

**FORUM PERGURUAN TINGGI UNTUK PENGURANGAN RESIKO BENCANA(FPT PRB)
PROVINSI JAWA TIMUR**

Sekretariat : Pusat Studi Kebumian Bencana dan Perubahan Iklim (PSKBPI)

Gedung Research Center Lt.5 Kampus ITS Sukolilo Surabaya 60111

BENCANA LONGSOR Di JAWA TIMUR

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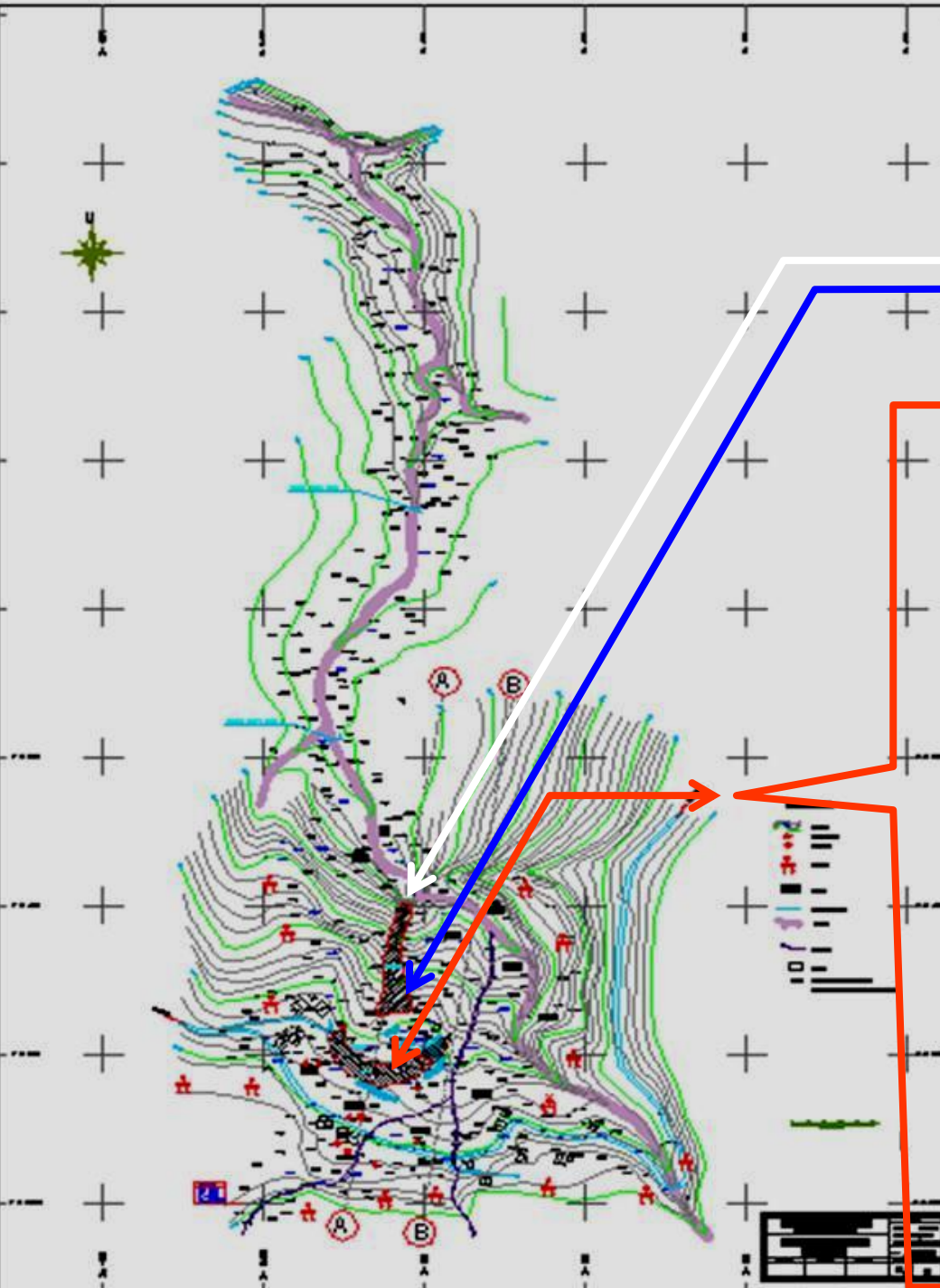
USAID
FROM THE AMERICAN PEOPLE



Mercy Corps Indonesia



PETA TOPOGRAFI DAN FOTO LONGSOR

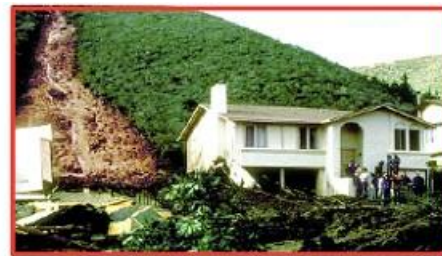


Tanggal 14 Februari 2007 Penurunan tanah sekitar 0,5 m

Tanggal 22 Februari 2007 Penurunan tanah sekitar 4 m

Tanggal 3 Maret 2007 Penurunan tanah sekitar 6,8 m

Earthquake-induced landslides,
Sichuan Province, China, May 12, 2008.
Photograph courtesy of Dr. Yin Yueping,
China Geological Survey,
Ministry of Land and Resources, China.



Site of
destroyed
homes



Source

Flow path

Debris flow from a steep hillslope in Pacifica, California, about 10 miles south of San Francisco, where three children were killed and two homes destroyed on January 4, 1982. Above—Distant view of the landslide source, flow path, and site of destroyed homes. Above left—View of destroyed homes from the street.

**Debris flow di Kalifornia,
Terjadi di hutan yang
terpelihara dan tidak ada
pembabatan hutan**



Source of large
debris flow

Flow path

Inundated
farm

**Debris flow
di Virginia, lihat hutannya yang
masih utuh**

Numerous debris flows scarred the foothills of the Blue Ridge in Madison County, Virginia, after the devastating storm of June 27, 1966. These debris flows, which began on steep slopes, moved rapidly down channels in the mountains. Small flows joined to form larger flows and spread mud, boulders, and other debris in valleys, inundating residents' homes and farms. (Photograph copyright by Kevin Lamb, 1995; published with permission.)

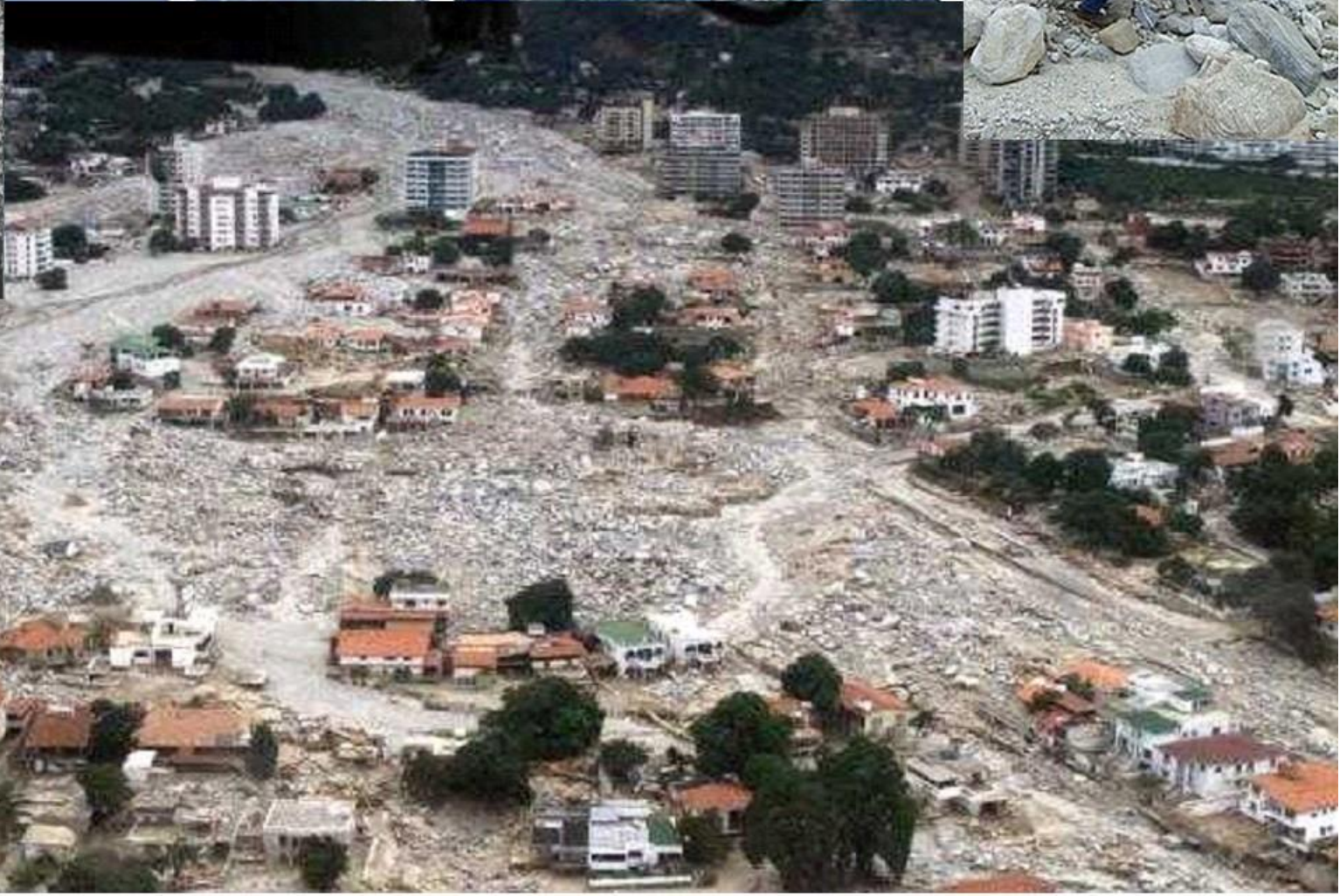
Banjir bandang
di Caraballeda Venezuela
sebelum dan sesudah



