Heterotrimeric G-proteins, composed of Gα, Gβ, and Gγ subunits, are ubiquitous and important signaling elements in eukaryotes. The Arabidopsis genome encodes one Gα subunit (GPA1), one Gβ subunit (AGB1), and three known Gγ subunits (AGG1, AGG2, and AGG3). We have shown that T-DNA insertional mutation of GPA1, AGB1, and AGG3 affects ABA signaling and ion channel regulation in guard cells. In whole-plant drought resistance experiments, we have demonstrated that agb1 mutants exhibit improved yield stability (seed production) under drought conditions. We have also identified two novel transmembrane proteins, GTG1 and GTG2, which both interact with GPA1 and themselves have GTP binding and GTPase activity. The GTG proteins also bind ABA, and their double knockout results in ABA-hyposensitive phenotypes.