Pulses production is an integral component of low-input agriculture system run by resource poor farmers of arid and semi-arid areas. Harsh, erratic and less predictable climatic conditions are characteristic features of such areas which limit the sustainable production of pulses. Elevated level of ethylene (plant endogenous stress hormone) is one of the key factors, which contribute for poor growth and yield of pulses under arid/semiarid regions and responsible for failure in rhizobium-legume symbioses. Some plant growth promoting rhizobacteria (PGPR) having an enzyme 1-aminocyclopropane-1-carboxylate (ACC) deaminase can facilitate plant growth by decreasing the ethylene levels. In the present study, number of rhizobial strains and PGPR having ACC-deaminase activity were isolated from nodules and rhizosphere of mung bean, chickpea and lentil, respectively, collected from different areas of Pakistan. The rhizobial and rhizobacterial isolates of each pulse crop were tested alone as well as in combinations under axenic conditions to screen effective multi-strain combinations for promoting the growth and nodulation. Selected combinations of rhizobia and rhizobacteria were evaluated in pot and field conditions for promoting growth, nodulation and yield. Locally available carrier materials were tested with efficient multi-strain combination for enhancing its efficiency under pot and field conditions. Survival competency of efficient multi-strain combinations was also tested in these carriers. In extensive field evaluation, efficient multi-strain bacterial combinations with appropriate carrier improved the grain yield of mung bean, lentil and chickpea by 14, 16 and 19%, respectively. Thus, it can be concluded that use of multi-strain inoculation with appropriate carrier could be the most effective and novel approach for promoting the yield of legumes.