March, 1999



December, 1999



SELAMAT HARI BUMI 22 APRIL 2012
SELAMATKAN TANAH SEKARANG



Amien Widodo © 2012



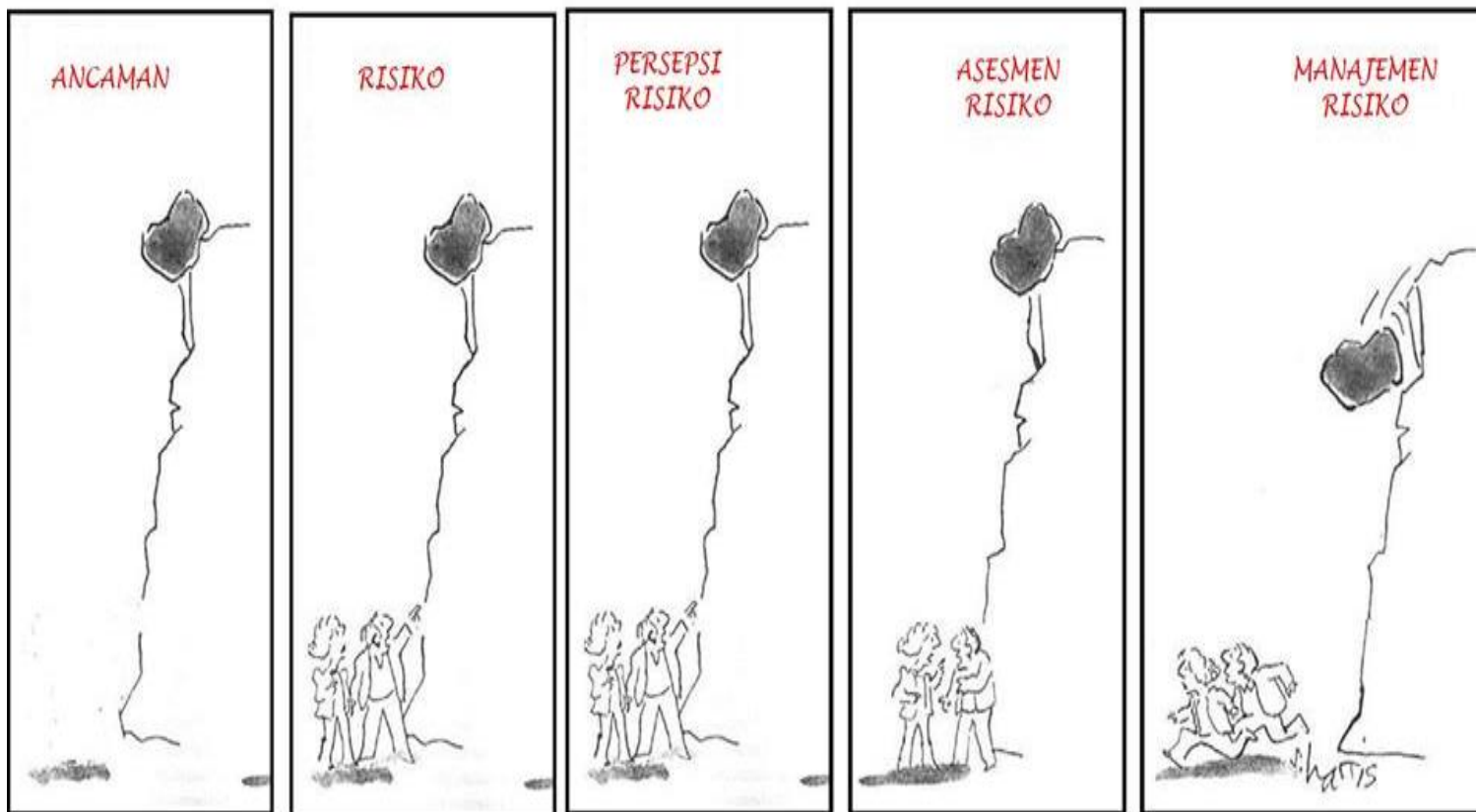








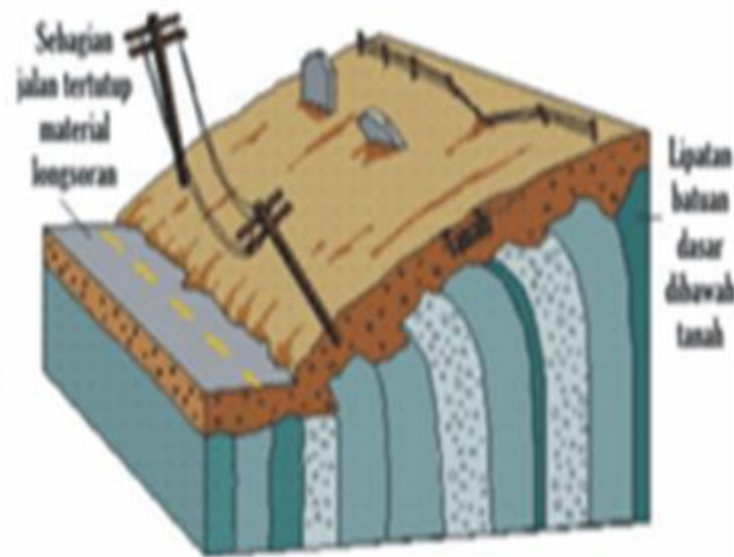
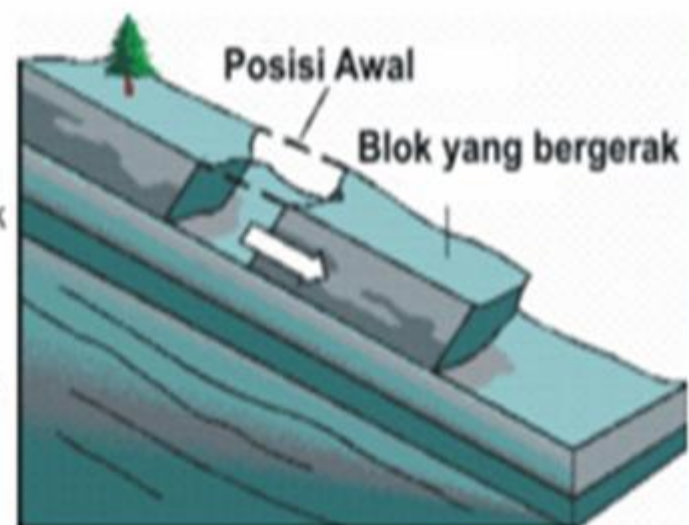
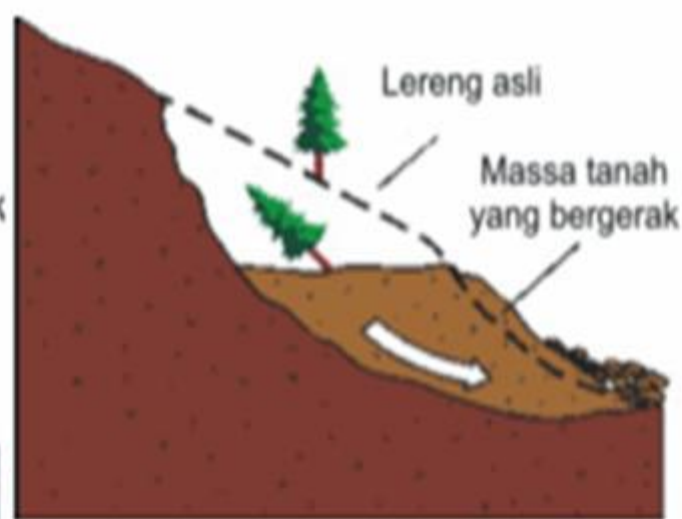
MENGENAL ANCAMAN DAN RISIKO



