In Kenya, biomass energy accounts for 75% of the energy consumed for domestic heating and industrial process applications. This has lead to massive deforestation and environmental degradation. In seeking solutions, this project was undertaken to develop a solar concentrating system for process heat generation in Kenya. The goal of the study was to design, construct and evaluate the thermal performance of the solar tracking concentrator for process heat generation. The solar tracking concentrator was designed, constructed and tested under field conditions in Kenya from February to August 2004. About 70 trials were conducted to investigate its thermal performance. The system components included rotating support structure, tracking unit with cylinders loaded with evaporative solvents, collector assembly (parabolic concentrator and receiver) and heat recovery unit. Locally available materials (including shock absorbers, solvents, square metal tubes & plywood) were used to construct the system. The measured parameters included solar radiation, ambient temperature, wind speed, tracking cylinders temperatures, water inlet and outlet temperatures, water flow, air inlet and outlet temperatures, airflow and tracking angle. The tracking unit utilized solvents for its operation. Three types of solvents used included chloroform, carbon tetrachloride and methylated spirit. The tracking angle was read and recorded manually at a regular interval of 10 minutes. Average process temperature ranging between 41.8 ± 9.7°Cand 59.3 ± 147.7°C was generated with an average insolation of 665 ± 302.1 W/m^2 and 684.4 ±147.7 W/m^2 for the non-tracking and the solar tracking systems respectively. From 70 field tests conducted in Kenya with system loaded with methylated spirit, chloroform and carbon tetrachloride the following was concluded:

(a) Chloroform solvent with an average tracking accuracy of 82+13.2% proved to be better than that of carbon tetrachloride that had tracking accuracy of 74.1± 2.5%.

(b) The use of mirrors on the solar concentrator's surface and integration of a solar tracking system increased the thermal efficiency by an average of 9.0 ± 1.5%.

(c) Concentrating system loaded with chloroform showed potential to generate 82.5± 5kWh per day when operating with averaged solar radiation of 644.3 ± 30.5 kW/m^2. (d) The solar tracking concentrator loaded with chloroform solvent demonstrated great potential for use in process heat generation, industrial and agricultural drying operations in sunny countries.