Lead (Pb) and cadmium (Cd) concentrations were determined in muscle, gonad, liver and brain of tilapia fish caught from fish ponds in Machakos and Kiambu counties in Kenya. A total of 217 fish samples were randomly sampled from the two counties. Acid digestion method and atomic absorption spectrophotometer were used for analysis. Heavy metal concentrations varied significantly depending on the type of tissue analyzed. Generally, the highest concentration of Pb was detected in brain and the liver. Fish organs contained Pb in the following order: brain > liver > muscle > gonad, while Cd followed the order: brain > liver > gonad > muscle. Kiambu county recorded higher concentration of the studied heavy metals compared to Machakos county although statistically there was no difference. Lead and Cd content in both counties studied exceeded the maximum allowable limit. The study recommended controlling industrial and agricultural effluents into surface water and proper sitting of ponds to minimize the risk of contamination of farmed fish by heavy metals.