In addition to the basic scientific goals, volcano monitoring has an essential additional component that should be considered in the framework of the data interpretation: the reduction of risk, which introduces a series of human factors related to the responsibilities involved in decision-making that may compromise many lives. It is essential to incorporate those factors in the conceptual frame of forecasting and monitoring volcanic activity, since the goals, methods and interpretations from the observations should be focused on the risk reduction. One of the key concepts involved in monitoring is the detection and recognition of eruption precursors. Defining precursor (other than previous eruptive activity) is not a simple task. The management of volcanic hazard has similarities with the management of seismic hazards. The analysis of the differences, derived from the nature of the phenomena, may clear up some of the inherent problems of volcano monitoring, namely, the recognition of precursors and causality. Following L.M. Jones classification for the management of seismic hazards, three types of volcanic phenomena may be discerned: chronicle (or informational), causal, and deterministic. Some considerations, experiences and results from the monitoring of two active volcanoes during the last 20 years are discussed, attempting to identify the factors involved in the forecasting of volcanic activity. The analysis of the evolution of Popocatépetl and Colima volcanoes hints that deterministic factors may be disclosed over periods of weeks to years before an eruption, but so far they can be recognized only in a very small proportion of the cases.