Rice breeding and crop research predominantly emphasize adaptation to ecological conditions, giving little attention to the ways local social organization and structure shape rice varieties and their dissemination. In this paper, we present how, next to ecological factors, socioeconomic factors, cultural norms, values, and narratives shape the use and development of local technologies related to the cultivation of African rice (Oryza glaberrima Steud.) in seven West African countries (Ghana, Guinea, Guinea Bissau, Senegal, Sierra Leone, The Gambia, and Togo). From 2000 to 2008, data were collected using questionnaires, interviews, focus group discussions, field observations, molecular analysis, and on-farm field trials. The findings show that a complex of cultural factors, in combination with ecological and genetic factors, maintained, reduced, or increased the cultivation of African rice. Along the Upper Guinea Coast, the role of African rice was somehow comparable across different ethnic groups, whereas its role was largely diverse in the Togo hills. Findings suggest that the role of African rice shapes the development of new promising farmer varieties as well as the adoption of new modern varieties. Findings ask for the recognition and validation of interactions between ecological, genetic, socioeconomic, and cultural factors within farmer innovations systems, including new emergent knowledge and technologies resulting from such interactions. We argue that to improve the adoption of modern technologies, we need to acknowledge that, in different regions, societal organizations differ and we therefore need to integrate socioeconomic and cultural factors into models of technology development and dissemination.