**Land Suitability Assessment for Hemp (*Cannabis sativa* L.) Cultivation in Sri Lanka**

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*Cannabis sativa L*., also known as hemp, is a versatile industrial crop. Despite being the most widespread illegal narcotic crop in the world, it has great potential as an economic crop. In Sri Lanka, hemp production is currently illegal and discussions are taking place to ease the restrictions on hemp legality by granting authorization to export-oriented cultivation to address the current crisis. In this study, suitability assessment (climate and soil), crop modelling, carbon footprint, and economic analysis including net present value (NPV), net present value benefit (NPVB), and benefit-cost ratio (BCR) were assessed. The yield and water productivity simulations were done using the calibrated and validated AquaCrop model. According to the land suitability evaluation, more than 70% of Sri Lanka is categorized as “highly suitable” in terms of overall climate and soil suitability. The simulated average potential seed and fiber yield at ten locations between 1990 and 2019 was 1.423 ± 0.2434 t ha-1 and 2.412 ± 0.3792 t ha-1 respectively. The highest and lowest water productivity for seed production was reported as 0.38 kg m-3 and0.28 kg m-3 respectively, and for fiber production, it was 0.25 kg m-3 and 0.17 kg m-3. Using five general circulation models (GCMs) simulations, yields under future climates in Sri Lanka demonstrated an increment in most of the locations. The highest NPVB for seed and fiber under baseline climate conditions was reported as 13,875 USD ha-1 (BCR of 2.83) and 5,627 USD ha-1 (BCR of 1.65) respectively. Under future climatic conditions for both seed and fiber production, the average NPVB values are positive for all locations. According to the results, hemp cultivation is economically feasible in Sri Lanka. The findings of the study would help in understanding the potential of hemp cultivation in Sri Lanka and its economic sustainability.

**Keywords***: AquaCrop, carbon footprint, land suitability assessment, water productivity*