Future of Agriculture - AgroVoltaic Farming

Crop Cultivation + Power Generation

Jain™ Solar Pump

AgroVoltaic Precision Farming

Agricultural pumps have more than 70% share among total water pump market. A solar pump is most suitable solution over conventional electrical and diesel agriculture pumps. In some cases, for installation of solar agri pump, there is limited space available for installation of solar modules in field with shadow free area. In such case, importance shall be given to both agriculture as well as energy generation. Jain has innovated AgroVoltaic concept for crop cultivation + generation of solar power within limited space using special structure. JISL, being expert in agriculture, irrigation, water management and solar pumping, provides solution for customised sustainable AgroVoltaic farming.

Features

- Optimal use of natural resources such as Land, Water & Sunlight
- Precision Farming Technology Integrated with Renewable Energy
- Architecture of Solar panel & Crop Geometry ensures optimum conditions for crop growth
- A holistic approach to farming: Jain TC Plants, Superior Seeds, Solar Energy, Drip Irrigation, Mulching, Fertigation, Automation & Hi-Tech Horticulture Practices
- Sub-surface drip, Sub-soil drainage, mulching & PV Panel as roof results in 99% water use efficiency
- Lower methane emission due to Drip Irrigated Rice
- Zero Green House Gas emission, reduces Global Warming effect and protects Ozone layer

Banana cultivation + Solar Power generation

Rice cultivation + Solar Power generation

Crop - BANANA	Yield[1,2] (Ton/acre)	Water use[1,2] (Million Lit/acre)	Energy Use[1,2] (Units/ acre)	Energy Produced in AgroVoltaic Farm (Unit/acre)	Water Footprint (Liter/kg)	Carbon Footprint (gm CO_2/kg)
Conventional Farming	14.36	7.12	2136	0	496	132
AgroVoltaic Precision Farming	34.5	3.93	1179	+264431	114	(7634)
Difference %	140%	45%	81%	100%	335%	5866%

Ref: 1) A. Narayanmoorthy (2004) - http://www.iwmi.cgiar.org/EWMA/files/papers/Drip-energy-AN-paper%20%282%29.pdf
2) Vaibhav Malunjkar, Santosh K Deshmukh and V. Balkrishnan (2013) Energy Efficiency of Micro Irrigation: Case study of Banana Crop. Lambert Academic Press Publishing ISBN: 978-3-659-45484-4 (M Tech Thesis approved by University of Agricultural Sciences, Raichur).

Crop - RICE	Yield1 (Tonn/ acre)	Water use[1] (Million Lit/acre)	Energy Use[1] (Units/ acre)	Energy Produced in AgroVoltaic Farm (Unit/acre)	Methane[2,3] Emission (kg flux/ acer)	Water Footprint (Liter/Kg)	Carbon Footprint (gm CO_2/ kg)
Conventional Farming	3.1	9.5	467	0	87.5	3065	783
AgroVoltaic Precision Farming	3.8	3.2	226	+53420	9	842	(13950)
Difference %	22.5%	66.3%	52%	100%	90%	263.9%	1881%

1) P. Soman (2012) Drip Irrigation and Fertigation Technology for Rice Cultivation Session 6b: Tools,Techniques, Innovations, Conference on Agriculture, ADB Manila (2012).
2) T K Adhya et.al (1994) Methane emission from flooded rice fields under irrigated conditions, Bio Ferti Soils 18: 245-248, Methane flux : 4-26 mg/h/m², in anerobic rice conditions. Here for reference the flux of 10 mg /h/m² was considered for calcuation in black cotton soils in Jalgoan.
3) T. Parthasarathi et al., (2012), Aerobic rice-mitigating water stress for the future climate change Subsurface drip irrgated aerobic rice reduces methane emission by 80-85%. Hence, we have considered 80% emission in this calculations.

Sustainable Agriculture -Ideal model to achieve Water + Food + Energy Security