

Fig. 1 Geographical location of the study area

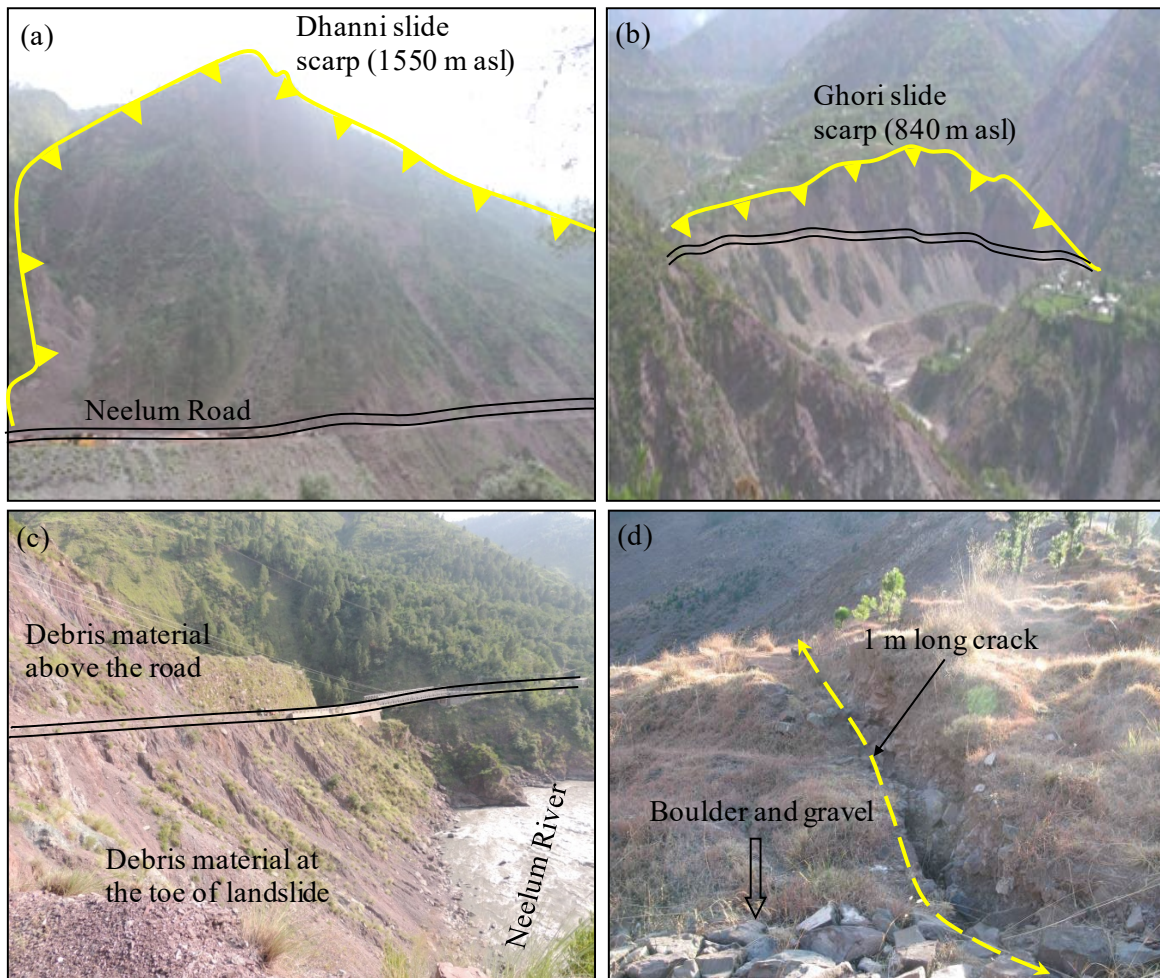


Fig. 2(a) Overview of Dhanni landslide (b) Overview of Ghori landslide (c) Material deposited above the main road and toe of the Ghori landslide (d) 1 meter long crack on the scarp of Dhanni landslide

