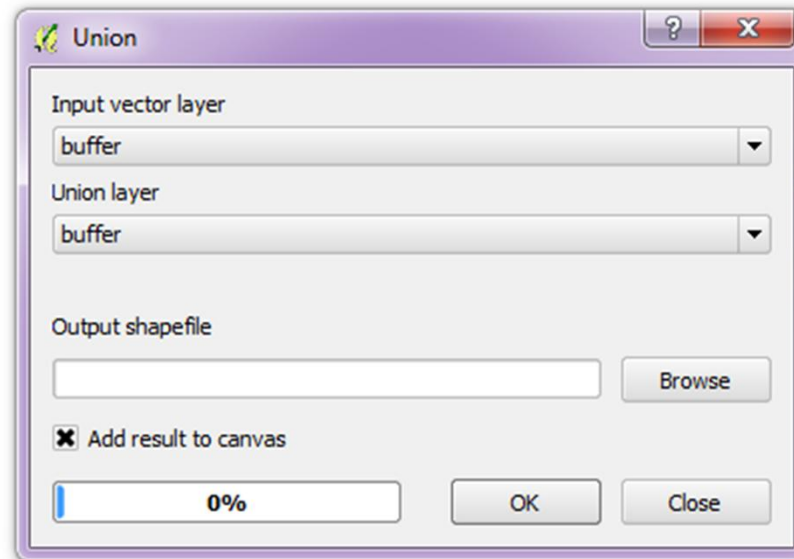
- It combine two layers together into one while preserving features and attributes of both.



