

# Low-cost Underground Trench Greenhouse in Cold Desert Ladakh, India

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**Abstract**—Trench is a low cost underground greenhouse preferably size (30' length  $\times$  10' width  $\times$  3' depth). The structure is very simple does not require much skill and technique for construction. It has been designed in such a way that it traps maximum solar radiation to maintain high temperature which is especially suitable for cold-arid regions. It is covered with UV stabilized 200 micron thick transparent polythene during daytime to harvest maximum solar energy and extra cover of black polythene at night time to check the heat loss during winter months. It maintain average maximum 16-17°C and minimum 5-6°C temperature difference in winter than open condition. Three cycles of crops were grown in a year in the greenhouse as against single crop in open field condition. Spinach production was 60-70 kg during mid October to early March. Vegetable seedlings were raised during late March to early May, which is not possible in open field condition. A variety of warm-season vegetables were grown at summer months during mid May to early October. Trench greenhouse was found very successful for vegetable production all year round in Ladakh.