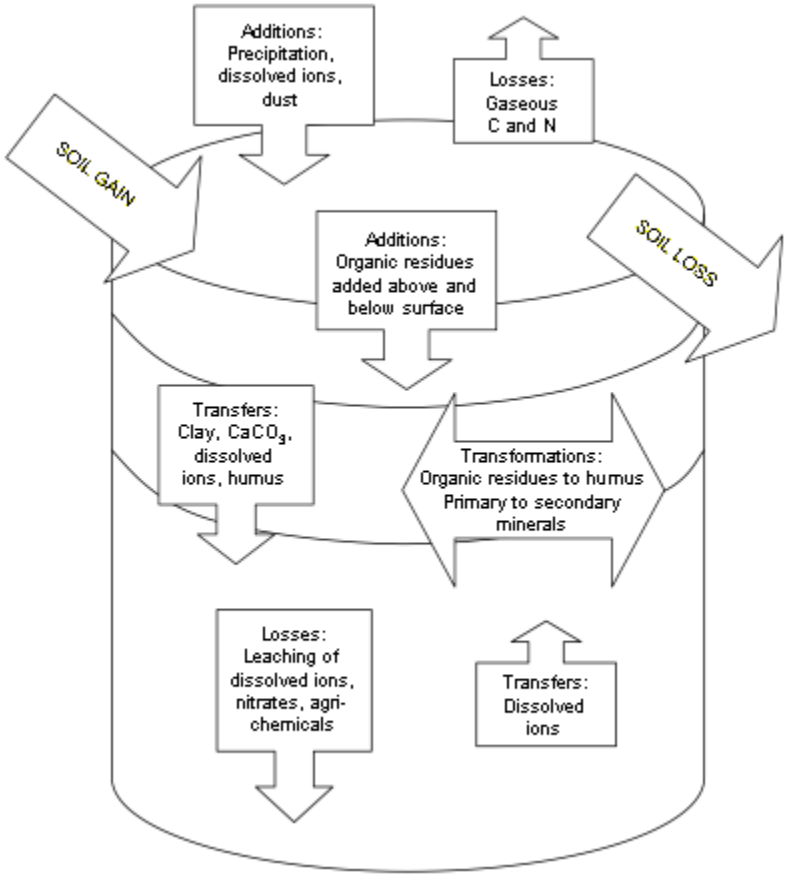
Soil formation: processes

Simonson (1958) proposed that soil formation could be regarded as two major steps:

- The accumulation of the parent material
- The differentiation of the horizons within the soil profile by soil-forming processes, which can be categorized as:
    - Additions
    - Removals
    - Transfers or translocations of materials
    - Transformations

All processes are active to some degree in all soils. The balance between the combination of processes determines the ultimate nature of the soil profile.



Some of the major processes of soil formation within a pedon are summarized in the following table (Adapted from Buol et al., 1980. Soil Genesis and Classification. The Iowa State University Press, Ames).

Process	Category	Brief Description
Eluviation	Transfer	Movement of material out of a horizon
Illuviation	Transfer	Movement of material out of a horizon
Decalcification	Transfer	Reactions that remove $CaCO_3$ from a horizon
Calcification	Transfer	Processes leading to accumulation of $CaCO_3$
Desalinization	Transfer	Removal of soluble salts in a horizon
Salinization	Transfer	Accumulation of soluble salts in a horizon
Solonization	Transfer	Accumulation of sodium salts in a horizon
Solodization	Transfer	Leaching of sodium salts from a horizon
Leaching	Transfer	Removal of soluble material from the soil
Lessivage	Transfer	Physical transfer of clay within the solum
Pedoturbation	Transfer	Physical churning and mixing of soil material
Podzolization	Transfer	Chemical migration of iron, aluminum, and SOM within the solum
Gleization	Transfer	Reduction of Fe^{3+} to Fe^{2+} under anaerobic conditions and transfer of Fe^{2+}
Desilication	Transfer	Chemical migration of silica out of the solum leaving iron and aluminum minerals behind
Melanization	Transfer	Darkening of A horizon material by addition and mixing of SOM
Decomposition	Transfer	Breakdown and loss of minerals and SOM
Mineralization	Transfer	Release of inorganic material through decomposition of organic matter
Paludization	Transfer	Accumulation of organic materials under anaerobic conditions (Organic soils)

http://www.soilsofcanada.ca/soil_formation/processes.php