Union

■ Command Path

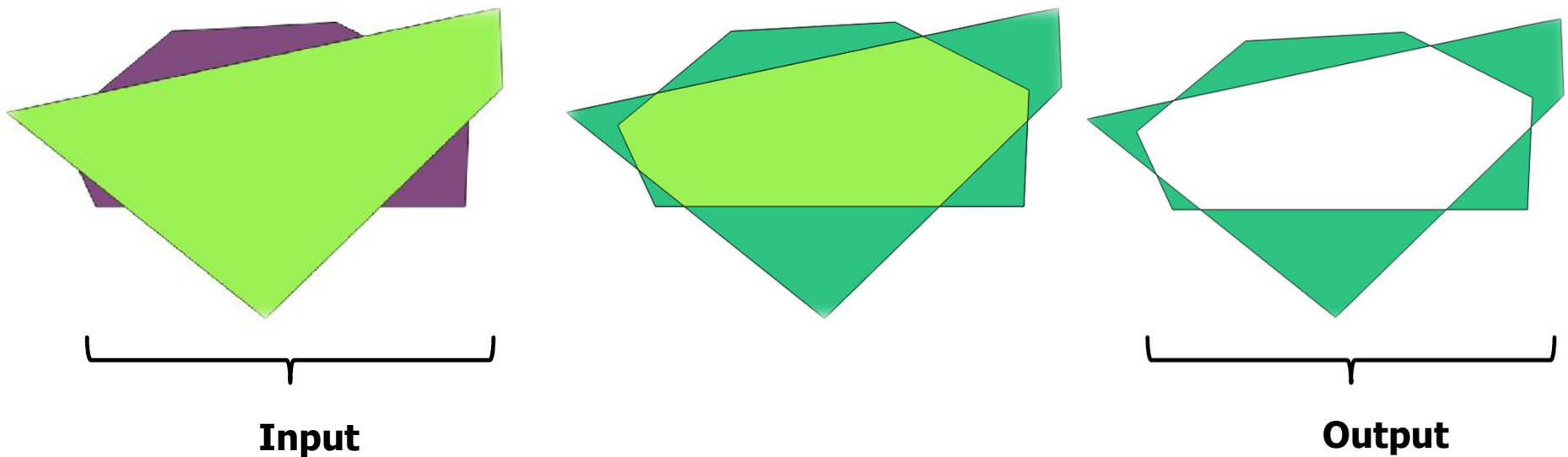
- Vector > Geoprocessing Tools > Union



Symmetrical Difference

■ Symmetrical Difference

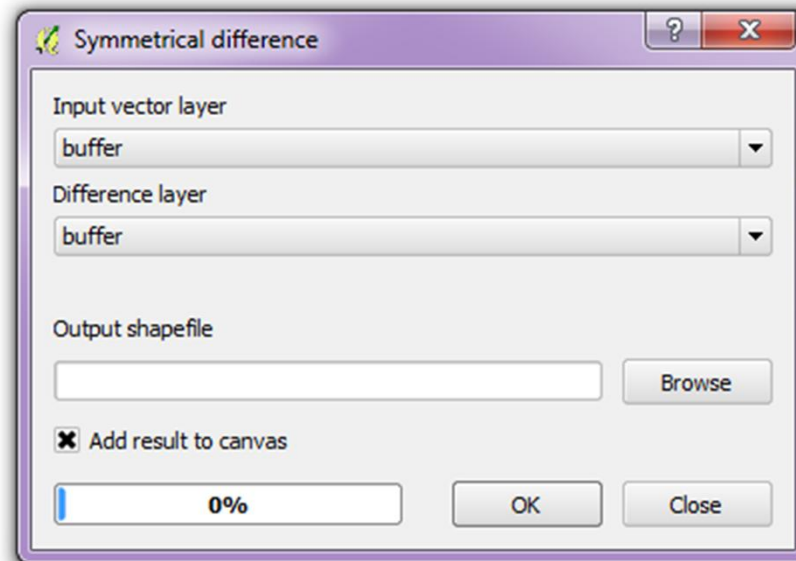
- It creates a new layer based on areas of two layers that do not overlap.
- The symmetric difference is the union without intersection.



Symmetric Difference

■ Command Path

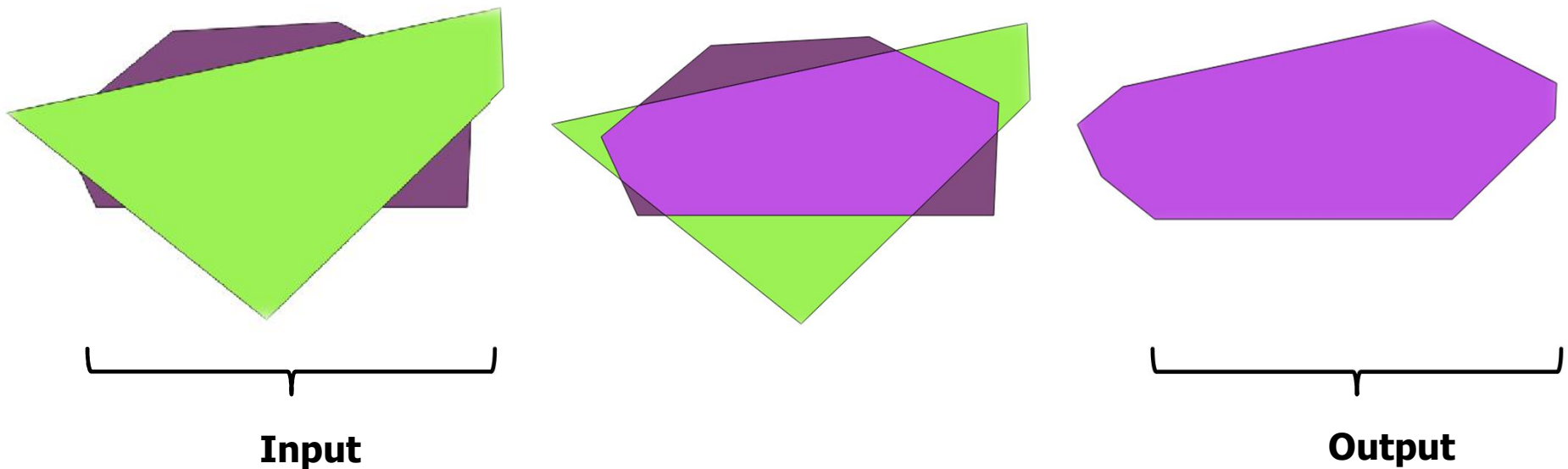
- Vector > Geoprocessing Tools > Symmetric Difference



