The under-representation of women in the doctoral mathematical sciences is a great concern to the mathematics community in the United States. Successful efforts made to increase their participation merits the attention of policymakers, higher education administrators and researchers. This study examines two university math departments that have succeeded in increasing the participation of women at the doctoral level in recent years, through qualitative case studies conducted in 2003-05. We analyzed interview data from 10 faculty and 8 female graduate students. The findings of this study revealed that departmental leaders took a personal initiative to identify the problem of the under-representation of women in math and made it a departmental priority for action. Through their initiatives, with the support of faculty, recruitment and retention policies and practices were formulated, adopted and implemented. These leaders played a very active role in the selection and retention process of the recruits. The findings of this study will act as a benchmark to other mathematics departments and policymakers who are interested in the success of women in doctoral level mathematical sciences. (Received September 22, 2006)