Watermelon, Brinjal, Tomato and Sweet Gourd Cultivation through Solar Powered Low Discharge Pump & Drip Irrigation Technology

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KEY FINDINGS

- Solar powered drip irrigation systems were proved to be a viable and environmental friendly alternative to promoting and enhancing crop production to achieve food security in saline prone coastal regions of Bangladesh.
- Use of solar power minimized the pumping cost in drip irrigation systems.
- Significant yield increase was observed with solar powered drip irrigation system over conventional irrigation systems (farmer's practice) for watermelon, brinjal, tomato and sweet gourd cultivation in the study areas in both 2019-2020 and 2020-2021 growing seasons.
- The farmers were benefited and interested in using this promising water saving irrigation technology.

BACKGROUND

- Bangladesh is an agro-based country where agriculture has enormous contribution to the national economy.
- Salinity and drought are the major environmental stresses in Bangladesh.
- The nature and extent of these stresses vary with season, topography and location.
- To minimize water application losses and increase water use efficiencies (WUE) in the saline region of Bangladesh, modern solar powered drip irrigation technology need to be introduced in these areas.
- IWM Division, BARI developed solar powered drip irrigation system could have been a promising solution for cultivating high value crops in these areas.
- Drip irrigation can increase yield of watermelon, brinjal, tomato and sweet gourd and WUE by 10-19% and 16-23%, respectively as compared to furrow irrigation with a considerable amount of fertilizer (40%) and water saving (48%).
- This method can be demonstrated intensively in saline prone areas where freshwater availability is very scarce for irrigation.

AIM

- To minimize water application losses and increase water use efficiencies (WUE) in the saline prone areas of Bangladesh.
- To increase the crop-water productivity and reduce irrigation water use in saline areas of Bangladesh.

METHODOLOGY

- Demonstrations of solar powered drip irrigation technologies for watermelon, brinjal, tomato and sweet gourd production were executed at three upazillas under three districts of the southern Bangladesh.
- Patuakhali district, 3 trials on drip irrigation were carried out in the rabi seasons of 2019-20, 2020-21, 2021-22, and 2022-23.
- In Borguna district, there were one drip irrigation trial for both 2019-20 and 2020-21 growing seasons. Besides, two drip irrigation trials were conducted in khulna district in 2019-20.
- In Bhola district, 3 solar powered drip irrigation trials were conducted during 2020-21 and 2021-22 growing seasons.
- One solar powered drip irrigation trial was conducted in Noakhali district.
- 30 farmers of the Kaliganj upazilla, Satkhira district were supplied with 6 solar powered irrigation pumps to facilitate irrigation in the Gher boundaries.
- The fertilizers were applied as per BARI recommendations.
- IWM Division, BARI developed solar powered drip irrigation system was used because of the lower installation cost when compared to that of low lift pumps (LLPs).
- Apart from irrigation use, farmers can use this portable solar panel for lighting and charging their home appliances.

The specification and cost of solar-powered drip irrigation system are given below:

Item	Specification	Unit Price (Tk.)	Total Cost (Tk.)
Solar Panel	300 watts	32 / watt	9600
Pump	180 watts	4500	4500
Accessories	-	-	500
		Total-	14600

MAJOR ACHIEVEMENTS

Technology 1:
Solar powered low discharge irrigation pumps control pond bank erosion, make use of low quality pond water to meet crop water requirements and enhance year-round vegetable production in the fish Ghers of Kaligang, Satkhira of Bangladesh.

Technology 2:
Watermelon cultivation has been facilitated using solar powered drip irrigation system as an environmental friendly alternative to enhancing crop production in the water scarce and salt affected coastal regions of Bangladesh.

CONCLUSIONS

The solar powered drip irrigation technique:

- Provides environmental friendly solutions to irrigating crops.
- Ensures increased yield of high value crops.
- Reduces top soil erosion.
- Minimizes the irrigation input costs.
- Increases livelihood of poor farmers.

RECOMMENDATIONS

As major parts of the southern districts of Bangladesh are suffering from shortage of water during the Rabi season to grow winter crops, these promising irrigation technologies need to be disseminated to other areas outside the project locations.

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