BENCANA

Kita kenal, kita selamat dan bisa menyelamatkan

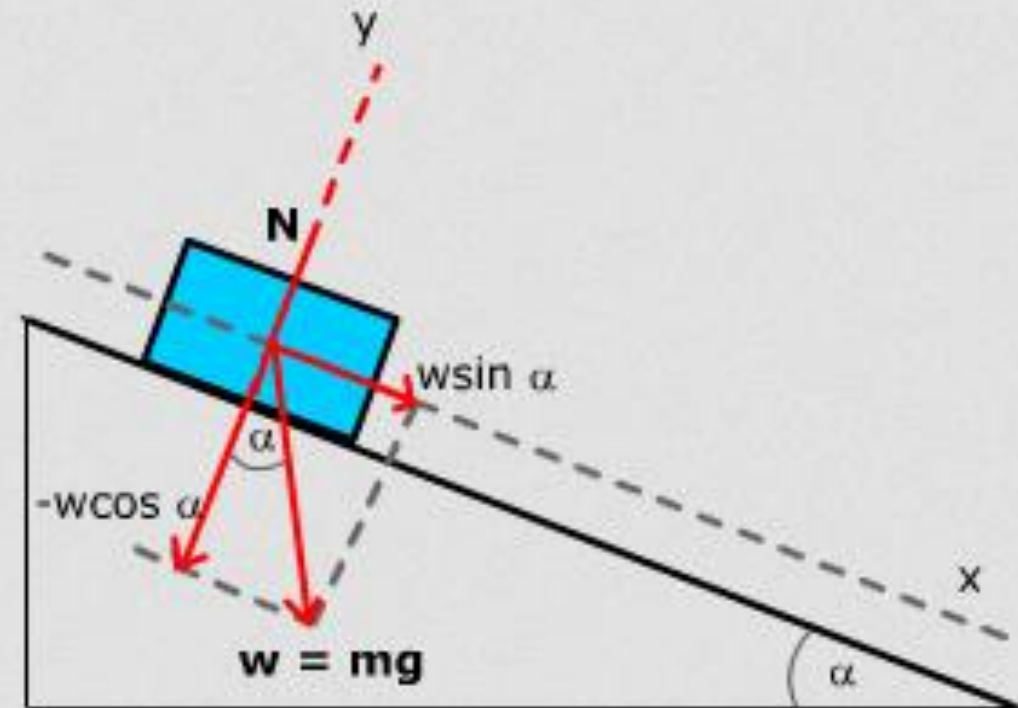
Macam macam Longsor





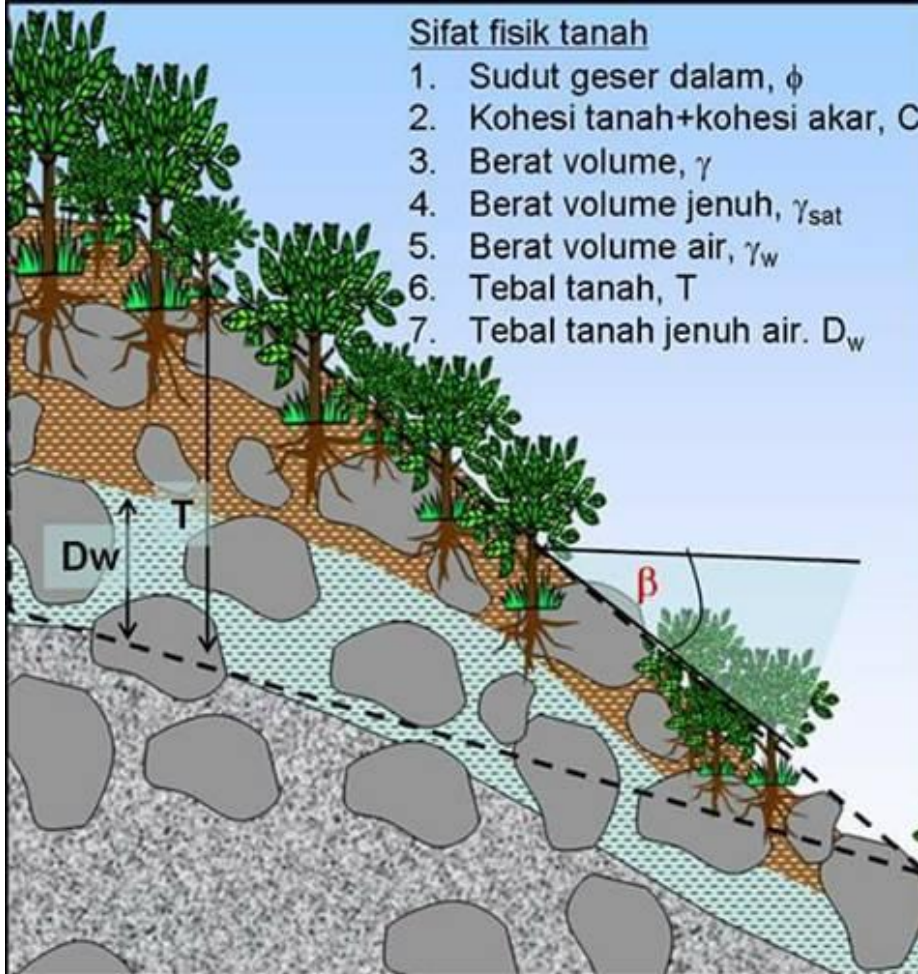


LONGSOR IDENTIK DENGAN GERAK BENDA DI BIDANG MIRING



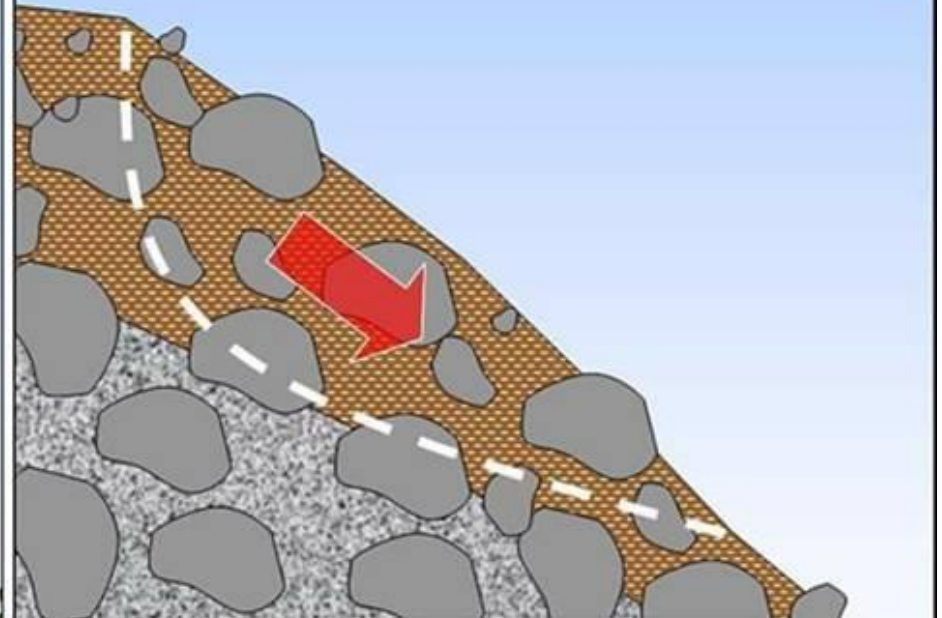
Sifat fisik tanah

1. Sudut geser dalam, ϕ
2. Kohesi tanah+kohesi akar, C
3. Berat volume, γ
4. Berat volume jenuh, γ_{sat}
5. Berat volume air, γ_w
6. Tebal tanah, T
7. Tebal tanah jenuh air. D_w



$$Fk = \frac{C}{\gamma_{sat} T \cos^2 \beta \tan \beta} + \frac{\gamma_{sat} - \gamma_w}{\gamma_{sat}} \frac{\tan \phi}{\tan \beta}$$