Clip

■ Clip

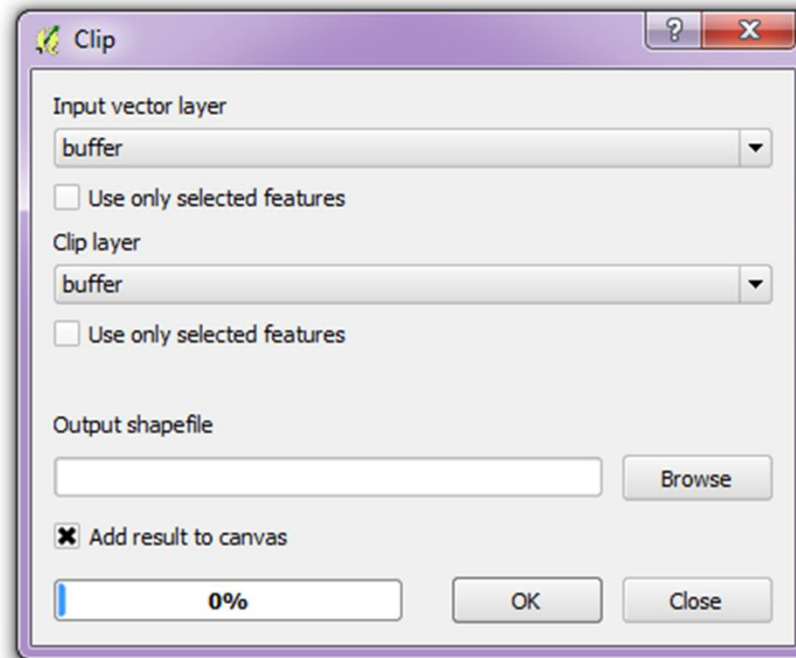
- This overlay function is performed to extract features in which the area of extraction is decided from the clip coverage and the features to be extracted are from the input coverage.



