No detailed information has been provided on the velocity structure of the crust and the upper mantle of Nigeria till-date. In this study, the depth distribution of seismic wave velocities over southwestern Nigeria was determined using teleseismic surface waves of different azimuths recorded by our network using 3-component broadband single-station between November 2007 and 2010. The group velocities of Rayleigh and Love waves with surface wave magnitude greater than 6 in the period range of 20 – 80 s were inverted for plane-layered shear-velocity structure. The shear-velocity of the crust increases gradually from about 3.27 to 4.17 km/s. The Lower crust was found at depth 37.5 km. The upper mantle shear-velocity increases from about 4.39 to 4.48 km/s between depth 37.5 and 87 km and a low velocity layer between depth 87 and 165 km. P velocities were generated from a $V_p$ to $V_s$ ratio of 1.78 obtained from Wadatti diagram. Further studies on seismic edata from many stations when available in this area will help to improve the results obtained in this study.