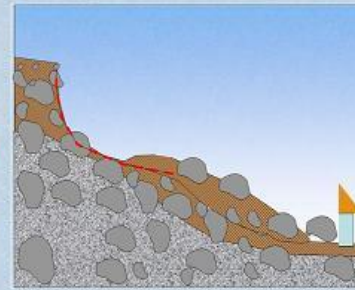
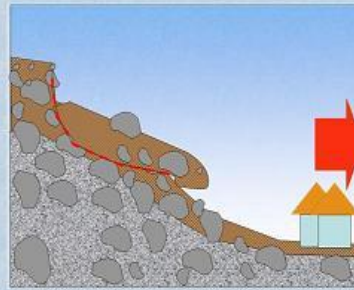
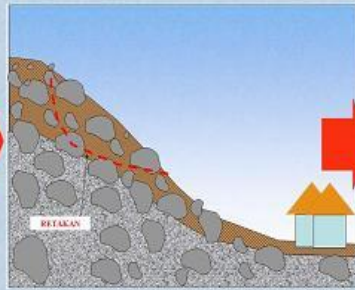
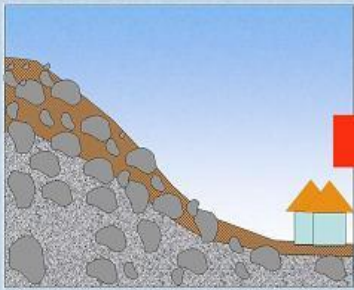
TANAH KRITIS/LONGSOR DIPICU PENEBAANGAN HUTAN



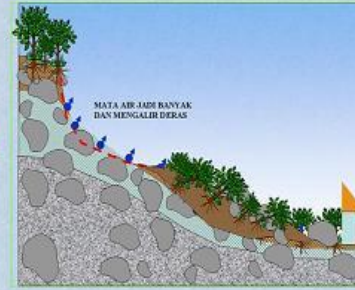
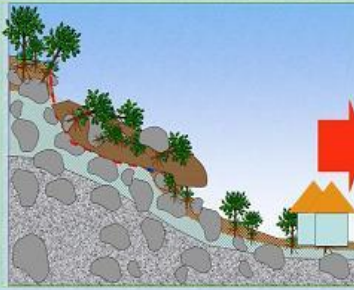
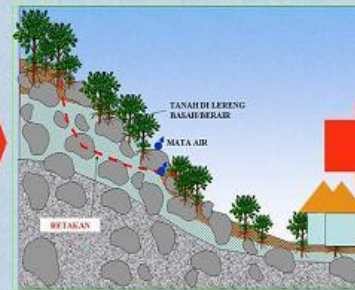
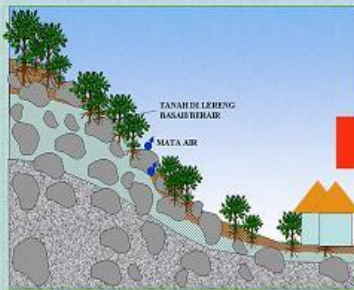
SAAT HUTAN DITEBANG **KOHESI TANAH+AKAR** AKAN BERKURANG, **FK** TURUN SEHINGGA TANAH DI LERENG AKAN KRITIS/LONGSOR. Tanah akan LONGSOR bila ada penambahan air, ada penambahan beban (misal didirikan bangunan atau dibuang sampah), ada getaran dll



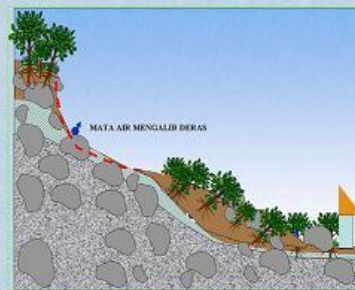
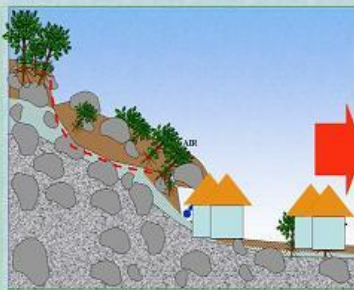
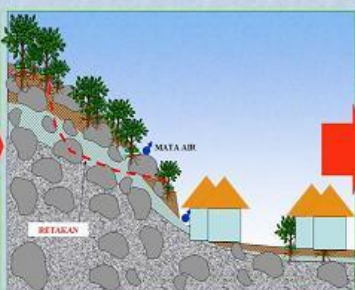
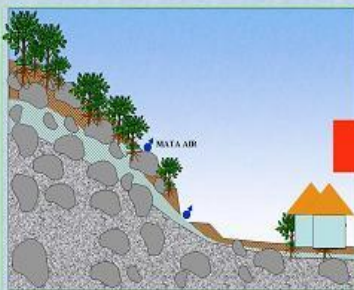
6 PEMICU DAN PENYEBAB LONGSOR



Pengurangan vegetasi (terbakar dan atau dibakar, tercabut angin ribut, ditebang legal dan atau ilegal).



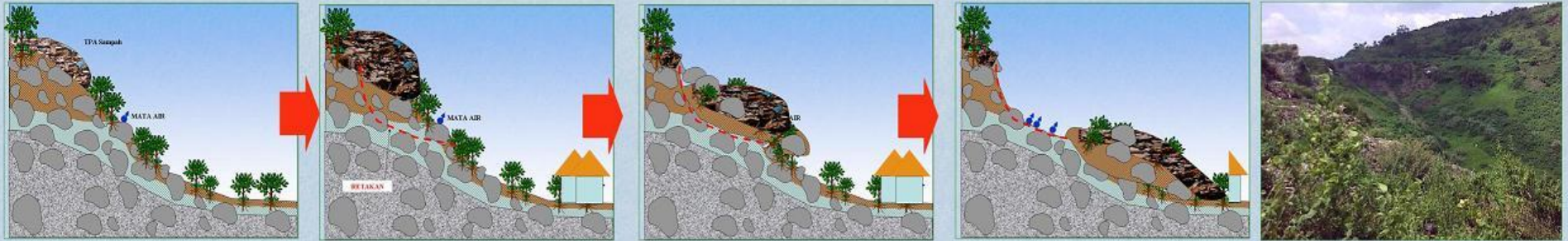
Penambahan Air (air hujan terus menerus, air kolam/sawah, air resapan dari septik tank)



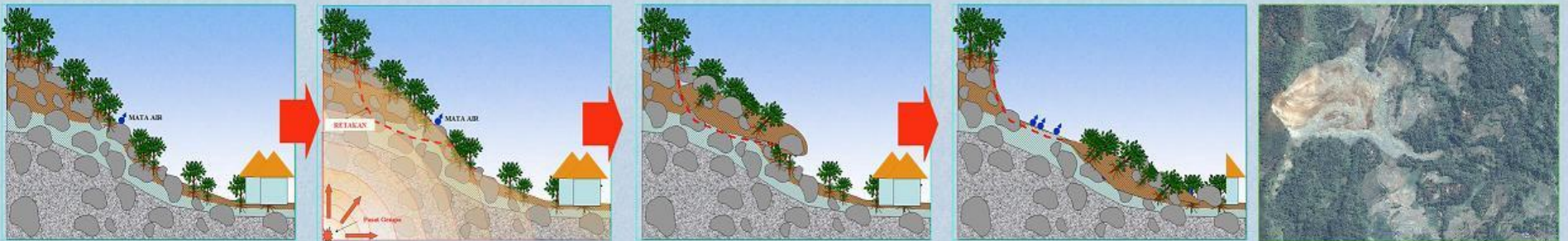
Terpotongnya lereng bagian bawah (karena erosi sungai, longsor, penambangan, terowongan, pembuatan jalan, pelebaran rumah di tepi lereng)