Clip

■ Command Path

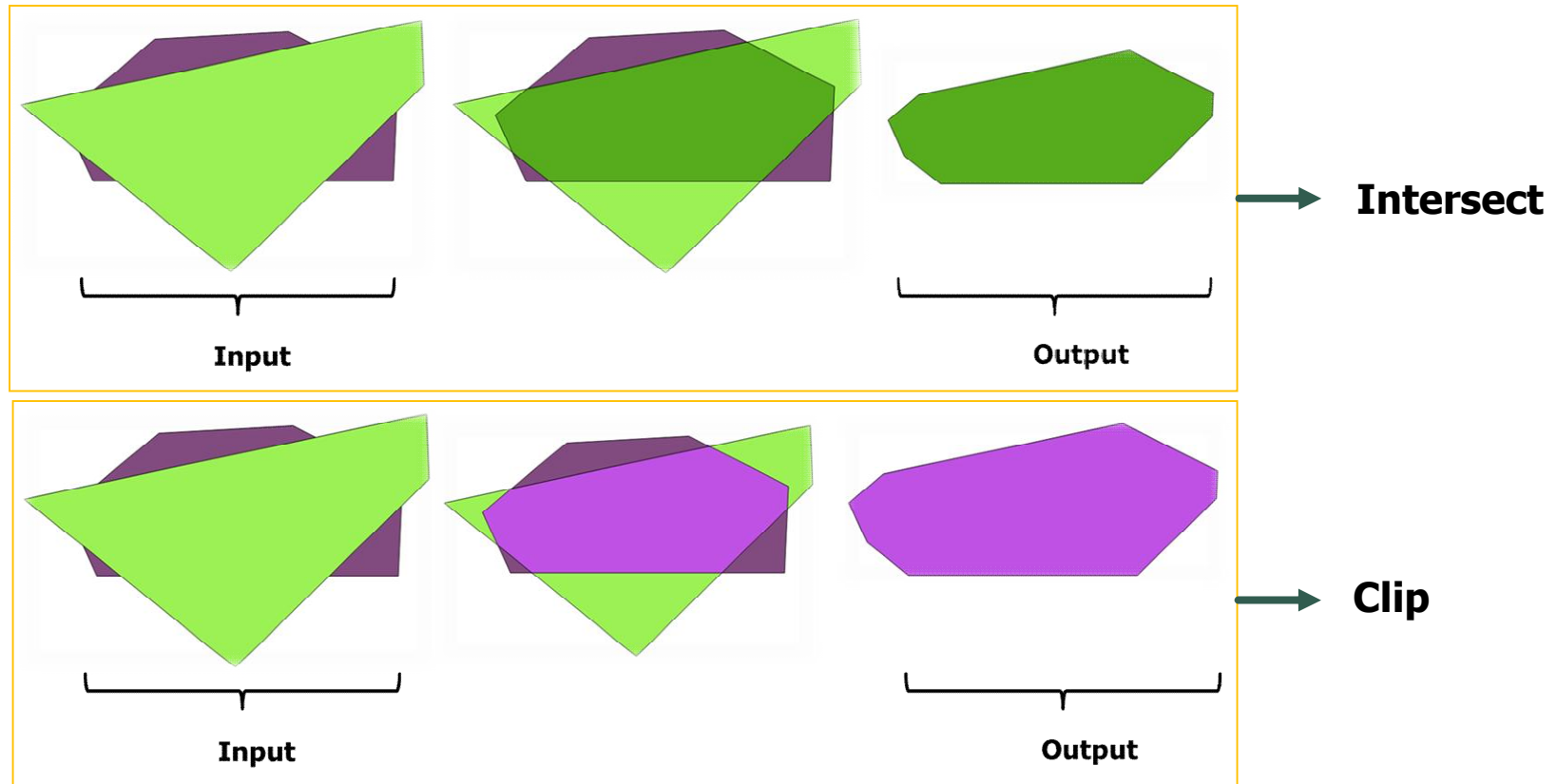
- Vector > Geoprocessing Tools > Clip



Clip

Clip and Intersect Tools

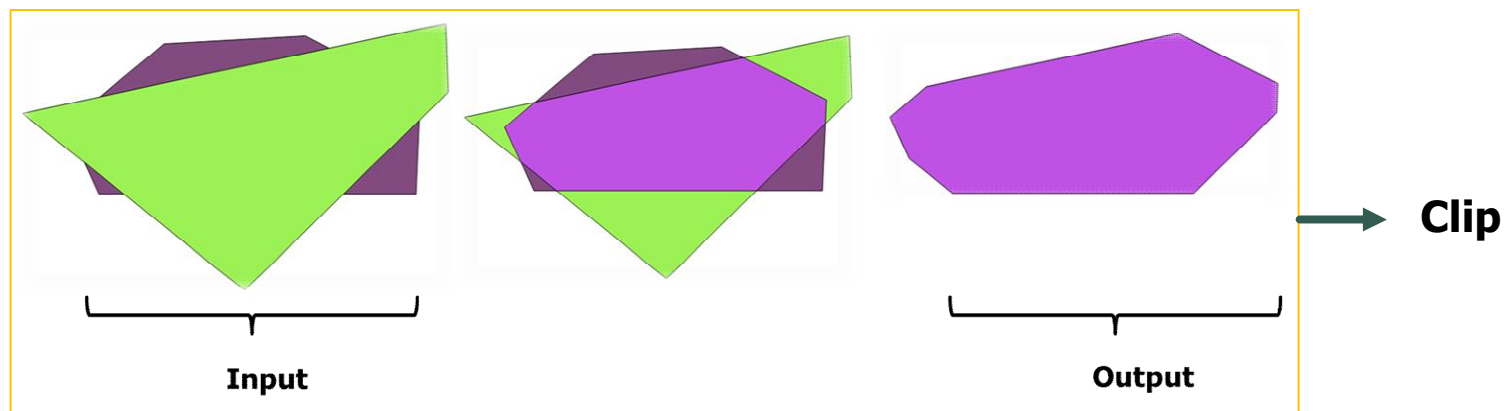
Is there any difference?



