Decadal to bi-decadal rainfall variation in the Western Pacific during July-October in the second half of the 20th century was identified in this study. This 10-20-year quasi-periodic oscillation was found associated with the leading sea surface temperature (SST) pattern in the South Pacific, which is called the 10-20-yr South Pacific (inter) Decadal Oscillation (SPDO). It is suggested that the 10-20-year fluctuation of the SPDO resulted in significant 10-20-year rainfall variation along the western Pacific coast. The anomalous divergent circulations were likely driven by the SSTA (SST anomaly) and resulted in the anomalous rainfall in Eastern Australia and the Maritime Continent. It is conjectured that the SSTA in the Western South Pacific led to an anomalous Hadley-like circulation in the Western Pacific and indirectly affected the convection activity in the Philippine Sea, which in turn impacted the rainfall in the Philippines, Taiwan and Korea.