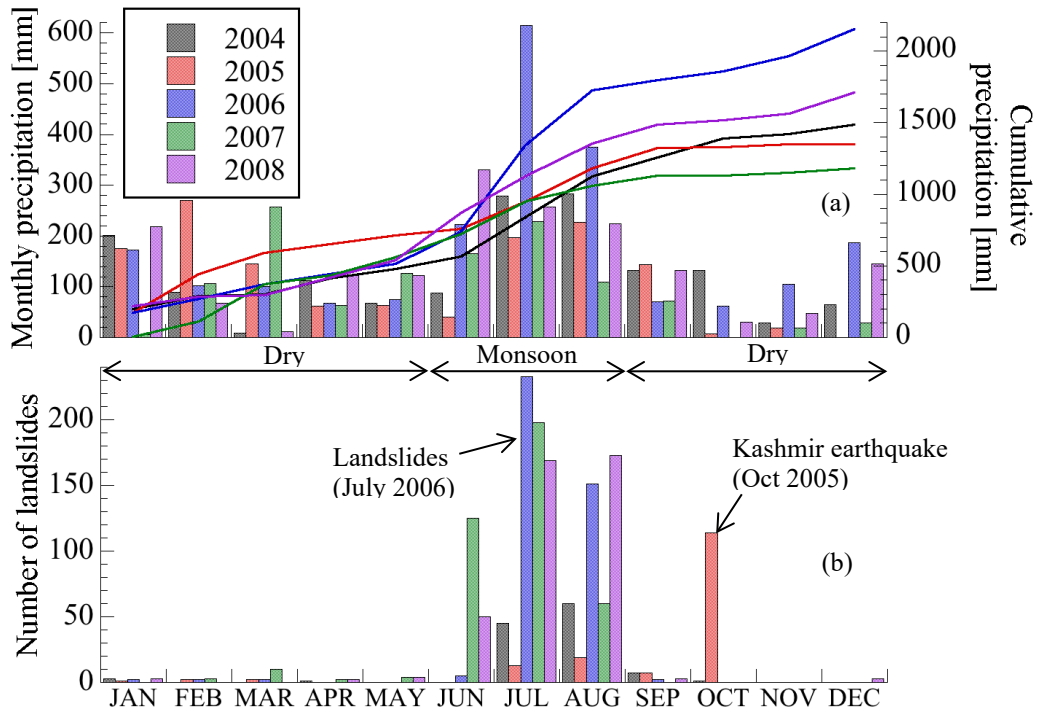


Fig.3(a) Rainfall characteristics at Muzaffarabad station and (b) number of landslides in District Muzaffarabad AJK, Pakistan from 2004-2008

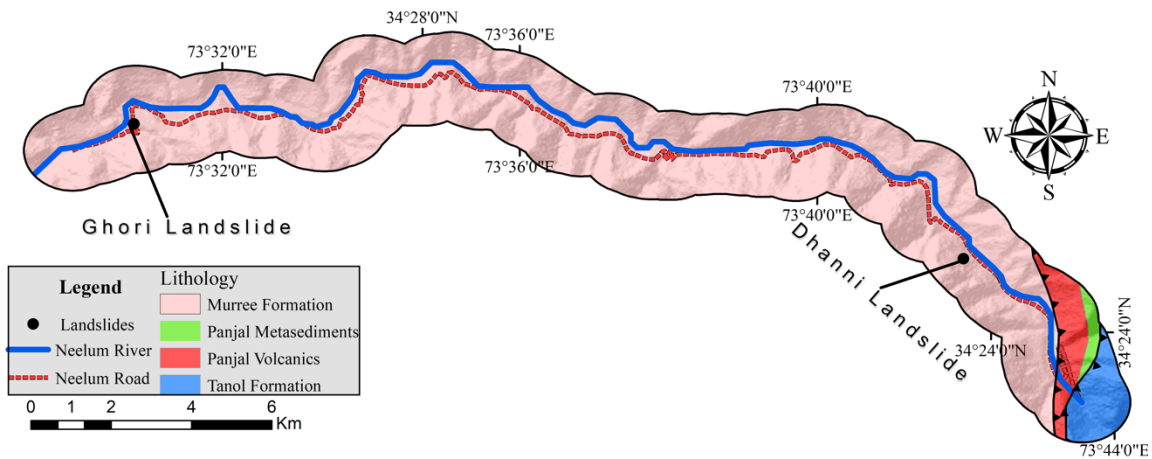


Fig. 4 Geology of the study area.