Clip

■ Clip and Intersect Tools

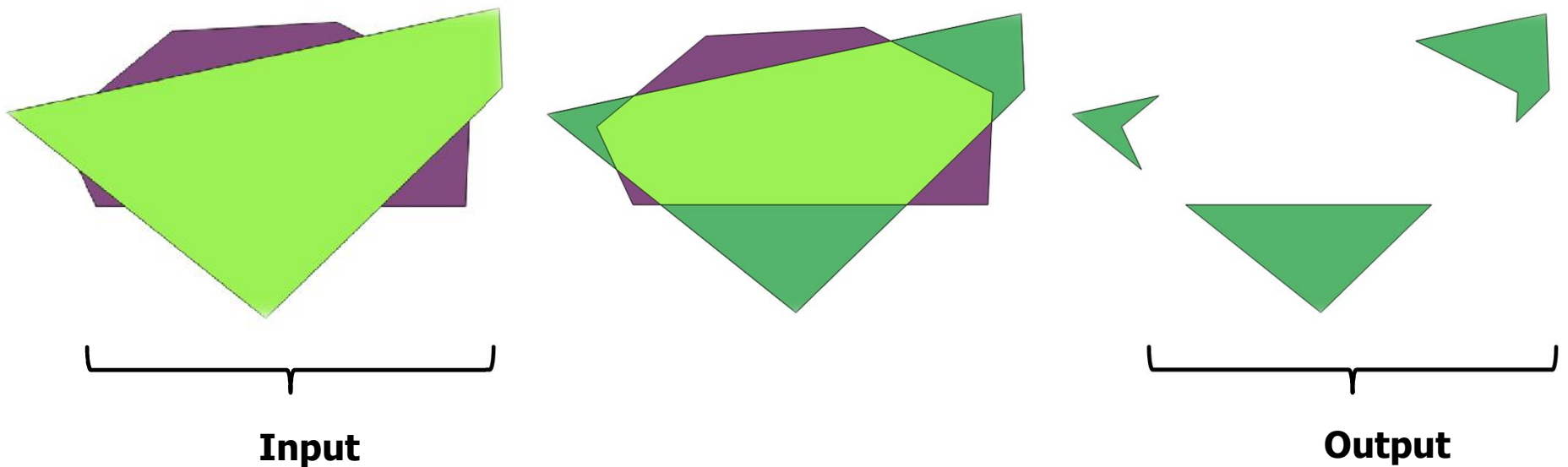
- The main difference will be in the attributes of the results.
- When using **Clip** only the input feature's attributes will be in the output (none from the clip feature), where if you used **Intersect** the attributes from all features used will be in the output.