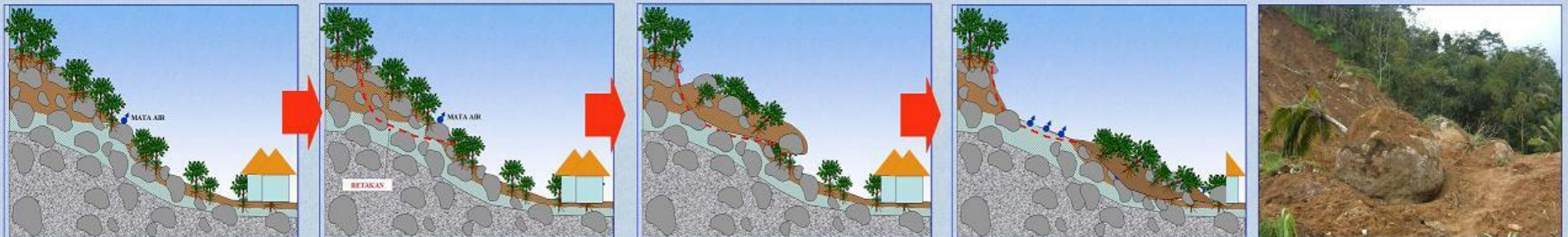
6 PEMICU DAN PENYEBAB LONGSOR



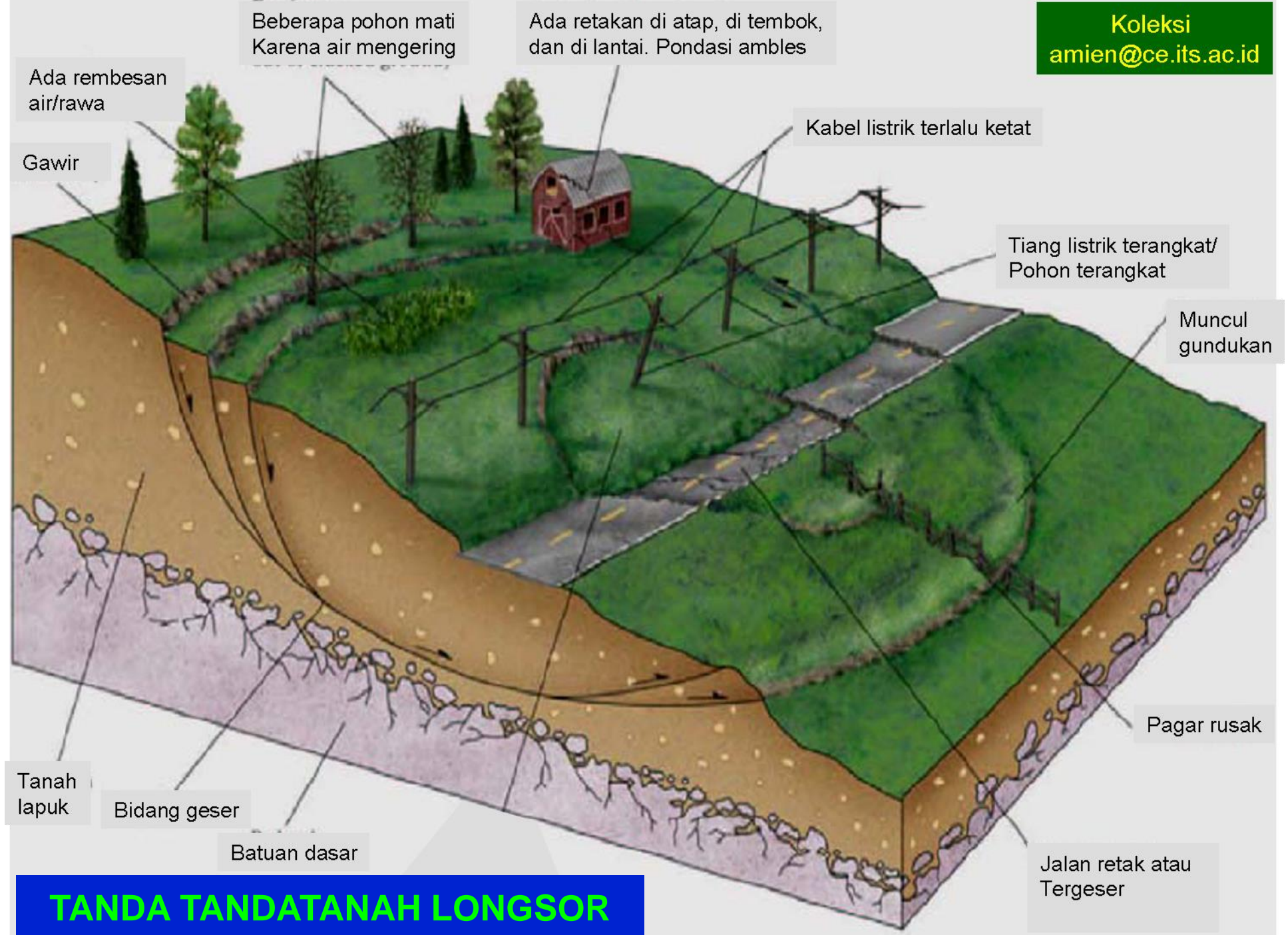
Penambahan beban (penambahan tanah akibat longsor tanah di atasnya, diurug tanah untuk pelebaran rumah, tempat pembuangan sampah)



Getaran (gempa, bom, kendaraan berat, kereta api)



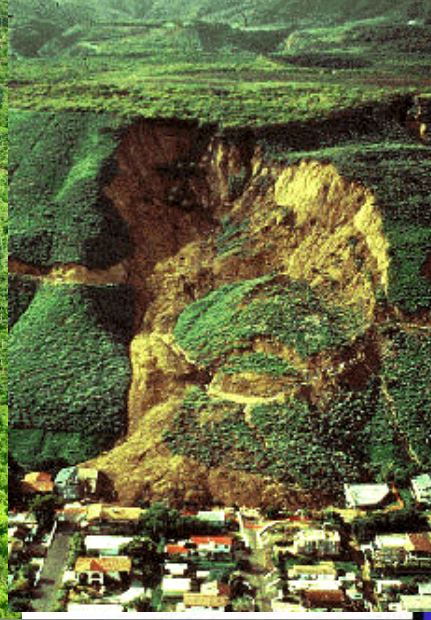
Pelapukan dan Proses Kimia (pelindihan senyawa atau unsur pengikat tanah, translokasi mineral lempung)



TANDA TANDATANAH LONGSOR



Longsor di Trenggalek 2006



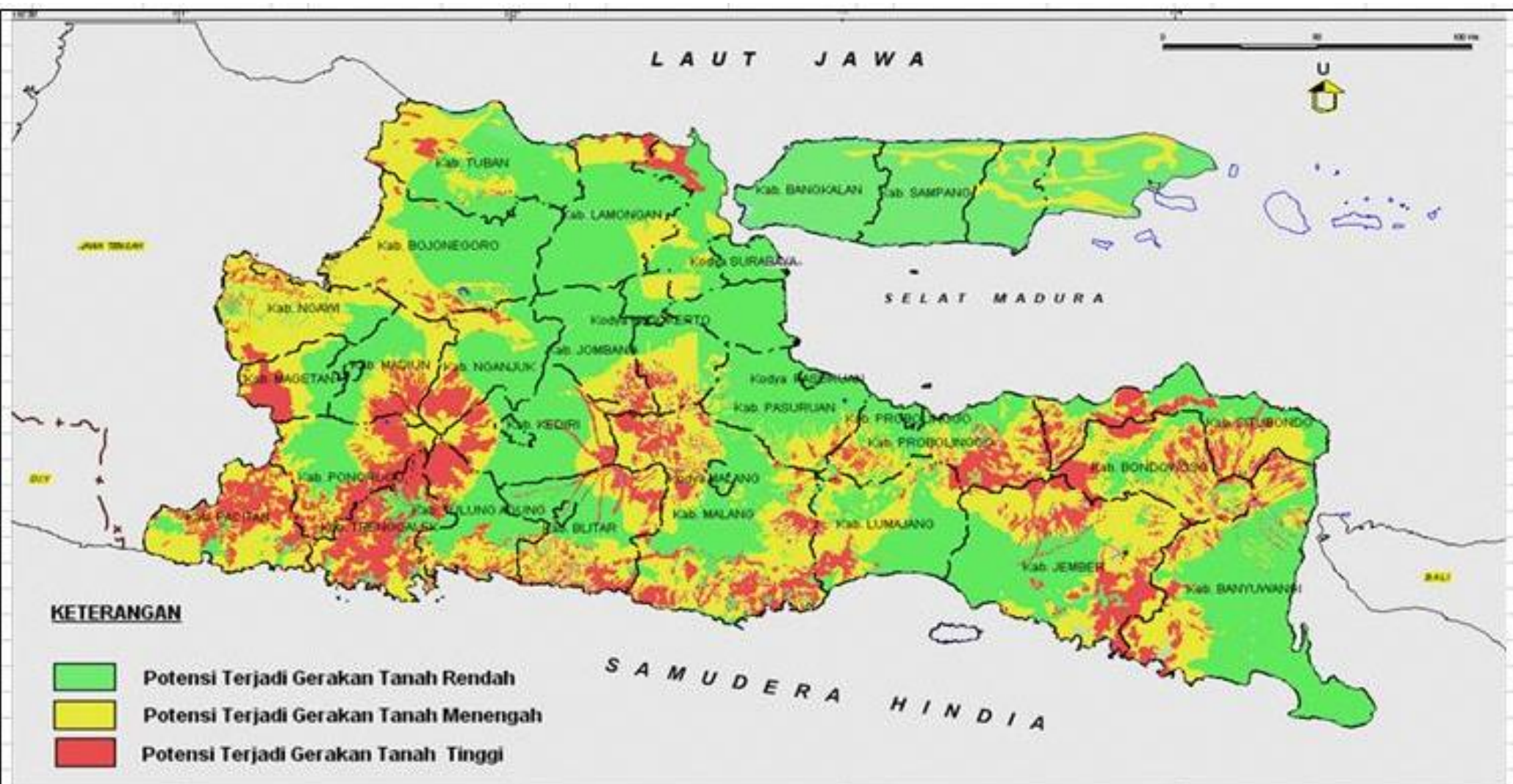
Longsor di Leuwigadjah 2005



Longsor Banjarnegara 2006



Longsor di Arjasa 2001



amien@ce.its.ac.id

DEPARTEMEN ENERGI DAN SUMBER DAYA MINERAL
 BADAN GEOLOGI
 PUSAT VULKANOLOGI DAN MITIGASI BENCANA GEOLOGI
 Jalan Diponegoro no. 57 Bandung



Diselektanakan Oleh Amien Widodo, 08121780246



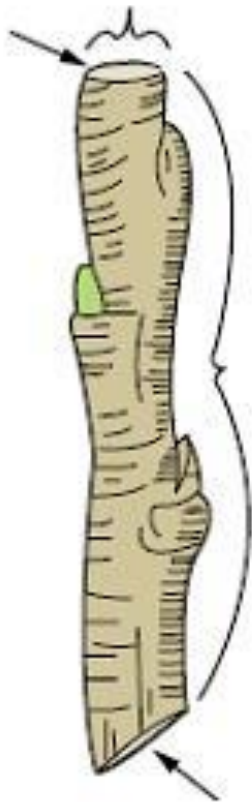
BIOENGINEERING

Rekayasa Vegetasi untuk mencegah dan atau mengurangi risiko longsor yang dilakukan bersamaan dengan upaya reboisasi. Kalau hanya reboisasi tanah masih bisa longsor atau tererosi.