Table 1. Geometric characteristics of the landslides

	Ghorri landslide	Dhanni landslide
Crown elevation (m)	840	1550
Length(m)	138	850
Width (m)	190	650
Estimated depth (m)	3-4	8-10
Height (m)	120	630
Total surface area (m ²)	26,082	56,7735
Deposit area (m ²)	8561	25,3504
Estimated volume (m ³)	10,4328	56,77350
Geological period	Miocene	Miocene

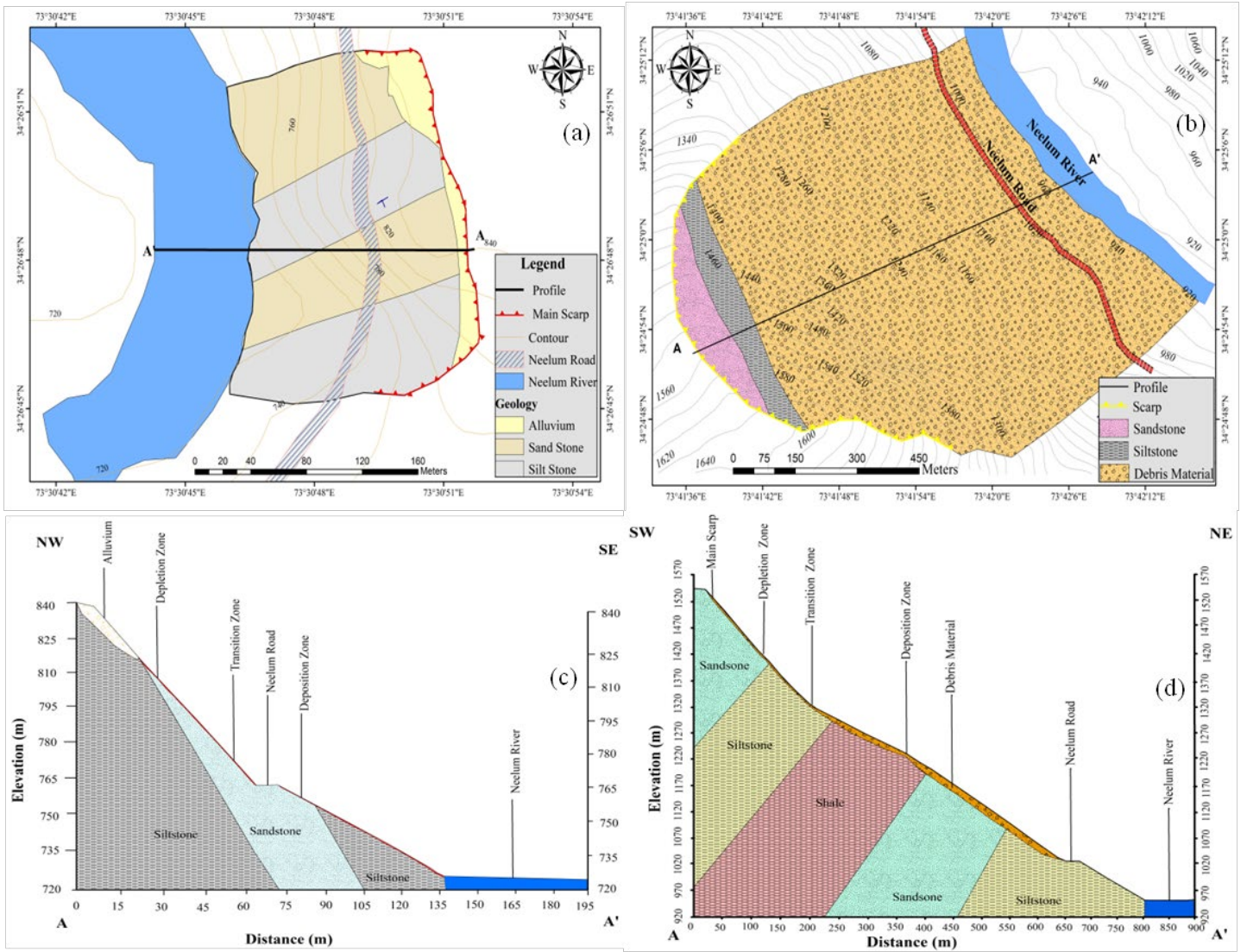


Fig. 5(a) Geological map of Ghori landslide (b) Geological map of Dhanni landslide (c) longitudinal profile of Ghori landslide (d) longitudinal profile of Dhanni landslide

Table 2. Physical properties of the tested material

	Dhanni landslide	Ghori landslide
Specific gravity, G_s	2.71	2.65
Maximum dry density, ρ_{dmax} (g/cm ³)	1.87	1.99
Minimum dry density, ρ_{dmin} (g/cm ³)	1.51	1.54
Minimum specific volume, v_{min}	1.45	1.33
Maximum specific volume, v_{max}	1.79	1.72
Liquid limit, w_l (%)	15.0	19.5
Plastic limit, w_p (%)	NP	NP