Difference

■ Difference

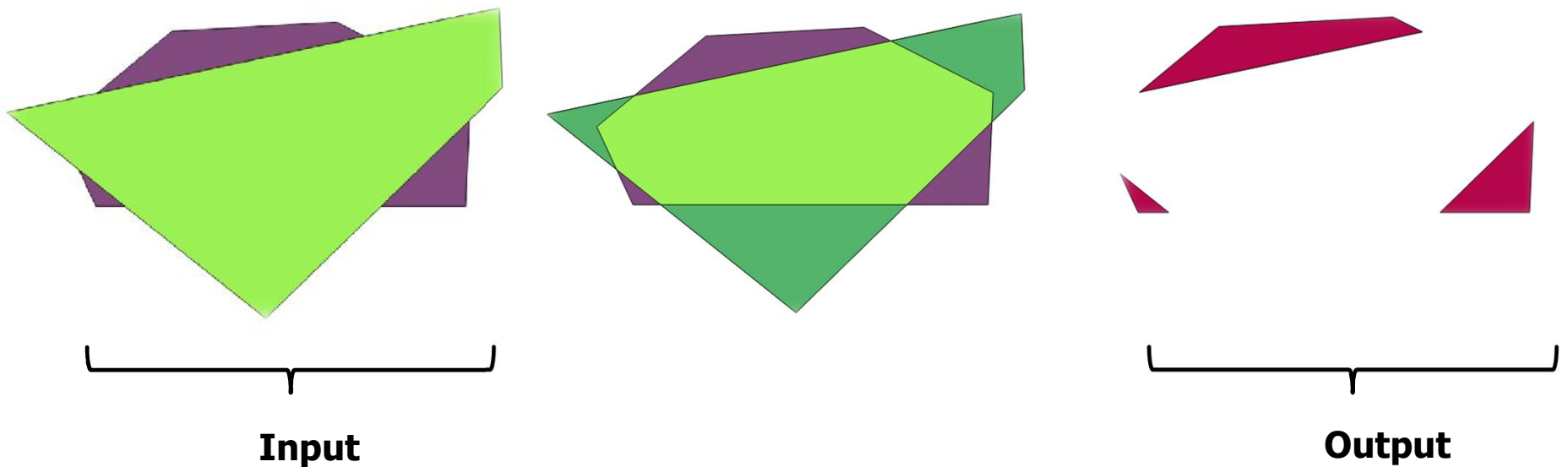
- It creates a new feature based on the area of the input layer that isn't overlapped by the clipping layer.



Difference

■ Difference

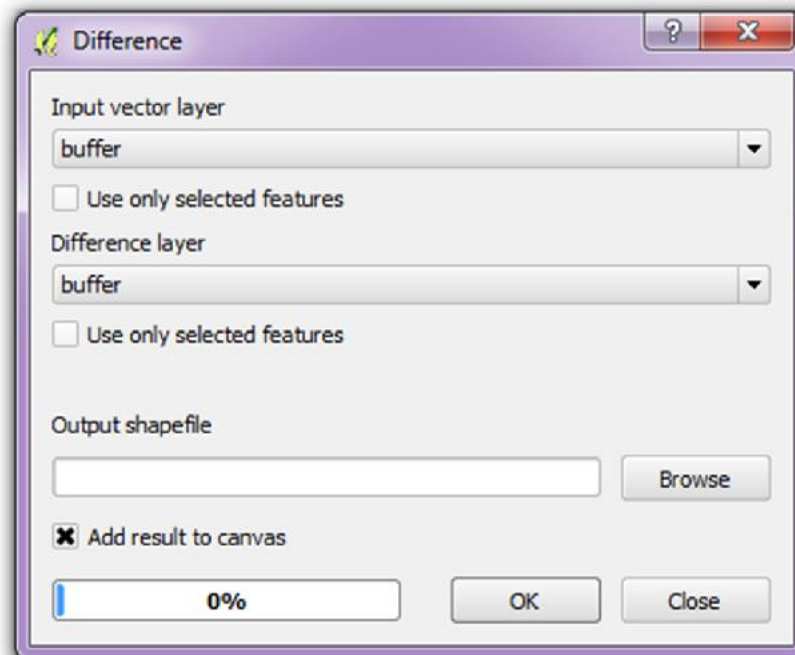
- It creates a new feature based on the area of the input layer that isn't overlapped by the clipping layer.



