



Golden Jubilee CAZRI (1959-2009)

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# INTERNATIONAL CONFERENCE ON NURTURING ARID ZONES FOR PEOPLE AND THE ENVIRONMENT: ISSUES AND AGENDA FOR THE 21<sup>st</sup> CENTURY

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## Abstracts

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significantly less leafhopper population (0.50/3 leaves). Pod borer damage (0.63% was significantly lowest in GM-04-04 followed by GM-06-02 (1.31%. Maximum yield was obtained in GM-06-02 (928 kg ha<sup>-1</sup>).

## **CARBON SEQUESTRATION BY DIFFERENT LAND USE SYSTEMS IN THE ARID KACHCHH REGION OF GUJARAT**

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Global warming is amongst the most important problems of the new millennium. The fourth assessment of the Intergovernmental panel on climate change reiterated the warming of the global climate beyond doubt. Most of the observed increase in global average temperature is due to the increase in the concentration of anthropogenic green house gases. CO<sub>2</sub> is the most important green house gas and the strongest factor that causes the global warming is supposed to be carbon emission. Since 1750, atmospheric carbon dioxide has risen by 30 per cent, with a steep increase observed during the last 50 years. In India agriculture sector contributes 29 percent of total CO<sub>2</sub>-eq through enteric fermentation, paddy cultivation, manure management, burning of crop residues and application of fertilizer to the soils. Agriculture can also be a sink for CO<sub>2</sub> by sequestering carbon in soil to a large amount and also in the biomass of crop plants that contain perennial woody vegetation including monocultures such as coffee, coconut, fruit orchards and poly culture such as agro forestry systems. With the launch of the Clean Development Mechanism under Kyoto protocol carbon sequestration now appears to have potential as tradable good that can be used to pay off a bad emission of CO<sub>2</sub>. A sound knowledge of the carbon sequestration capacities both in soil and in the crop biomass (above and below ground) is a prerequisite for developing such CDM projects. Such information with respect to soil and biomass under different cropping system is lacking especially in the arid Gujarat. Therefore a study was carried out at Regional Research Station of Central Arid Zone Research Institute, Kukma-Bhuj with the objective of assessing the carbon sequestration by different land use system involving trees viz. *Prosopis juliflora*, *Acacia tortilis*, *Azadiracta indica*, and silvipastoral systems like *Acacia* + *Cenchrus ciliaris*, *Acacia* + *Cenchrus setigerus*, and neem + *Cenchrus ciliaris*. The above ground and below ground biomass was estimated by destructive methods. The carbon content in the different parts like stem, leaves, branches and roots were analysed by CHNO-rapid auto analyzer. The total biomass put in by *Prosopis juliflora* was 3.96 t ha<sup>-1</sup> with a carbon stock of 1.60 t ha<sup>-1</sup>. *Acacia* sequestered 5.1 t ha<sup>-1</sup> in its above ground biomass whereas in neem the above ground portions contributed to 2.92 t ha<sup>-1</sup>. The introduction of grasses like *Cenchrus ciliaris* and *Cenchrus setegerus* in *Acacia* plantation imparts a favourable addition of 15.2 to 27.2 per cent more total biomass compared to sole tree plantation and an additional sequestration of 14.1 to 25.7 per cent carbon in the ecosystem. In neem the additional carbon added to the system by the introduction of perennial grasses was 34.9 per cent compared to the sole plantation. It can be concluded that that proper combination of trees and pasture can enhance the sinks for green house gas in the agro ecosystem apart from other benefits like control of erosion, diversification of farm income, contribution to live stock feed stock.