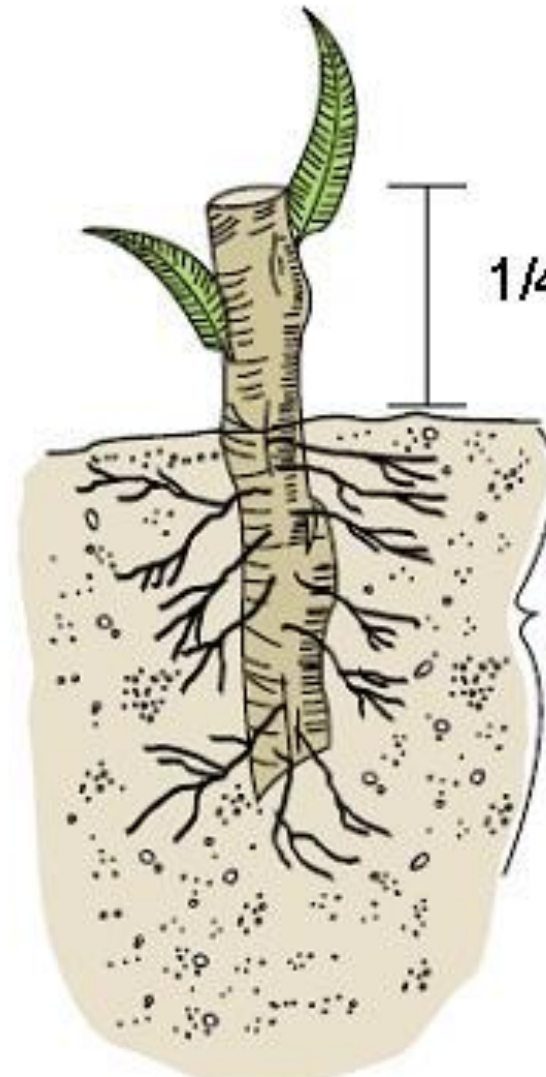
Diameter 2-5 cm

datar



50 – 100 cm

menyudut



1/4-1/3 bagian

2/3-3/4
bagian
batang

Dimensi setek pohon yang akan ditanam sebagai upaya rekayasa vegetasi

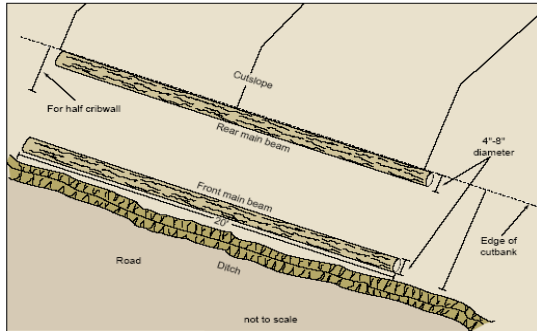


Figure 4—Live cribwall construction.

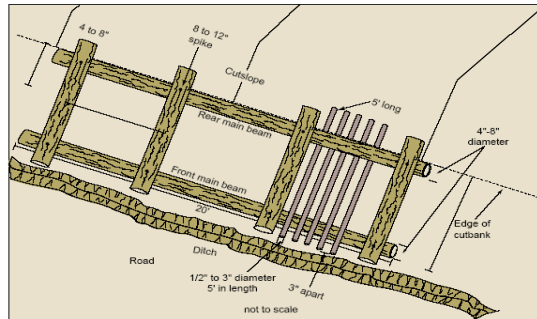


Figure 5—Live cribwall construction.

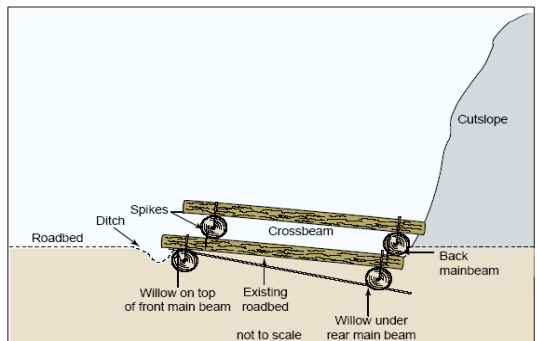


Figure 6—Live cribwall construction.

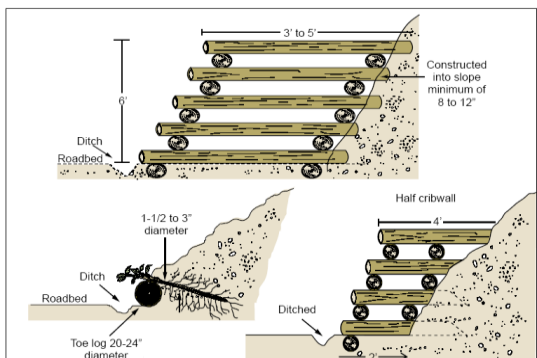
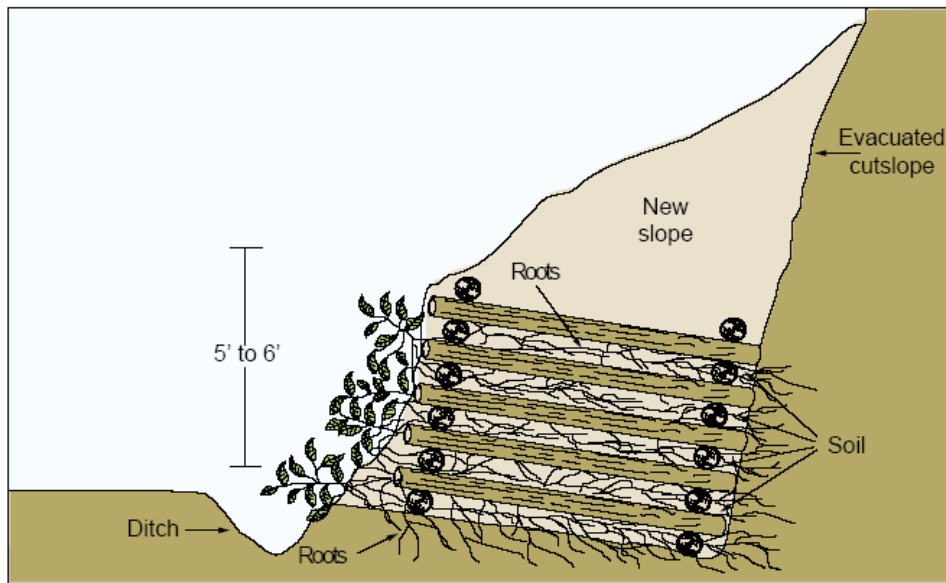


Figure 7—Live cribwall-stepped full, half and toelog construction.



