

The role of forestry in farming systems with particular reference to forest-grazing interactions.

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Abstract

An analysis of global trends in the supply and demand livestock products has shown that without close integration of their production there will be an increased disparity between supply and demand. Various estimates of production levels which will be necessary in the wood, crop and livestock sectors to meet increasing demand have failed to appreciate that any increase in production in one sector is dependent on developments in the other sectors; these developments are themselves often unlikely to happen because of the very developments occurring in the first. An increase in the spatial and sequential integration of forestry, pasture and livestock husbandry has frequently been proposed to help improve sustainable production. From published information an analysis was made of the interactions of these components under varying conditions to try to identify the bio-physical situations in which integration is likely to be beneficial. The nature and magnitude of the interactions are highly variable and are specific in terms of diurnal and seasonal cycles, site, species, ecotypes and management regimes. However the interactions need to be understood before any observed responses can be explained. Consequently generalisations cannot be made about the conditions under which integrated systems result in improved overall production. Integrated systems which demonstrate increased or reduced production are described. Implications for interpreting research results are discussed since traditional research methodology of isolating parameters to test the response of organisms do not always take account of the influence on other parameters which may also have a bearing on the organisms' responses. Semi-arid W Rajasthan (India) in 1971-72 is taken as a case study of the actual and potential role of agro-silvopastoralism, and in particular the role of fodder trees is evaluated, using data from over 110 technical publications. Inadequate experimental methods, interpretation and unrepresentative conditions of the research in relation to the actual situation in the farming systems has necessitated a number of assumptions to be made. These were derived from a critical evaluation of local research backed by information from elsewhere. Claims that the planting of fodder trees in rangeland will increase livestock productivity and economic development are disputed. Trends in livestock numbers and herd composition, land use patterns and status of vegetation suggest that the degradation of the natural resource base can partly be attributed to higher livestock numbers supported by fodder trees. The increased density of browsers on common rangelands (0.20 Adult Cattle Unit/ha) has resulted in a browsing demand during the monsoon estimated to be higher than the production. Hence fodder trees are unlikely to get established. Nevertheless, their growth has been encouraged

on cropland where crop yields have apparently not been affected and measurable benefits can be seen. It is estimated that, in areas with 300-400 mm precipitation, fodder trees may produce 38 to 75% of the dry season forage from available croplands. A small/medium sized farm (c. 5 ha) may produce all the fuelwood needs (2.9 tonnes p.a.) of a household (6.3 people). Agro-silvopastoralism therefore appears primarily to benefit private land holders to the detriment of common land. In other parts of the world, successful and sustainable silvo-pastoral systems have developed on private holdings or common rangelands with effective control over livestock densities and grazing. It appears unlikely that such systems could develop in areas where such conditions do not prevail.

Reference:

Gupta, M.C., Gandhi, B.M. and Tandon, B.N. (1974a). An unconventional legume - *Prosopis cineraria*. Am. J. Clin. Nutr. 27, 1035-1038.