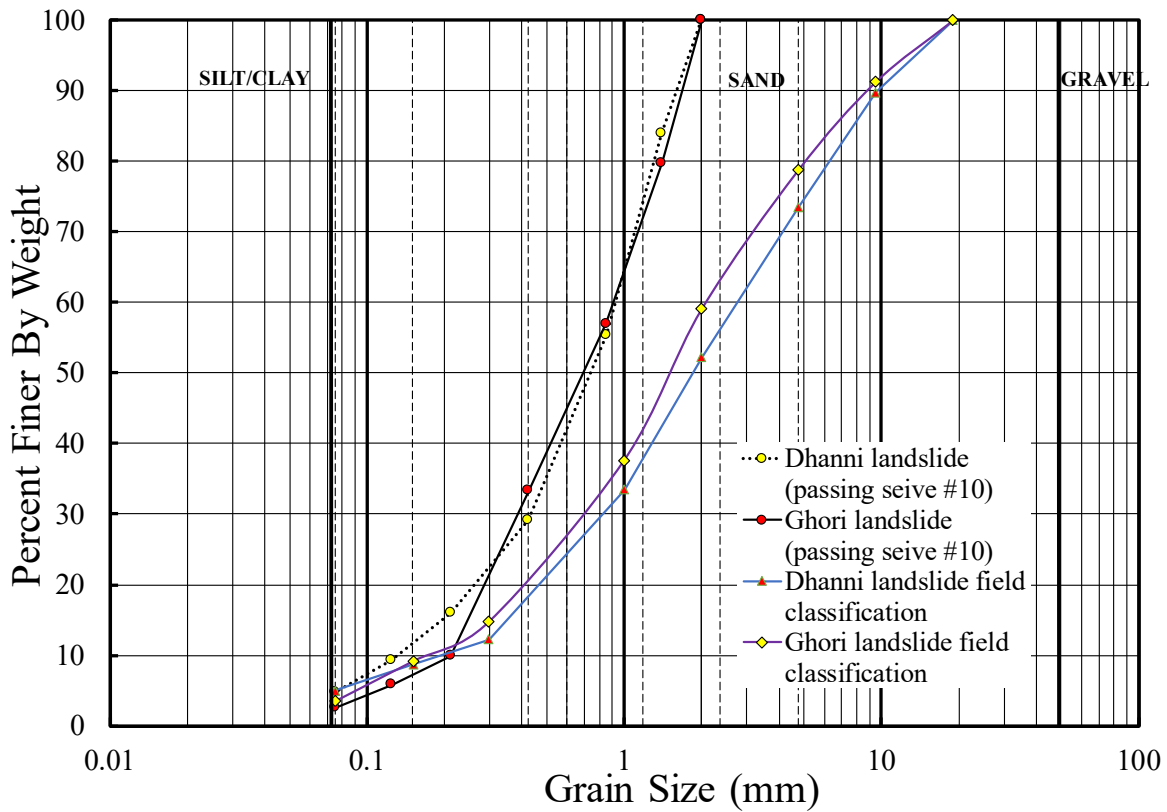


Fig. 6 Grain size distribution of soils collected from the middle of Ghori and Dhanni landslide

