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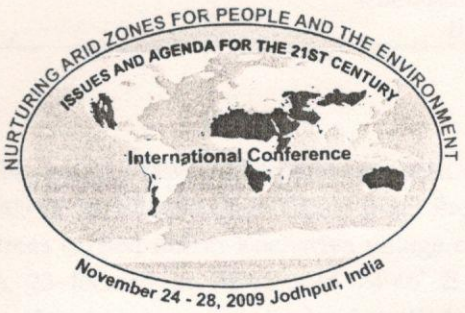

INTERNATIONAL CONFERENCE ON NURTURING ARID ZONES FOR PEOPLE AND THE ENVIRONMENT: ISSUES AND AGENDA FOR THE 21st CENTURY

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Abstracts

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This paper draws on experiences with several participatory research activities carried out during 2007 to 2009 in the context of an Operational Research Project of All India Coordinated Research Project for dryland areas carried out in Kochariya village of Bhilwara district of Rajasthan state situated in watershed NWDPRA 23 located at 74°41' and 74°46' E longitude and 25°12' and 25°17' latitude in India. The experimental soils belonged to order *Inceptisols* and *Entisols*. Soil texture varied from sandy clay loam to sandy with sub-angular texture. Soils are shallow to moderately deep. Soils were neutral to slightly alkaline in reaction (pH -7.15 to 8.18) and electric conductivity varied from 0.15 to 0.68 d Sm^{-1}. Available water holding capacity was low to medium. Soils of the area were low in available nitrogen, medium in available phosphorus and high in available potassium. The available water holding capacity of these soils varied from 90-120 mm. A trial was conducted with the three treatments viz. T_1-50 kg urea +40 kg DAP +1.5 t FYM ha^{-1} + local seed (Farmer's practice), T_2-50 kg N and 30 kg P_2O_5 ha^{-1}+5.0 t FYM ha^{-1} + Improved seed and T_3-15 kg N through compost + 10 kg N through inorganic fertilizer+ recommended dose of P_2O_5 ha^{-1} with maize crop. Another trial was conducted with the three treatments viz. 30 kg P_2O_5 through DAP, 30 kg P_2O_5 through PROM ha^{-1} and control at three locations in maize+ blackgram (2:2) intercropping system.

Results revealed that application of 15 kg N through compost + 10 kg N through chemical fertilizer+ recommended dose of P_2O_5 ha^{-1} gave higher maize grain yield of 2878 kg ha^{-1} which was at par with the application of recommended dose of fertilizer i.e. 50 kg N + 30 kg P_2O_5 ha^{-1} +5.0 t FYM ha^{-1} gave (2863 kg ha^{-1}). The percent increase in yield was 32.63 per cent higher due to application of 15 kg N through compost + 10 kg N through chemical fertilizer+ recommended dose of P_2O_5 ha^{-1} over farmer's practice. In another experiment, application of 30 kg P_2O_5 through PROM gave higher maize equivalent grain yield of 3332 kg ha^{-1} over 30 kg P_2O_5 through DAP (3134 kg ha^{-1}). The percent increase in yield due to application of 30 kg P_2O_5 through PROM was only 6.31 over 30 kg P_2O_5 through DAP and 29.90 per cent higher over control.

POTENTIAL OF GRASSES FOR CARBON SEQUESTRATION IN THE RANGE LANDS OF KACHCHH REGION OF GUJARAT

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Grass lands are one of the major ecosystems in arid north-west India especially in the Kachchh. The grass lands of Kachchh support over 1.5 million livestock which has a significant bearing on the livelihood security of the people in the area besides considerable contribution to the national economy. These grass lands are in a state of degradation despite significant contribution to the economy high biodiversity value. Vast grass lands located along the northern part of Kachchh, known as Banni, was once referred as Asia's largest and finest grass land that covered an area of 2525 km^2. These grass lands are in a state of degradation mainly due to over grazing, invasion of *Prosopis juliflora*, increase in soil salinity and climatic abnormalities. This necessitates immediate attention in view of the significance of grass lands ecosystem to serve as carbon sinks for mitigating global climate change. Better understanding and assessment of the total carbon stock is importance in predicting the biogeochemical processes in this region that can help in predicting and

recommending practical strategies to sequester carbon in soils and improving the soil productivity. This could be of utmost important in fragile ecosystems that face multiple pressures from different human interventions like over grazing, urbanization and indutrialisation. Sequestering carbon not only serves the purpose of mitigation of elevated atmospheric carbon dioxide that cause global warming, but also improve the soil quality and productivity. The present investigation was carried out to study the carbon accumulation by three species of grasses in the Kachchh region of Gujarat namely *Cenchrus ciliaris*, *Cenchrus setigerus* and *Lasiurus sindicus*. The highest total biomass was recorded by *Lasiurus sindicus* (12.7 t ha^{-1}) of which 62.2 per cent was contributed by the above ground parts. *Cenchrus ciliaris* and *Cenchrus setigerus* registered a total biomass of 10.96 t ha^{-1} and 4.53 t ha^{-1}, respectively. The average above ground biomass contribution by *Cenchrus ciliaris* was 6.26 t ha^{-1} and 2.78 t ha^{-1} in *Cenchrus setigerus*. The carbon content in the above ground biomass of these grasses followed the order *Lasiurus sindicus*> *Cenchrus ciliaris* > *Cenchrus setigerus*. The above ground contribution to total biomass carbon stock was 62.0 per cent in *Lasiurus sindicus*, 57.3 per cent in *Cenchrus ciliaris* and 59.4 per cent in *Cenchrus setigerus*. *Lasiurus sindicus* recorded an above ground biomass carbon stock of 3.2 t ha^{-1}, *Cenchrus ciliaris* 2.44 t ha^{-1} and *Cenchrus setigerus* 1.04 t ha^{-1}. On an average, *Cenchrus* spp. sequestered a total carbon of 3 t ha^{-1} in its biomass. The Banni grass lands which are in the state of degradation, if rejuvenated with *Cenchrus* spp.; a prominent grass species of the region, to 75 per cent, can contribute an estimated sequestration of 0.57 million tones of carbon.

RELATIVE CONTRIBUTION OF NATIVE P RECYCLING INDICATORS

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A regression equation was developed to understand the relative contribution of acid phosphatase, alkaline phosphatase, phytase and organic acids towards the total native P mobilization/recycling. Individual contribution was also recorded under different soil types (low, medium and higher soil organic matter as well as low available soil P conditions). In general, significant contribution towards P mobilization was observed in the order: acid phosphatase > phytase > organic acids > alkaline phosphatase. The results clearly showed that contribution from acid phosphatase was more as compared to the other agents if we look at the overall situation. But under low organic matter soil phytase was more efficient (β-weight, 0.4903). In medium organic matter soil more efficiency was observed from phytase (β weight; 0.5772) followed by acid phosphatase (β-weight; 0.3681). The P mobilization from high organic matter soil was mostly contributed by organic acids (β-weight; 0.2676) closely followed by alkaline phosphatase (β-weight; 0.1805).

The results clearly showed that in low organic matter soils, phytase and organic acids are the main contributors towards the P mobilization, while phosphatases are of insignificant contributions. In medium organic matter soil, main contribution was noticed from phytase and acid phosphatase, but alkaline phosphatase and organic acids seems to be insignificant contributors. In high organic matter soil, although the combined effect of all the parameters was significant but not a single agent was found to be significantly contributed towards P mobilization. However, organic acids were found to be most dominant component (β-