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# Vibrant rhizosphere for second green revolution

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**ABSTRACT :** The climate change is the most urgent challenge of the 21st century to produce more from the same land with limited resources. Currently farmers are struggling to obtain sustainable productivity in the face of increasing variability and growing competition for scarce water resource, fossil fuel and agrochemicals. Challenge of drought should be converted into opportunity by the researchers and policy makers. Use of drought tolerant crops/cultivars and water conservation practices will benefit farmers. Under such situations, cost effective and scientific innovations from public and private sources can be utilized to sustain productivity and thereby help shaping food security to feed country. Shroff Research Farm and Research Center has been adopted alternate farming practices for last two decades to reduce adverse effects of toxic plant exudates derived from GM crops and chemicals in belowground portion of plant living system. It has been adopted by two ways to revitalize rhizosphere (environment around roots) soil (i) use of protein hydrolysate and bioinoculants as a soil detoxicant (ii) by growing legumes as companion crops which host rhizobia and arbuscular mycorrhizal fungi as symbionts with monocots (cereal/millets/grasses) which hosts mycorrhizae and vice-versa. Such practice made rhizosphere vibrant and capable to reduce dependence on chemical fertilizers particularly nitrogen and phosphorus. These two interventions simulate Nature's process of self manuring, crop rotation, green manuring, green cover and sequestration of carbon in soil reduces polluting effect of excess carbon dioxide ($CO_2$) – a greenhouse gas. Enhancement in soil carbon stock up to 0.6 % had positive effect on soil quality, texture to conserve plant nutrients and moisture. These changes even served the purpose of cut in cost of production by 25% as well as made possible to enhance production-productivity of crops for sustainable socio-economic growth and environmental benefit. Farmers may be enthused to adopt 'Shroff Technique to make second green revolution successful to feed an evergrowing population'.

**Key Words:** Companion crops, multiple symbioses, protein hydrolysate, vibrant rhizosphere.