Difference

■ Command Path

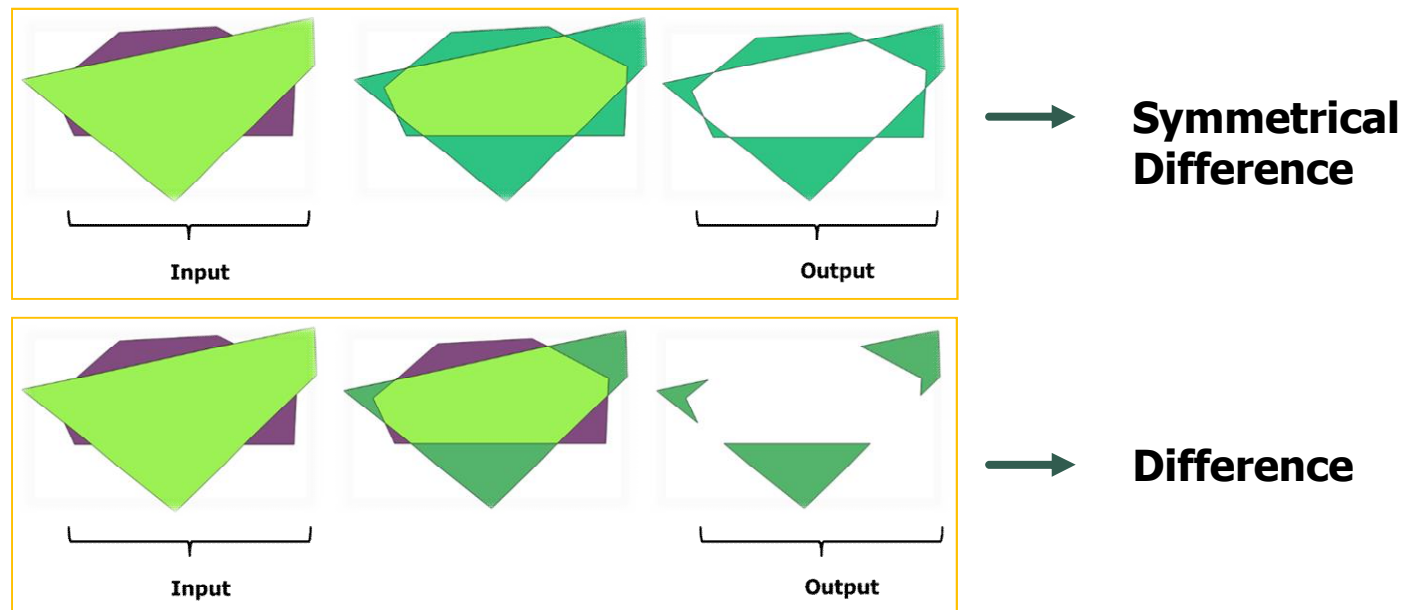
- Vector > Geoprocessing Tools > Difference



Difference

■ Difference and Symmetrical Difference Tools

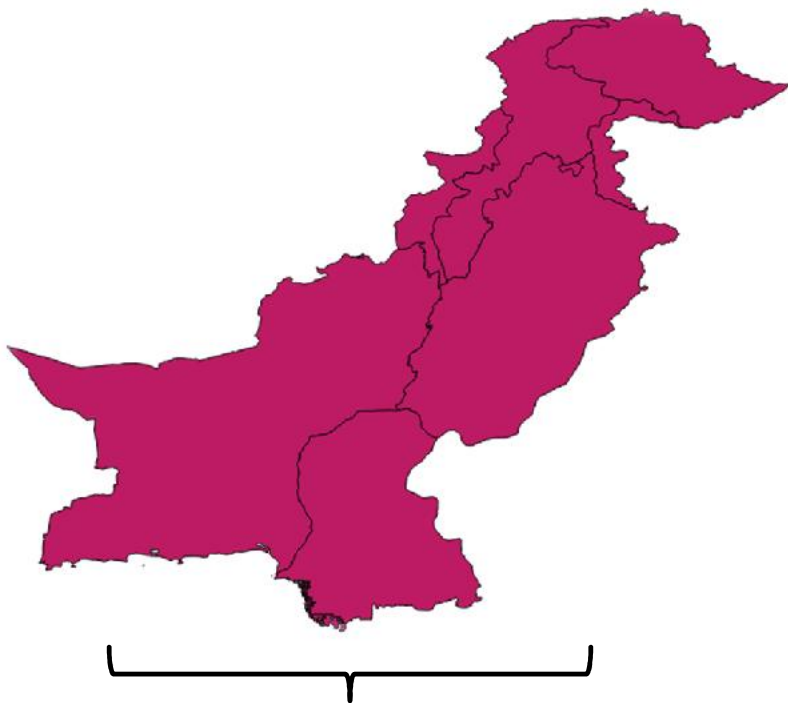
- **Symmetrical Difference** results in a feature that contain the features of both input layer and difference layer **except** those which overlap.
- **Difference** results in a feature that contain the features of the input layer **only** **except** those which overlap with the difference layer.



