ABSTRACT. Let T_1 and T_2 be homogeneous trees of even degree ≥ 4. A BM group Γ is a torsion-free discrete subgroup of $\mathrm{Aut}(T_1) \times \mathrm{Aut}(T_2)$ which acts freely and transitively on the vertex set of $T_1 \times T_2$. This article studies dynamical systems associated with BM groups. A higher rank Cuntz-Krieger algebra $\mathcal{A}(\Gamma)$ is associated both with a 2-dimensional tiling system and with a boundary action of a BM group Γ. An explicit expression is given for the K-theory of $\mathcal{A}(\Gamma)$. In particular $K_0 = K_1$. A complete enumeration of possible BM groups Γ is given for a product homogeneous trees of degree 4, and the K-groups are computed.