Live cribwall during construction. USDA Forest Service



Live cribwall

LOG
TERRACE



Installation - cutslope stabilization with log terracing. USDA Forest Service

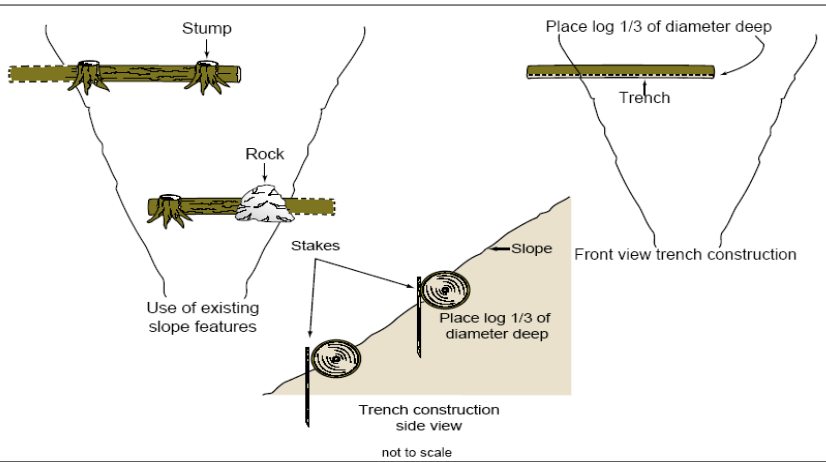
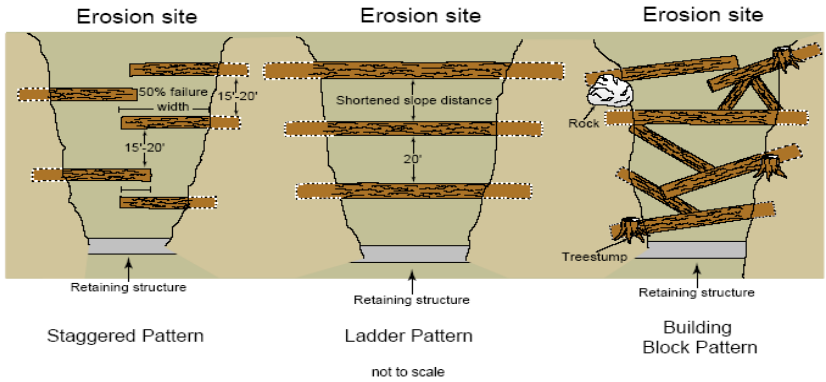


Figure 16-Log terrace construction.

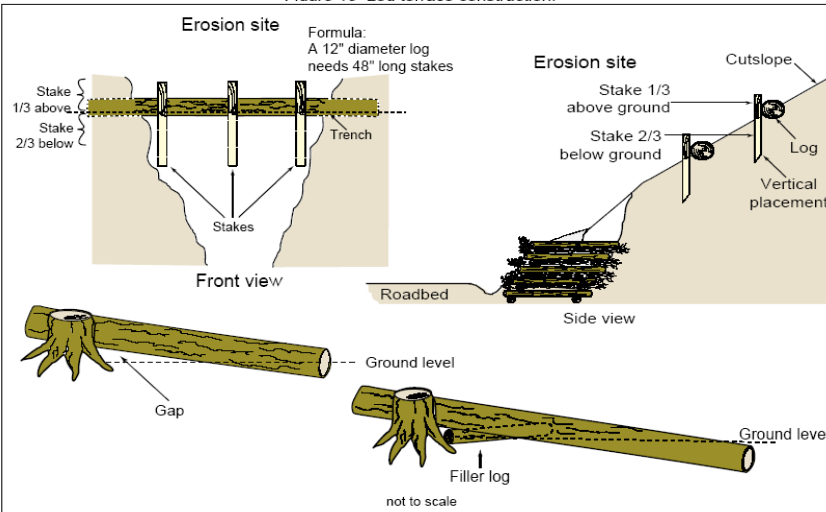
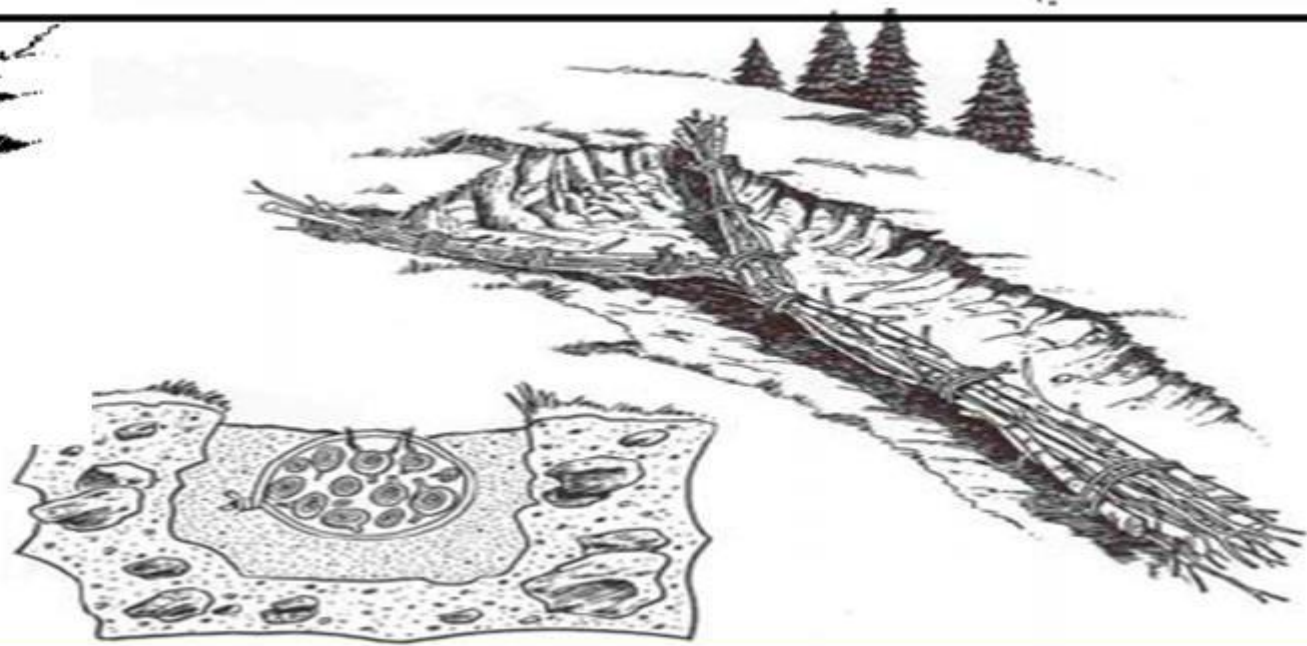
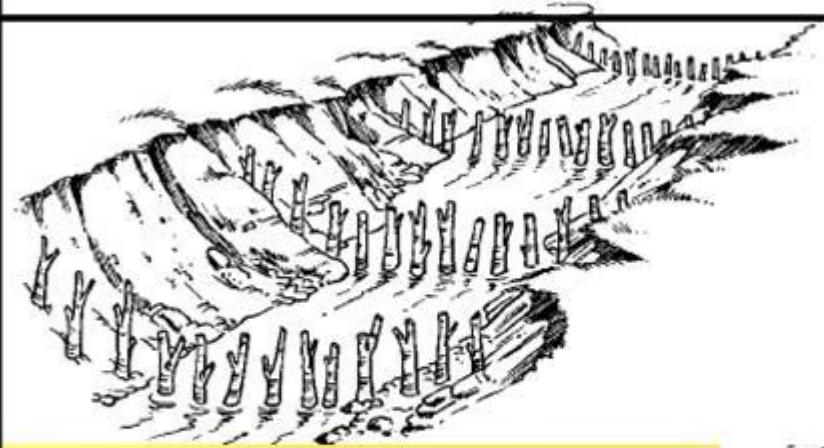
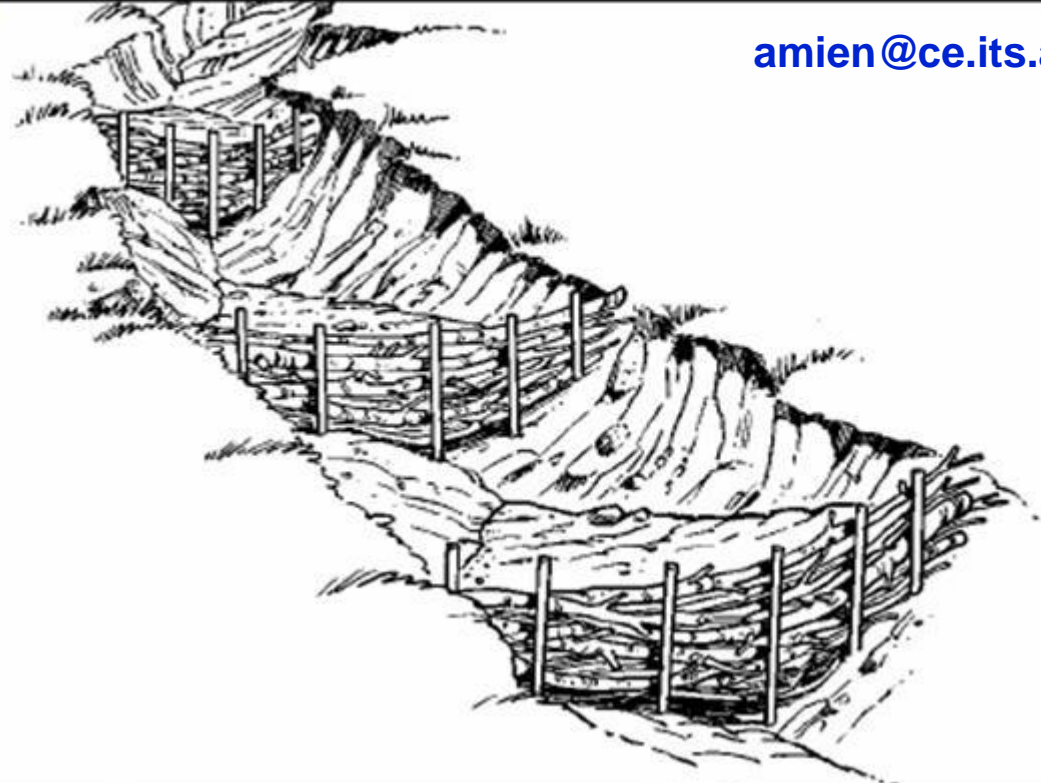
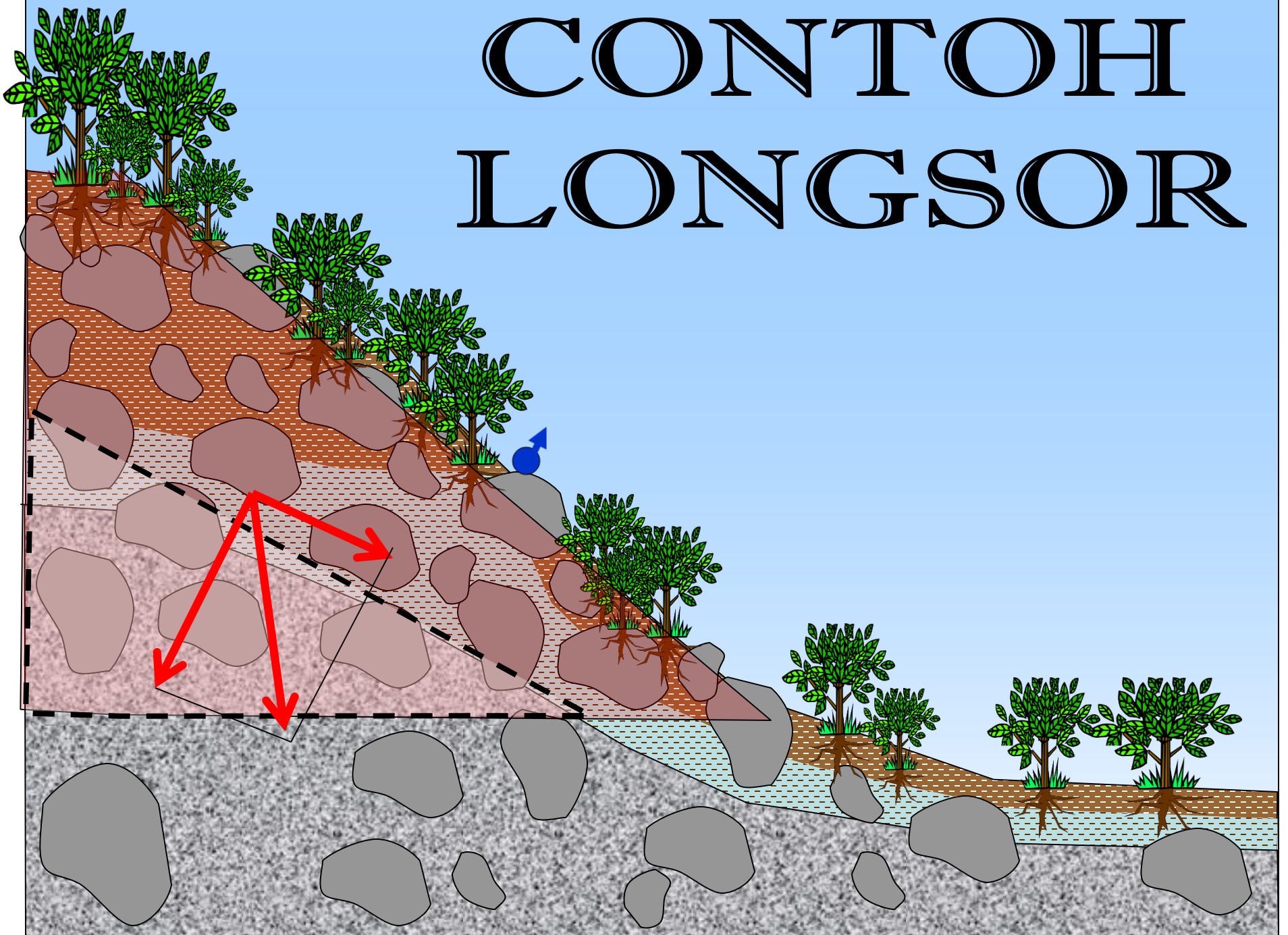