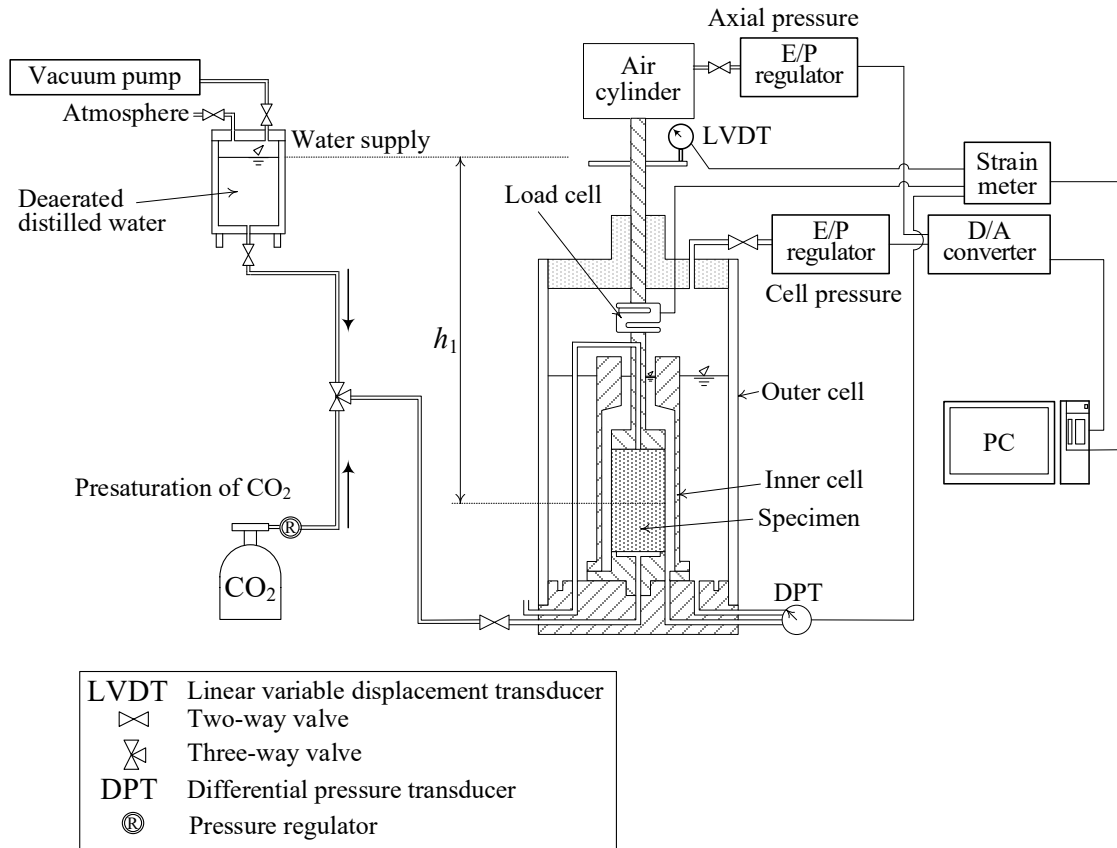


Fig. 7 Schematic figure of the triaxial testing apparatus with wetting path and double-cell type volume measurement system

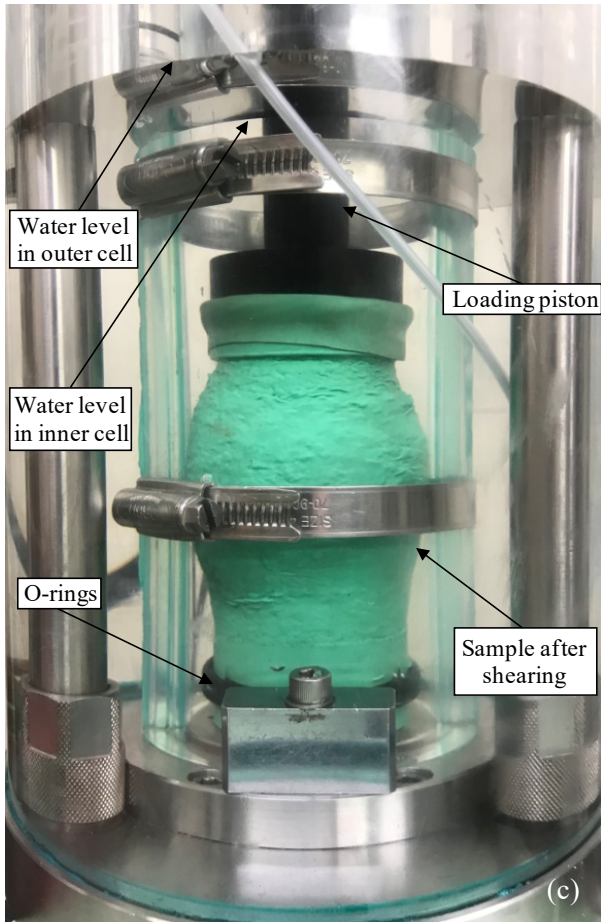
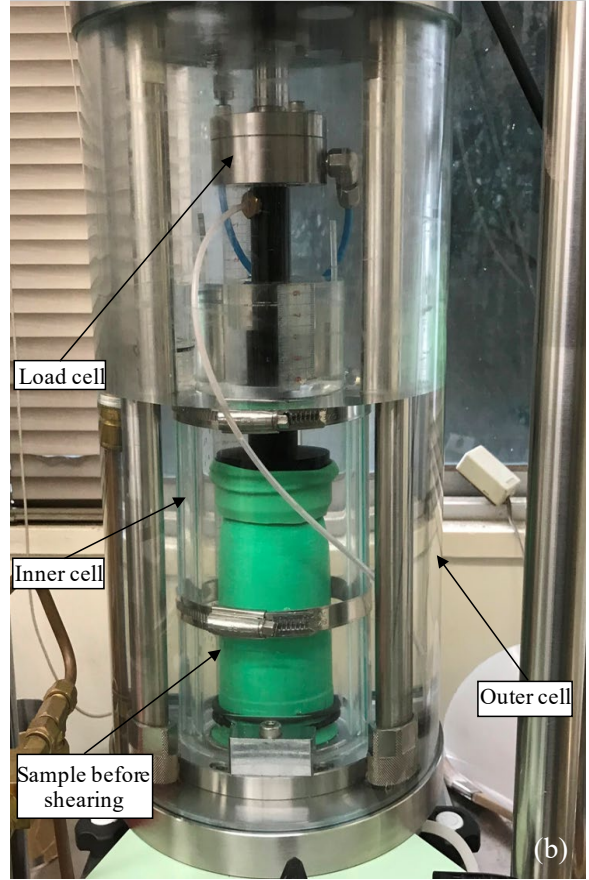


