

General overview on nitrogen fixing trees  
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In order to better assure relevance and effectiveness in Research it is proposed that Research be evaluated within a cultural-ecological framework of analysis. Ecosystems and social systems are dynamically linked by flows of energy, material and information. Rigorous Historical analysis should be undertaken to assess the biological potential and changing character of environmental systems, social adaptations to these systems, and the impact of external influences upon these systems. Charcoal production in the Saharan Borderlands in connection with the trans-Saharan trade, Arab and Berber settlement on easily disturbed fossil dunes, the destructive exploitation of gum arabic, the loss of plant stimulation and seed dispersal as advanced firearms led to extensive wildlife losses, the proliferation of cattle in marginal areas during the colonial period, the direct and indirect impacts upon vegetation by expanding transportation networks, the transformation of Sahelian livelihood systems. Changing public domain law, and urbanization were cited as representative external agents of environmental change.

Much of modern science is devoted to the measurement and analysis of natural processes and phenomena; sahelian agrosylvo-pastoral systems were well adapted to natural processes and phenomena. Sahelian bush fallow and Acacia Albida. Based systems were employed to illustrate livelihood adaptations to sahelian environmental conditions. It was suggested that such systems serve as the basis for future efforts in strengthening Sahelian agricultural production. Similarly, it is proposed that Research on pre-colonial management systems incorporating substantial livestock populations, such as that conducted by ILCA on the HERIMA system of MACINA (Mali), be encouraged in relation to efforts to improve range productivity. The application of inappropriate western science to the transformation of sahelian systems of production has contributed to social disorientation, declining PER CAPITA production, and widespread environmental degradation. It is doubtful that the application of additional inappropriate western science will improve matters.

It is proposed that in order to avoid the errors of the past, research efforts take into account the effectiveness and economic soundness of their historical antecedents, as well as rigorously defined local needs, indigenous systems of knowledge, and social adaptations to specify environments. These efforts should be based on the complementarity of indigenous and western systems of

knowledge and management. Hence, species choice and associated research agendas should largely emerge from collaborative assessments of local needs and preferences.