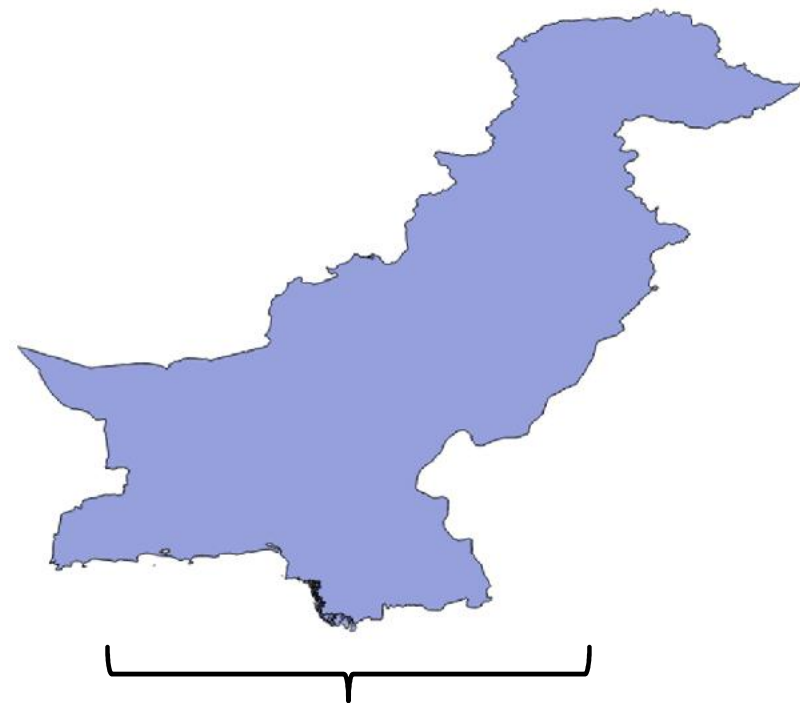
Dissolve

■ Dissolve

- It creates a new set of features from a given set of features based on the attribute specified for the purpose.



Input

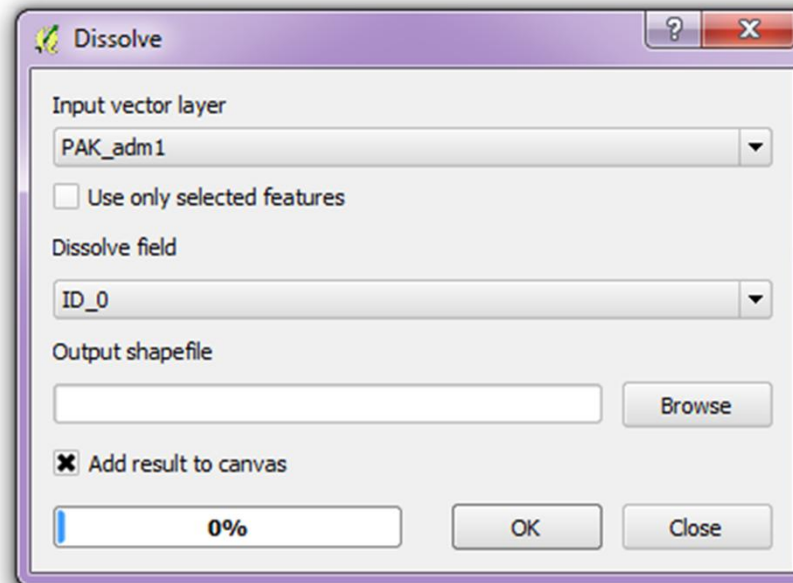


Output

Dissolve

■ Command Path

- Vector > Geoprocessing Tools > Dissolve



References

- QGIS Training Manual
- A Gentle Introduction to GIS