AGRICO
THE INTERNATIONAL CONFERENCE ON AGRICULTURE

19TH TO 20TH AUGUST 2021

The 8th International Conference on AGRICULTURE 2021

VIRTUAL CONFERENCE

"FUTURE OF AGRICULTURE AND ORGANIC AGRICULTURE TOWARDS GREEN ECONOMY"

BOOK OF ABSTRACTS

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BIOFILM AMELIORATORS CAN BRING A PARADIGM CHANGE TO AGRICULTURE AND THE ENVIRONMENT

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ABSTRACT

Excessive use of chemical fertilizers (CF) and greenhouse gas emissions have led to stagnating crop yields and climate changes, respectively. Finding ways to secure foods for increasing population in eco-friendly manner is the need of the hour. Microbial biofilm ameliorators like Biofilm biofertilizers (BFBF) have shown the potential of achieving food security and environmental protection. Present study investigated the effects of BFBF on crop production and soil carbon sequestration (SCS) in large scale rice cultivation in Sri Lanka. Here, the BFBF practice and farmers' current CF alone (FC) practice were compared in 25 different locations in major paddy growing districts during three consecutive seasons. The BFBF application increased crop yields by ca. 20%, while cutting down CF up to ca. 50%. If we could expand the BFBF practice to entire paddy cultivation (i.e. 1 Mha year^{-1}) that would bring a paradigm change to agriculture and the environment. This is because microbial effects exerted from the BFBF to the soil largely contribute to increased microbial diversity, soil carbon accumulation and improved nutrient use efficiency. The comparison of costs to the government showed that the BFBF practice is cheaper by Rs. 9,800 ha^{-1} than the FC practice. Thus, the increased yield would increase farmer's income over Rs. 50,000 ha^{-1} season-^{1}. In addition, SCS in the BFBF practice would add another Rs. 1 billion to the country's economy through carbon trading, and the overall contribution of the BFBF practice would be about Rs. 10 billion annually. Environmental benefits like locking toxic compounds and heavy metals in the soil organic matter and reduced N_2O emissions would also contribute immensely to lower soil and human health costs and to mitigate climate change, respectively.

Keywords: biofilm biofertilizer, carbon trading, climate change, paddy cultivation, rice yield