Flexible supply chain planning as an efficient way to cope with future uncertainties, our focus lies on low-frequency and high-impact supply chain risks. These catastrophic disruptions are forecasted based on Supply Chain internal and external Big Data analyses. Uncertainties are captured in a potential scenario tree, which is modeled by a multi-stage scenario tree. A stochastic programming model is used to determine a decision for each node of the scenario tree, given the information available at that node. The example shows a two-stage stochastic programming problem. The objective is to make the first stage supply chain plan taking into account potential catastrophic disruptions during the second stage to minimize supply chain costs for the whole considered time horizon.