

Chemical free and solar driven electro-chlorination for remote villages – pilot test in Julo, Uttarakhand

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Introduction

In the village of Julo (Uttarakhand, north India), a small scale solar driven electro-chlorination unit was installed in September 2016. The highlight of the system is the electrolytic and chemical-free production of disinfectant for the supply of safe drinking water in rural areas. The unit receives filtrate from a well installed in the riverbed or a “Koop” well (Figs. 1 & 2). The pilot plant runs entirely on solar energy, is maintenance free and operational parameters are received online (Figs. 3 to 7, Table 1).



Figure 1: River Bed for Koop Well filtration nearby Julo Village



Figure 2: Photo and principle of Koop well

Table 1: Source water conditions of RBF Filtrate

Parameter	Koop Well
EC[μS/cm]	332
pH	7.6
Chloride [mg/L]	2.7 (NaCl dosing required)
Iron [mg/L]	0.06
Manganese [mg/L]	< 0.002
Phosphate [mg/L] (PO ₄ -P)	--
Total Hardness (calc.) [°dH]	6.0
Arsenic [μg/L]	1.1
Calcium [mg/L]	31.7
Nitrate NO ₃ -N [mg/L]	0.2



Figure 3: Pilot disinfection plant



Figure 4: Project-team and house containing pilot plant (background) with roof-top solar panel

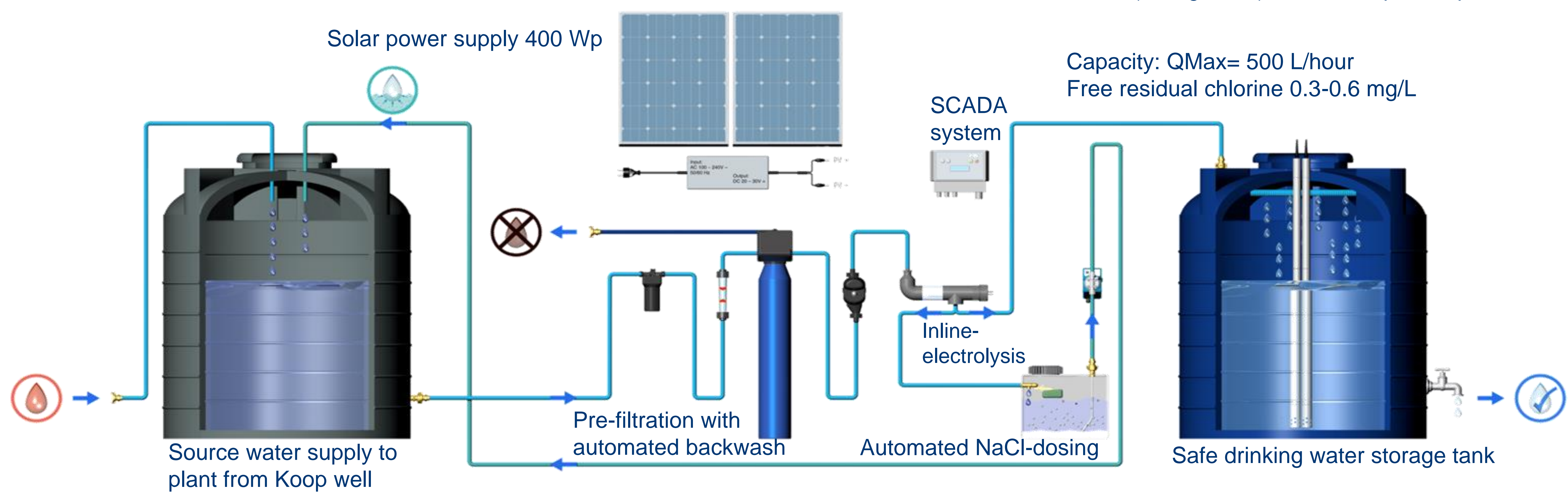


Figure 5: Pilot plant setting for filtration and disinfection installed in Julo (Source: AUTARCON)

