Long term settlement on different planets of the solar system is a fascination for mankind. Some researchers contemplate that planetary settlement is a necessity for the survival of the human race over millions of years. The generation of food for self sufficiency in space or on planetary bases is a vital part of this vision of space habitation. The amount of mass that can be transported in deep space missions is constrained by the launcher capability and its costs. The space community has proposed and designed various greenhouse modules to cater to human culinary requirements and act as part of life support systems. A survey of the different greenhouse space concepts and terrestrial test facilities is presented, drawing a list of measurable factors (e.g. growth area, power consumption, human activity index, etc.) for the evaluation of greenhouse modules. These factors include tangible and intangible parameters that have been used in the development of an evaluation method on greenhouse concepts as a subsystem of planetary habitats at the DLR Institute of Space Systems, Bremen.