Fig. 8 (a) Soil sample before testing, (b) soil specimen after consolidation, (c) bulging failure of soil specimen after shearing, and (d) soil specimen after testing

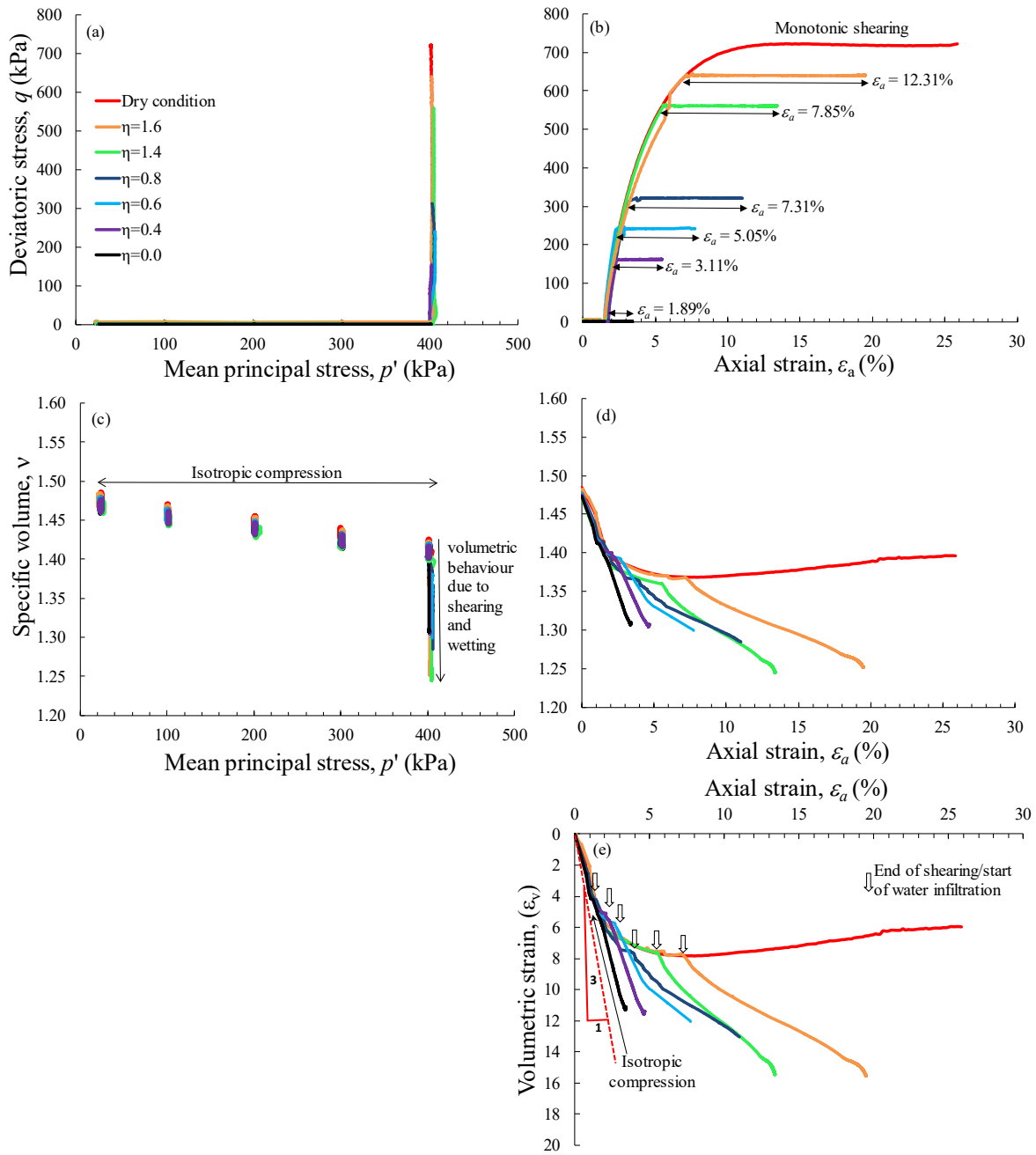


Fig. 9 CD triaxial test results of Ghori landslide

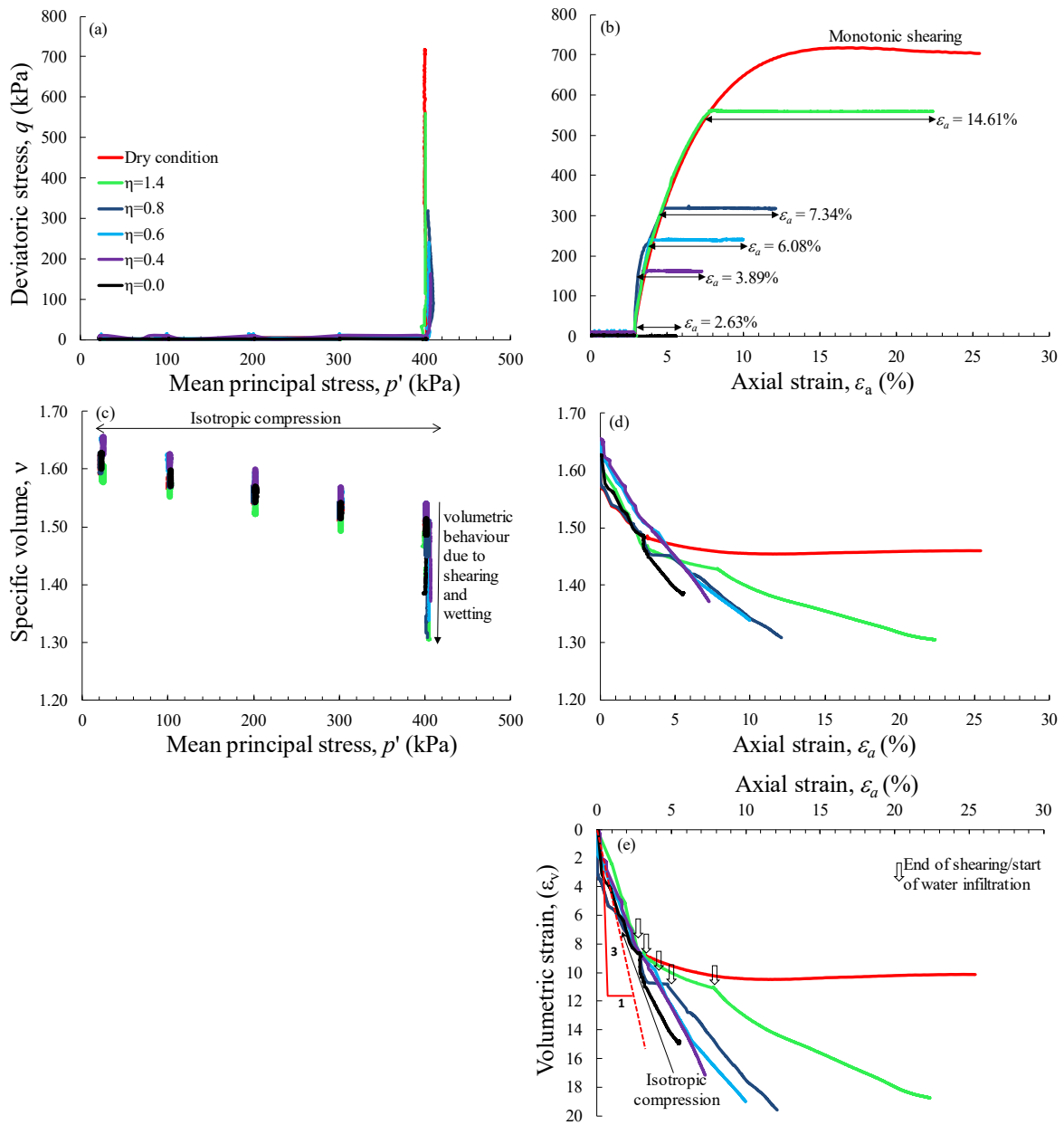


Fig. 10 CD triaxial test results of Dhanni landslide