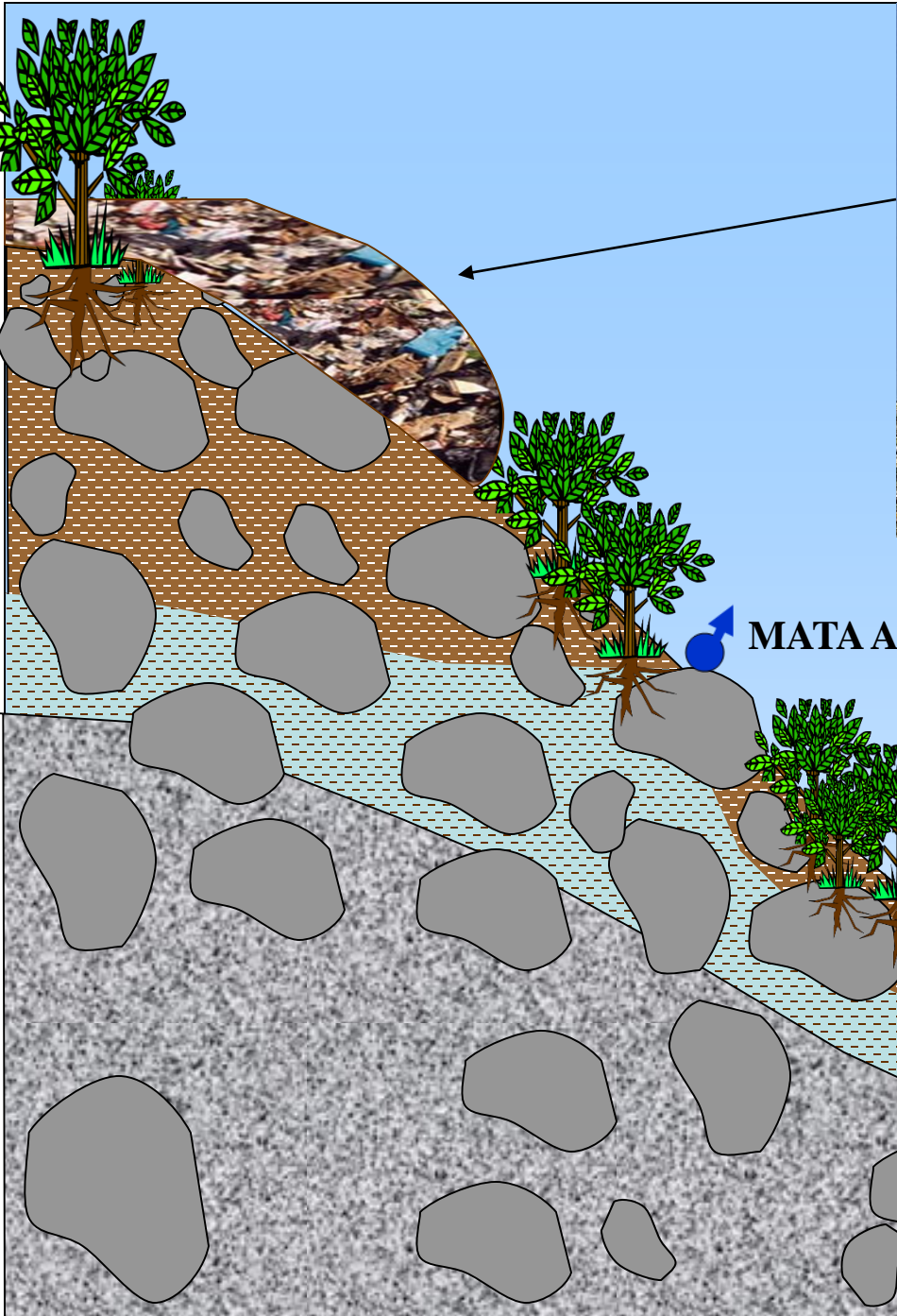
Figure 17-Anchoring and filling gaps.



Stabilisasi Alur sungai

CONTOH LONGSOR





MATA AIR

**LONGSOR DIPICU
PENAMBAHAN
BEBAN (SAMPAH)**

