In this study, smart nanocomposite films possessing both thermal and water/moisture responsiveness were produced with addition of cellulose nanocrystallite (nanowhisker) (5, 10 and 20 wt%) as nanofiller material. The water/moisture responsiveness was obtained by this modification which is easier than chemical synthesis of the polymer and dual sensitivity of the produced nanocomposite films were examined in detail by thermo-mechanical-aqueous shape memory test procedures. Additionally, particle distribution and matrix-nanofiller interactions of the produced films were investigated by SEM, FT-IR and XRD analyzes. According to the results, it was found that mechanical properties of the films improved as expected. Moreover, besides thermal sensitivity, water/moisture sensitivity increased proportional to the cellulose nanocrystallite (nanowhisker) concentration.