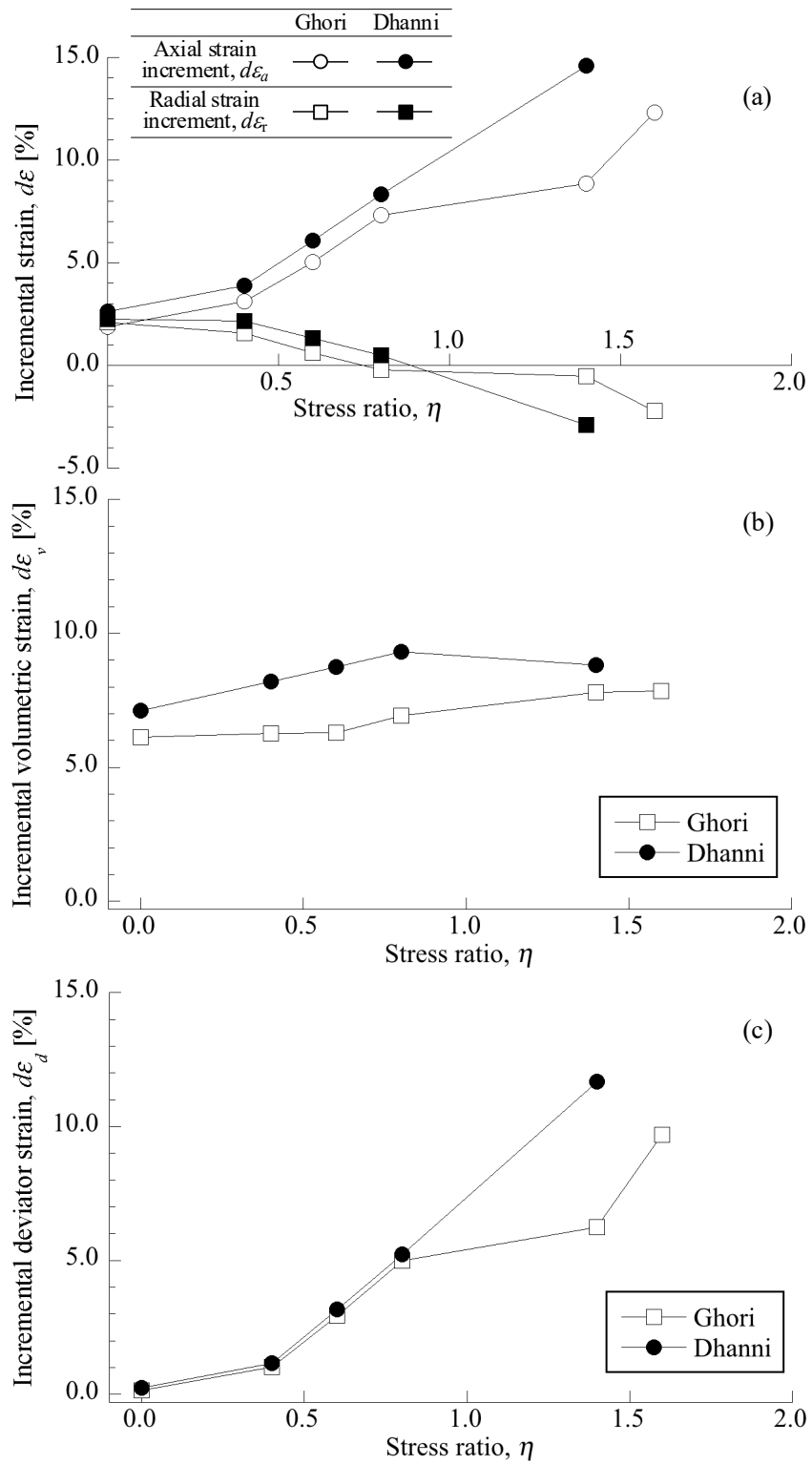


Fig. 11 Wetting-induced deformation of soils of Ghori and Dhanni landslide with deviatoric stress ratio