Although energy consumption of wireless sensor network has been studied extensively, we are far behind in understanding the dynamics of the power consumption along with energy production using harvesters. We introduce Energy Harvesting Routing Analysis (EHRA) as a formal modelling framework to study wireless sensor networks (WSN) with energy-harvesting capabilities. The purpose of the framework is to analyze WSNs at a high level of abstraction, that is, before the protocols are implemented and before the WSN is deployed. The conceptual basis of EHRA comprises the environment, the medium, computational and physical components, and it captures a broad range of energy-harvesting aware routing protocols. The generic concepts of protocols are captured by a many-sorted signature, and concrete routing protocols are specified by corresponding many-sorted algebras. A first analysis tool for EHRA is developed as a simulator implemented using the functional programming language F#. This simulator is used to analyze global properties of WSNs such as network fragmentation, routing trends, and energy profiles for the nodes. Three routing protocols, with a progression in the energy-harvesting awareness, are analyzed on a network that is placed in a heterogeneous environment.