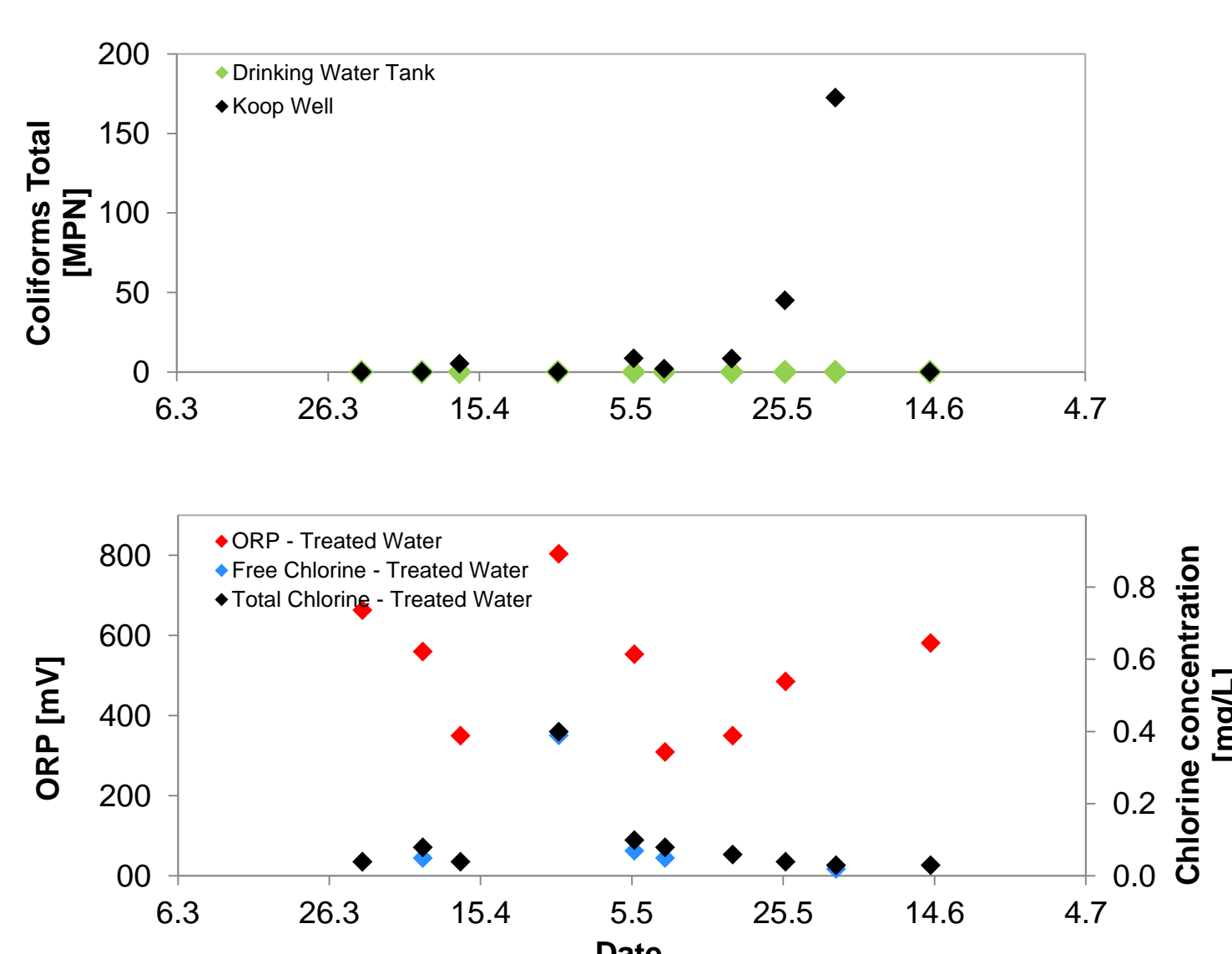


Figure 7: Pathogens in source and treated water

Intermediary results

- Online monitoring provides assurance of off-grid disinfection
- Coliform free water supplied
- Minimal maintenance required during start-up phase of pilot plant
- Chlorine production needs to be improved to assure constant concentrations



Figures 6: Control panel and link to online monitoring